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# Undergraduate Catalog 1990-1992

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USU Undergraduate Catalog  
1990-1992



*Utah State University*  
*Bulletin*  
*1990-1992*  
*Catalog*

### **Catalog Information**

Catalog information and University requirements may change at any time. USU is not bound by requirements or regulations listed in this catalog. Information may change before a new catalog is issued, and students must adhere to changes. It is the student's obligation to ascertain current rules, regulations, fees, and requirements.

### **Course Descriptions**

Course descriptions in this catalog are an overview and generally reflect what will be taught, but students should not rely on them as a guarantee of what they will be taught in a given quarter.

### **Waiver of Risk**

Some classes within the University involve some risk and some may also involve travel. The University provides these classes on a voluntary basis, and students ought not participate in them if they do not care to assume the risks. Students ought to inquire as to possible risks a class or major may generate, and if they are not willing to assume the risks, they should not select that class or major. By voluntarily participating in these types of activities, the student agrees not to hold USU or its staff liable.

### **Equal Opportunity/Affirmative Action**

Utah State University is committed to providing equal educational and employment opportunity regardless of race, sex, color, religion, national origin, marital or parental status, physical or mental handicap, or age. Equal opportunity applies to all aspects of employment: recruiting, hiring, training, benefits, and salary. Equal educational opportunities include admission, access to course offerings, financial assistance, housing, and extracurricular activities.

### **Privacy Rights**

In compliance with the Family Educational Rights and Privacy Act of 1974, Utah State University has developed policy guidelines which (1) provide that eligible students will have access to inspect and review their educational records, and (2) protect the rights of a student to privacy by limiting access to the educational record without express written consent.

UTAH STATE UNIVERSITY BULLETIN  
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# Calendar

## 1990-91

### 1990 Fall Quarter

September 24,25 New student orientation  
 September 26 Classes begin  
 November 21,22,23 Thanksgiving break  
 Nov. 29,30, Dec. 3,4,5 No-test days  
 December 5 Last day of classes  
 December 6 Interim day\*  
 December 7,10,11,12 Final examinations

### 1991 Winter Quarter

January 3 Classes begin  
 January 21 Holiday (Human Rights Day)  
 March 6,7,8,11,12 No-test days  
 March 12 Last day of classes  
 March 13 Interim Day\*  
 March 14,15,18,19 Final examinations

### 1991 Spring Quarter

March 26 Classes begin  
 May 24,28,29,30,31 No-test days  
 May 27 Holiday (Memorial Day)  
 May 31 Last day of classes  
 June 3,4,5,6 Final examinations  
 June 7,8 Graduation

### 1991 Summer Quarter

June 10-21 Presession  
 June 24 Classes begin  
 July 4 Holiday (Independence Day)  
 July 24 Holiday (Pioneer Day)  
 August 16 Quarter ends  
 August 19-23 Postsession

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\*No classes or tests on this day

## 1991-92

### 1991 Fall Quarter

Sept. 30, Oct. 1 New student orientation  
 October 2 Classes begin  
 November 27,28,29 Thanksgiving break  
 December 9,10,11,12,13 No-test days  
 December 13 Last day of classes  
 December 16,17,18,19 Final examinations

### 1992 Winter Quarter

January 6 Classes begin  
 January 20 Holiday (Human Rights Day)  
 March 9,10,11,12,13 No-test days  
 March 13 Last day of classes  
 March 16,17,18,19 Final examinations

### 1992 Spring Quarter

March 30 Classes begin  
 May 25 Holiday (Memorial Day)  
 June 1,2,3,4,5 No-test days  
 June 5 Last day of classes  
 June 8,9,10,11 Final examinations  
 June 12,13 Graduation

### 1992 Summer Quarter

June 15-19 Presession  
 June 22 Classes begin  
 July 3 Holiday (Independence Day)  
 July 24 Holiday (Pioneer Day)  
 August 14 Quarter ends  
 August 17-21 Postsession

---

\*No classes or tests on this day



# *Utah State University*

The academic advantages of a large university together with the friendliness of a small college are offered at Utah State University. With a student body of more than 14,000, USU recognizes that the needs of the individual are of major importance, and many programs have been established to give the student the optimum of individual attention.

With 45 departments in eight academic colleges, a School of Graduate Studies, University Extension, and several research programs, Utah State University offers an excellent opportunity for students to study a wide range of subjects.

USU was founded in 1888 as part of the public educational system of Utah and operates under the constitution and laws of the state. It belongs to the family of institutions known as land grant universities, which had their origin in 1862. The institution was originally called the Agricultural College of Utah, later becoming Utah State Agricultural College. The state legislature designated the name change to Utah State University in 1957.

A seventeen-member State Board of Regents governs the Utah state system of higher education. This board has the responsibility for state-wide master planning for higher education, assignment of roles

to the several institutions in the state system, and control of operating and capital budgets for the institutions. USU has a ten-member Institutional Council which is responsible for implementing the assigned roles, including the appointment of personnel and the enactment of rules and governing regulations.

USU is accredited by the Northwest Association of Secondary and Higher Schools and is listed by other accrediting agencies including the following: American Assembly of Collegiate Schools of Business, National Council for the Accreditation of Teacher Education, Engineering Council for Professional Development, Council of Professional Development of American Home Economics Association, Society of American Foresters, Society of Range Management, National Association of Schools of Music, American Chemical Society, American Speech-Language-Hearing Association—Educational Training Branch, American Society of Landscape Architects, National League of Nursing Accrediting Service, American Psychological Association, Council on Social Work Education, and Utah State Board of Vocational Education. It is a member of the National Association of State Universities and Land Grant Colleges and is on the accepted list of the Association of American Universities and of the American Association of University Women.

# Degrees Offered at Utah State University

## College of Agriculture

### Agricultural Education

Agricultural Education—BS, MS  
Agricultural Machinery Technology—One-year  
Certificate, AAS

### Animal, Dairy and Veterinary Sciences

Animal Science—BS, MS, PhD  
Dairy Science—BS, MS  
Bioveterinary Science—BS, MS  
VoTech Dairy Herdsman—One-year Certificate

### Economics

Agricultural Economics—BS, MS  
Agribusiness—BS  
Agricultural Industries—MAI  
Economics—PhD

### Nutrition and Food Sciences

Nutrition and Food Sciences—BS, MS, PhD

### Plants, Soils, and Biometeorology

Plant and Soil Science—BS  
Agronomy—BS  
Horticulture—BS  
Plant Science—MS, PhD  
Soil Science—MS, PhD  
Biometeorology—MS, PhD  
Ecology (Plant or Physical)—MS, PhD  
Applied Ornamental Horticulture—One-year Certificate,  
Two-year Diploma, AAS

### Interdepartmental Programs

Toxicology—MS, PhD  
International Agriculture—BS

## College of Business

### Accountancy, School of

Accounting—BS, BA, MAcc

### Business Administration

Business Administration—BS, BA  
Finance—BS, BA  
Marketing—BS, BA  
Production Management—BS, BA  
Master of Business Administration—MBA

### Business Information Systems and Education

Business Education—BS, BA  
Business Information Systems—BS, BA  
Business Information Systems and Education—MS, MEd  
Secretarial/Administrative Support—AAS  
Marketing Education—BS, BA  
Interdepartmental Doctorate of Education Program—EdD

### Economics

Economics—BS, BA, MS, MA, PhD  
Master of Social Science—MSS

## Management and Human Resources

Personnel/Human Resource Management—BS, BA  
Management—BS, BA

## College of Education

### Communicative Disorders

Communicative Disorders—BS, MS, MA, MEd, EdS

### Elementary Education

Elementary Education—BS, BA, MS, MA, MEd  
Early Childhood Education—BS, BA

### Health, Physical Education and Recreation

Health Education—BS  
Physical Education—BS  
Health, Physical Education and Recreation—MS, MEd  
Dance—BS  
Parks and Recreation—BS

### Instructional Technology

Instructional Technology—MEd, MS, EdS

### Psychology

Psychology—BS, BA, MS, MA, PhD

### Secondary Education

Secondary Education—BS, BA, MS, MA, MEd

### Special Education

Special Education—BS, MS, MEd, EdS, PhD

### Interdepartmental Doctorate of Education Program

Doctorate of Education—EdD  
Business Information Systems and Education  
Curriculum and Instruction  
Instructional Technology  
Occupational and Adult Education  
Research and Evaluation

## College of Engineering

### Agricultural and Irrigation Engineering

Agricultural and Irrigation Engineering—BS, IE, ME,  
MS, PhD  
Irrigation Science—MS

### Civil and Environmental Engineering

Civil and Environmental Engineering—CE, MS, ME, PhD  
Civil Engineering—BS

### Electrical Engineering

Electrical Engineering—BS, MS, ME, MES, PhD

### Industrial Technology and Education

Industrial Teacher Education—BS  
Industrial Education—MS, MIE  
Drafting—AAS  
Aeronautics—AAS



Industrial Technology (Electronics/Computer)—BS  
 Industrial Technology (Aerospace)—BS  
 Industrial Technology (Flight)—BS

**Mechanical and Aerospace Engineering**

Mechanical Engineering—BS, MS, ME, PhD

**Interdisciplinary Engineering Program**

Engineering—MS, ME, MES, PhD

**College of Family Life**

**Family and Human Development**

Family and Human Development—BS, BA, MS, PhD  
 Early Childhood Education—BS, BA

**General Family Life**

General Family Life—BS, BA

**Home Economics and Consumer Education**

Fashion Merchandising—BS, BA  
 Home Economics Education—BS, BA  
 Interior Design—BS, BA  
 Home Economics and Consumer Education—MS

**Nutrition and Food Sciences**

Nutrition and Food Sciences—BS, MS, PhD

**College of Humanities, Arts and Social Sciences**

**Art**

Art—BA, BS, BFA, MA, MFA

**Communication**

Journalism—BS, BA  
 Speech—BS, BA  
 Communication—MS, MA

**English**

English—BS, BA, MS, MA  
 American Studies—BS, BA, MS, MA

**History**

History—BS, BA, MS, MA  
 Master of Social Science—MSS

**Landscape Architecture and Environmental Planning**

Landscape Architecture—BLA, MLA  
 Town and Regional Planning—MS

**Languages and Philosophy**

French—BA  
 German—BA  
 Spanish—BA  
 Philosophy—BS, BA

**Music**

Music—BA, BM  
 Music Therapy—BS, BA

**Political Science**

Political Science—BS, BA, MS, MA  
 Prelaw—BS, BA  
 Master of Social Science—MSS

**Sociology, Social Work and Anthropology**

Sociology—BS, BA, MS, MA, PhD  
 Master of Social Science—MSS  
 Social Work—BS, BA

**Theatre Arts**

Theatre Arts—BA, BFA, MA, MFA

**Interdisciplinary HASS and Science Program**

Liberal Arts and Sciences—BA

**College of Natural Resources**

**Fisheries and Wildlife**

Fisheries and Wildlife—BS, MS, PhD  
 Ecology (Wildlife)—MS, PhD  
 Ecology (Aquatic)—MS, PhD

**Forest Resources**

Forestry—BS, MS, PhD  
 Forest Management—MF  
 Ecology (Forest)—MS, PhD  
 Recreation Resources Management—BS, MS, PhD

**Geography and Earth Resources**

Geography—BS, BA

**Range Science**

Range Science—BS, MS, PhD  
 Ecology (Range)—MS, PhD

**Interdisciplinary Natural Resources Programs**

Watershed Science—BS, MS, PhD  
 Environmental Studies—BS

**College of Science**

**Biology**

Applied Biology—BS  
 Medical Technology—BS  
 Public Health—BS  
 Premedical Biology—BS  
 Predental Biology—BS  
 Biology—BS, BA, MS, PhD  
 Ecology (Biology)—MS, PhD

**Chemistry and Biochemistry**

Chemistry—BS, BA, MS, PhD  
 Biochemistry—MS, PhD

**Computer Science**

Computer Science—BS, BA, MS

**Geology**

Geology—BS, BA, MS  
 Ecology (Geology)—MS

**Mathematics and Statistics**

Mathematics—BS, BA, MS, MMath  
 Mathematics Education—BS, BA  
 Mathematical Sciences—PhD  
 Statistics—BS, BA, MS

**Physics**

Physics—BS, BA, MS, PhD

**Interdepartmental Program**

Toxicology—MS, PhD

**Interdisciplinary HASS and Science Program**

Liberal Arts and Sciences—BA

# Entering Utah State University

## Admissions and Records

**Assistant Vice President for Student Services:** Lynn J. Poulsen

**Director of Admissions:** J. Rodney Clark

**Registrar:** Charles L. Olson

**Assistant Registrar:** Elizabeth W. Thom

Offices in Taggart Student Center 246

The Office of Admissions and Records performs the following academic services:

1. *Admission of Students:* interviews prospective students, evaluates credentials; processes records.
2. *Registration:* conducts registration and facilitates drop/add, audit, Pass/D+, D, F adjustments, and issues verifications. See University Class Schedule for registration procedures.
3. *Records:* maintains academic records, processes transcripts and all grade adjustments, facilitates advisers, major and name changes.
4. *Scheduling:* builds and publishes University Class Schedule, assigns courses to classrooms, maintains curriculum file of approved courses.
5. *Microfilm and I.D.:* maintains microfilm records; prepares reports for local, state, and national agencies; issues student and faculty/staff I.D. cards.
6. *Undergraduate Graduation:* processes applications, verifies completion of University requirements, orders and distributes diplomas, posts degrees to transcripts, maintains graduation records.
7. *Residency:* counsels students on Utah residency laws, processes and evaluates residency applications, advises applicants of their status.
8. *Veterans Affairs:* certifies, reports, and advises U.S. veterans and qualified dependents relative to training and educational benefits.

## Admission Requirements

Admission to the University is dependent on demonstrated competencies determined by a formula based on scores received on the American College Test (ACT) and high school grades earned in the same subject areas.

In addition, some departments may of necessity be required to limit enrollments. See the applicable departmental or college section in this catalog or contact the department or college directly for specific admissions information. It is the responsibility of the student to be informed of rules and regulations concerning admission as they apply to his or her acceptance into a program of study.

Students are encouraged to take high school courses that will prepare them for success at Utah State University. To be admitted in good standing a student must have a predicted college grade point average of C (2.0) or higher. Predicted GPA's are based on high school grades and ACT scores. Those who do not meet these performance standards will be considered for admission to General Registration rather than their chosen major until they have taken requisite remedial work.

A student is admitted to the University on the basis of an official application (which includes transcripts of credit from each school previously attended), a \$25 nonrefundable application fee, and ACT scores when applicable. A student entering for the first time may be admitted by the above procedure or by requesting that the ACT Corporation send his or her scores to USU. (See Freshman Admission.)

**Application for admission and credentials from schools previously attended should be received not later than one month before the beginning of a quarter.**

## Freshman Admission

A student entering college for the first time may apply for admission in one of two ways: (1) By requesting that the ACT Corporation send his or her scores to USU or (2) by completing an application for admission. Since the ACT is required for admission, the most convenient way to apply is to request that the ACT record be sent to USU. The procedure is as follows:

1. A student takes the ACT, preferably late in the junior year or early in the senior year of high school, and requests that the scores be sent to USU.
2. Upon receipt of the ACT scores, the record is examined and an admission decision is made according to the following criteria:

(a) Graduates of Utah high schools are admitted to an academic college if their predicted college grade point average (GPA) is satisfactory. Students with a predicted GPA below the minimum will be considered for admission to General Registration if it is determined that they have a reasonable chance for success at the University.

(b) Non-Utah high school graduates whose predicted GPA is less than satisfactory will be required to submit the regular application for admission, which includes a \$25 application fee and a high school transcript.

When the admission decision is made, an admission verification form will be sent to the student.

3. When the student receives the verification form, he or she will verify the intent to register by returning the verification form and a \$25 application fee. This fee is nonrefundable and should be submitted by personal check or money order. The student will have completed the admission process when the University has received an application or verification form, a \$25 fee, and ACT scores. **The application process must be completed at least thirty days prior to the start of the quarter for which admission is desired.**

**Testing.** All freshmen, including transfer students with less than 45 quarter hours of credit, must present the results of the American College Test (ACT) as part of their application for admission to the University. **The test scores must be sent directly to the University from The American College Test, P.O. Box 451, Iowa City, Iowa 52240.**



Utah State University accepts students who satisfy the admission standards, without regard to race, color, creed, sex, or national origin.

**Early Admission.** A high school student who has completed his or her junior year and maintained a superior scholastic record may be granted special consideration for admission. An applicant must satisfy the following requirements.

1. Submit an official application, ACT scores, and a high school transcript.
2. Submit letters of approval and recommendation from:
  - (a) Superintendent or principal
  - (b) Parent or guardian
3. Admission is not automatic, and will be determined by the admissions committee.

**Nontraditional Admission.** An applicant who is not a high school graduate may be considered for admission by presenting satisfactory evidence of ability to do university work. This evidence may be demonstrated by scores on the General Education Development Test (GED). Admission will not be offered unless a student has a high school diploma or a satisfactory GED Test score. (Students in this category include those whose high school class has graduated and those over the age of 18.)

**General Registration.** Students who do not qualify for enrollment into one of the academic colleges may be considered for enrollment in General Registration. These students include Utah residents who have graduated from high school with less than a satisfactory predicted GPA, non-Utah residents who have graduated from high school with less than a satisfactory predicted GPA, transfer students from other institutions of higher learning with less than a 2.2 GPA, and former USU students seeking readmission with less than a 2.0 GPA.

When a student has demonstrated ability to maintain a 2.0 GPA, that student may apply for admission to an academic college and department through the Director of General Registration. Regular college admissions evaluation procedures will then be made, and if there are no admissions restrictions, the student will be admitted to the department of his or her choice.

**Advanced Placement.** Students who present Advanced Placement examination scores of 3, 4, or 5 may receive 12 University credits for each Advanced Placement examination.

**Credit by Special Examination.** Students may challenge a course for credit by taking a special departmental examination which surveys knowledge of course content. Students who perform successfully on a challenge exam can receive credit for the course.

University credit is awarded for examinations in subjects the student has not taken. To determine which courses are available for challenge, a student should consult the appropriate academic department.

Credits earned by challenge exam cannot be used toward a graduate degree nor used to meet the resident requirement for graduation.

Application forms for permission to take special examinations are available in the Records Office, SC 246.

**CLEP General Exams.** Up to 46 credits may be acquired through the College Level Examination Placement (CLEP) general examinations. These credits may be used to fill general education re-

quirements, but are not designed to meet specific course requirements.

**CLEP Subject Exams.** Many of the CLEP subject examinations are also accepted as equivalent to specific courses. For a complete list of examinations accepted and scores necessary to receive credit, inquire at the Testing Office, SC 304, 750-1004.

**Credit for Military Service.** The University may grant credit to students currently enrolled at the University who have served in the armed forces. Applications for credit are made by submitting the DD214 form to the Office of Admissions.

**Veterans Educational Benefits.** Veterans or qualified dependents of disabled or deceased veterans who may be eligible for Veterans Educational Benefits should contact the Office of Veterans Affairs, or telephone 750-1102 for information concerning their educational benefits. Veterans or eligible dependents must make application for admission and be matriculated in a degree program.

**Transfer Student Admission.** Transcripts of credit must accompany applications for admission when submitted by students who have attended other collegiate institutions. Transcripts submitted for admission become the property of the University and are not returned. *Transcripts from all institutions previously attended are required.*

At its discretion, the University may accept transfer credit from accredited and nonaccredited institutions and miscellaneous sources. These may include:

- (1) accredited institutions, (2) foreign universities, (3) U.S. military credit for approved job and educational experiences, (4) credit by examination, (5) miscellaneous sources: internships, nontraditional learning experiences.

The following evaluation criteria for acceptance will be used:

- (1) accreditation status of the institution, (2) recognized national standards published by the American Association of Collegiate Registrars and by the American Council on Education, (3) guidelines given by the State Board of Regents (including guidelines for CLEP and AP credit), (4) recommendations given by various University units having appropriate academic competence, including: Faculty Senate, college and departmental curriculum committees.

Utah State University does not accept transfer credit from nonaccredited institutions in those cases where USU lacks an academic unit to evaluate such transfer credits.

In addition to meeting minimum admissions requirements of a cumulative 2.0 grade point average, students who transfer to Utah State University will be required to meet the minimum requirements, including grade point average, set by the college and/or department into which the student transfers.

Transfer students who have a cumulative grade point average between 2.0 and 2.2 will be referred to the dean of the college of their choice for admission to that college. If unacceptable to the dean of the college, such students may be considered for admission to General Registration (if they have earned fewer than 135 quarter hour credits) or to Undeclared (for students who have not decided on a major).

Transfer students who have a grade point average below 2.0 will be considered for admission to General Registration. After a transfer student is admitted to USU, only grades earned at USU will be used in computing the USU grade point average.

**Credit Transfer Policy of Utah System.** An Associate of Arts or an Associate of Science degree earned at any institution within the Utah System of Higher Education, or at other non-Utah institutions with articulation agreements, will be considered as meeting the General Education requirement of any institution in the system. When the General Education requirements of an institution not offering the Associate of Arts or Associate of Science degree have been met in earning a 93 to 96 credit hour diploma, a Registrar's certification that the transferring student has completed baccalaureate-level General Education requirements at the sending institution will be accepted by the receiving USHE institution in lieu of the AA/AS degree. In the latter case, the Registrar at the sending institution will forward to the receiving institution an up-to-date description of the General Education requirements.

Credit for courses numbered 100 or above earned in the Utah System of Higher Education are transferable within the System and will be carried on the student's transcript by the receiving institution. **Acceptance of credit should not be confused with its application. Transfer credit may or may not apply to the graduation requirements of an institution, regardless of the number of credits transferred.** Credit other than that intended wholly to meet the General Education requirements of the receiving institution will be applied on the basis of the appropriateness of credit to a particular institution's specific degree program requirements as determined by the receiving institution.

**International Undergraduate Student Admission.** The following fees, documents, and information should be submitted to the Admissions Office three months prior to the beginning of the quarter for which an international student wishes to be considered for admission:

1. Utah State University application for admission for students outside the United States and a \$30 application fee.
2. One copy of official transcripts and certificates or certified true copies for each secondary school, college, and university attended with official English translation of all documents.
3. Costs are running approximately \$750 per month for international students. This expense will be the responsibility of the student. Evidence of financial capability must be provided with the application.
4. International students must be proficient in the use of English. Proficiency is determined for undergraduates by a minimum TOEFL score of 500, or a Michigan test score of 80, or by passing level 4 (advanced level) of the Intensive English program at Utah State University. For graduate students, proficiency is determined by a minimum TOEFL score of 550, or passing level 4 (advanced level) of Intensive English at Utah State University.

Qualified students in level 4 (advanced level) of Intensive English may take one or more academic courses if approved by the Intensive English staff and their University adviser. Graduate students need the additional approval of the Dean of Graduate Studies. Students at any level may audit academic courses with approval of the Intensive English staff.

Failure to carry a full course of study (at least 12 credit hours per quarter for undergraduates), or failure to make satisfactory progress

towards the receipt of an undergraduate or advanced degree, or failure to comply with any other immigration requirements for students attending USU, will be grounds for suspension or dismissal in accordance with existing University policy.

**Graduate Admission.** Any student who has graduated from USU or any other university must apply to the School of Graduate Studies for admission and present two copies of an official transcript.

**Readmission.** Former students of the University returning after an absence of one or more quarters are required to file applications for readmission at least one week prior to the first day of the quarter.

**The stop-out.** Students who find military, vocational, religious, or other reasons for breaking their educational experience are not penalized and may resume their education when they are ready. However, students who stop-out will be subject to all department, college, and/or University requirements in effect at the time they return. Some noncollegiate experiences may permit credit through challenge and foreign language examinations.

Students who were in attendance the previous spring quarter are not required to reapply for fall quarter unless suspension or graduation occurred at the conclusion of the spring quarter.

**Students who have been denied admission to the University may appeal the decision by contacting the Admissions Office, SC 246. The appeal must be made no later than seven calendar days from the first class day.**

**Admission of Undergraduate Students on a Nonmatriculated Status.** Students who are not planning to earn a degree or who do not meet admission requirements may be admitted to the University on a nonmatriculated basis. The following persons are not eligible for admission under the nonmatriculated policy: former USU students, students currently enrolled in high school, applicants whose high school class has not yet graduated, and international students.

Credit earned by a nonmatriculated student may not count toward a degree unless he or she does matriculate, and no more than 90 credits earned before matriculation may be counted toward a degree. A nonmatriculated student may request matriculation by applying for admission to the University and satisfying current admission procedures and policies.

**Residency Application and Appeal.** Nonresident students who feel they have met the requirements for instate resident student status must file an official residency application with the Residency Office, Taggart Student Center 246, no later than seven calendar days from the first class day and **not more than 30 days before the beginning of the quarter for which residency is sought.** Those missing the application deadline will have residency considered for the next quarter, provided that the next appropriate deadline is met with adequate updated documentation.

If an application is denied by the Residency Officer, the student may appeal to the Residency Appeals Committee no later than the tenth class day of the quarter. Appeals cannot be considered after this deadline.

Procedures concerning residency are as follows:

1. Persons claiming residency on their application for admission, but who are coded nonresident, will be notified in writing of their nonresident status. They will be informed of the procedures and deadlines for applying for residency status.

2. Definition of a "resident student"<sup>1</sup>

(a) An adult who has come to Utah and established residency here for the purpose of attending an institution of higher education must maintain continuous Utah residency status for one full year prior to the beginning of the academic period for which registration as a resident student is sought, and, in each case, must demonstrate by additional objective evidence the establishment of a domicile in Utah and that the student does not maintain a residence elsewhere.

(b) Aliens who are present in the United States on visitor, student, or other visas which authorize only temporary presence in this country, do not have the capacity to intend to reside in Utah for an indefinite period and therefore must be classified as nonresident.

(c) Aliens who have been granted immigrant or permanent resident status in the United States shall be classified for purposes of resident status according to the same criteria as citizens.

(d) Any American Indian who is enrolled on the tribal rolls of a tribe whose reservation or trust lands lie partly or wholly within Utah or whose border is at any point contiguous with the border of Utah or any American Indian who is a member of a federally recognized or known Utah tribe and who has graduated from a high school in Utah, shall be entitled to resident status.

3. Handouts listing the policy and deadlines will be provided to students who inquire about residency.

**Western Undergraduate Exchange.** Utah State University participates in the Western Undergraduate Exchange (WUE), a program of the Western Interstate Commission for Higher Education. Through WUE, certain students who are not residents of the state of Utah may enroll at Utah State University in designated programs, paying resident tuition plus 50 percent of that amount (plus other fees that are paid by all students).

Because Utah State University participates, residents of Utah may enroll under the same terms in designated institutions and programs in other participating states.

Information about WUE programs available at Utah State University may be obtained from the Admissions Office, SC 246, UMC 1600, tel. (801) 750-1095. Utah residents may obtain information about WUE programs in other states from the Certifying Officer for Utah WICHE Student Exchange Program, #3 Triad Center, Suite 550, 355 West North Temple, Salt Lake City, Utah 84180-1205, tel. (801) 538-5247 or from WICHE Student Exchange Program, P. O. Drawer P, Boulder, Colorado 80201-9752, tel. (303) 497-0210.

**Cooperative education and/or internships.** Cooperative education involves faculty and employers in a partnership to provide a student with a blend of academic and on-the-job experiences. Interested students should contact their academic department or the Office of Cooperative Education, UI 102G.

## Tuition and Special Fees

Registration for a quarter is not complete until all fees have been paid and a fee receipt has been prepared by the cashier.

### Tuition and Registration Fees per Quarter<sup>1</sup>

UNDERGRADUATE STUDENTS			
Credits	Utah Resident	Nonresident*	International Students**
1	\$105	\$ 270	\$ 295
2	132	352	377
3	162	437	462
4	192	523	548
5	222	608	633
6	251	692	717
7	319	816	841
8	348	900	925
9	378	985	1010
10	408	1071	1096
11	433	1151	1176
12	458	1231	1256
13	483	1311	1336
14	508	1391	1416
15	534	1472	1497
16	559	1553	1578
17	584	1634	1659
18	609	1715	1740
19	634	1796	1821
20	659	1877	1902
21	684	1957	1982
22	709	2037	2062
23	734	2118	2143
24	759	2198	2223
25	784	2278	2303

Note: Over 25 credits, additional tuition is \$25.00 per credit hour for undergraduate residents.

Over 25 credits, additional tuition is \$80.00 per credit hour for undergraduate nonresidents.

GRADUATE STUDENTS			
Credits	Utah Resident	Nonresident*	International Students**
1	\$113	294	319
2	142	384	409
3	175	478	503
4	207	571	596
5	240	664	689
6	271	756	781
7	342	888	913
8	373	980	1005
9	406	1073	1098
10	438	1167	1192
11	466	1255	1280
12	493	1344	1369
13	521	1432	1457
14	549	1521	1546
15	577	1609	1634
16	604	1698	1723
17	632	1787	1812
18	659	1876	1901
19	687	1965	1990
20	714	2054	2079
21	742	2143	2168

<sup>1</sup>Utah House Bill No. 5, 1980.

### GRADUATE STUDENTS (continued)

Credits	Utah Resident	Nonresident*	International Students**
22	769	2232	2257
23	797	2321	2346
24	824	2410	2435
25	852	2499	2524

Note: Over 25 credits, additional tuition is \$28.00 per credit hour for graduate residents.

Over 25 credits, additional tuition is \$88.00 per credit hour for graduate nonresidents.

**The University reserves the right to alter any tuition or fee charges without notice.**

\*These fees are effective Fall Quarter 1990.

\*Other U.S. citizens and immigrants

\*\*Non-U.S. citizens and nonimmigrants

**Visitor fee (audit)** ..... same as classes with credit (except for persons 62 years of age or older who are permitted to audit free of charge after a recording fee of \$10.00 per quarter has been paid)

**Late registration fee** ..... \$20  
beginning the first day of classes

**Continuing Graduate Advisement (699 and 799)** .. 1 credit \$113  
3 credits—\$175

**Continuing Graduate Registration Fee** ..... \$10

**Refund of Registration Fees:** When a student withdraws from the University not later than the end of the third week of the quarter, he or she is entitled to a refund of registration fees according to the following conditions:

1. Ten dollars of every registration fee and the insurance premium are nonrefundable.

2. After the \$10 and insurance premium are deducted from the registration fees paid, refunds are calculated as follows:

Refund period	Percent of registration fee to be refunded
Before commencement of quarter classes .....	100%
Through the seventh calendar day .....	90%
Through the fourteenth calendar day .....	70%
Through the twenty-first calendar day .....	50%
After the twenty-first calendar day .....	0%

Refunds in excess of \$50 will be mailed to the student.

3. No refund will be made unless the student's official receipt and activity sticker for the current registration fees are surrendered to the Cashiers Office at the time of withdrawal.

4. Special refund provisions apply to students who are required to withdraw during the quarter for active duty in the military forces.

**The University reserves the right to withhold registration privileges, graduation, diploma, and transcript for nonpayment of University fees or obligations.**

**Activity Validation Sticker:** According to the constitution of the Associated Students, a regularly enrolled student registered for 7 or more credits must obtain, at time of registration, a student body activity validation sticker which will admit him or her to all activities controlled by Associated Students: athletic events—football, basketball, tennis, and track—dramatics and musical entertainment, socials, lectures, etc. Students registered for less than 7 credits may purchase an activity validation sticker for \$39.00. The activity validation sticker must be attached on the back of the student ID card to be valid. The ID card is free for new students their first quarter at USU. All other students and spouses will be assessed a fee for a student ID card.

**Spouse Activity Validation Sticker** ..... \$18  
May be purchased by any student having an activity validation sticker.

All dishonored checks will be collected by Check Rite. In addition to the original check amount, a service charge of \$15 will be collected.

**Deferred Fee Note Fee:** \$22.00 per deferred fee note. An additional note fee of 12 percent per annum will be assessed from the date of the note until paid if the deferred fee note becomes delinquent.

### Special Fees

Special fees are in addition to tuition and registration fees. Carefully review the University Class Schedule to determine courses which require special fees.

**Special Course Fees.** There may be certain courses which require special fees. Special fees are identified in the University Class Schedule.

### Parking Permits

Parking Permits for students ..... \$8 per quarter  
\$20 per year

Parking Permit for students living in dorms ..... \$15 per year

Out-of-state Student Auto Permit ..... \$1  
(in addition to parking permit of \$20)

### Music

Piano practice fees (one hour per day for the quarter) payable at Department ..... \$15-20

Private instruction (per credit) payable at Department ..... variable fee

**Division of General Registration Fee** ..... \$25 per quarter

**Health and Accident Insurance** is available to all students for nominal costs at the time of registration. Additional insurance may be purchased for spouse and children. Insurance coverage is mandatory for international students. Students are encouraged to provide themselves with adequate protection in case of illness or serious injury. See University Class Schedule for premiums.

### Insurance Information/International Students

All international students attending Utah State University are required to purchase one of the student health insurance plans offered at the University for themselves and accompanying dependents. Insurance coverage is required each quarter.

International students are cautioned to purchase only temporary travel insurance to cover travel to the U.S.

**Admission Application and Evaluation Fee (nonrefundable):**

U.S. Residents (undergraduate and graduate) .....	\$25
Foreign Students (undergraduate and graduate) .....	\$30

**Special Examination Fee:** \$10 per examination plus \$5 per credit hour up to a maximum of \$50 including the \$10 examination fee.

**Late Graduation Application Fee for undergraduate**

dipoloma .....	\$10
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**Graduation Fee:**

One-year Certificate .....	\$10
Two-year Diploma .....	\$10
Bachelors Degree .....	\$10
Advanced Degree .....	\$15

**Cap and Gown Rentals:**

Bachelors Degrees .....	\$9
Masters Degrees .....	\$10
Doctor of Philosophy or Education .....	\$10

**Teacher Placement Registration .....** \$10

**Transcript of Credits:** The transcript fee (per transcript) is \$3. The fee is to be paid in the Office of the Registrar (Records Services), Taggart Student Center 246.

**University Publications:** General Catalog \$4.50; Quarterly Class Schedule \$1.00. Send request and money to High School/College Relations, Utah State University, Logan, Utah 84322-0160. These publications may also be purchased at the USU Bookstore.

**Information on Scholarships, Fellowships, and Assistantships** can be found in the section on Student Services and Programs in this catalog.

**Housing Fees:** Write for a Housing Bulletin; send request to the Office of Housing and Residential Life, Utah State University, Logan, Utah 84322-8600.

**Estimated Cost of Education for Three Quarters—  
1990-91 Academic Year**

	Resident	Nonresident
Tuition and General Fees	\$1,605	\$4,420
Room and Board	2,577	2,577
Books and Supplies	500	500
Personal Expenses	1,000	1,000
Totals .....	\$5,682	\$8,497

## Registration

**Office of the Registrar:** SC 246, 750-1094

All students attending classes must be registered. Students are officially registered when all registration fees have been paid in full. Failure to pay tuition and fees by the published fee payment deadline will result in courses being voided. Detailed registration instructions are printed in the University Class Schedule, which is published quarterly.

**Eligibility.** Only eligible students may register for courses at the University. An eligible student is either continuing from the previous quarter or has been admitted or readmitted to the University.

**Registration Procedures.** The University Class Schedule lists each quarter's course offerings, dates, times, places, and procedures for registration and fee payment.

**Late Registration.** A \$20 late registration fee is assessed beginning the first day of classes. Students must complete registration by the end of the third week of the quarter.

**Assignment of Adviser.** When students have been admitted to the University and have indicated their proposed major field of study, their names are forwarded to the dean of the college concerned. The dean will assign advisers who will assist in registration and career planning. Students may also receive assistance from their college or the University Academic Service Center.

**Full-time Status.** The minimum registration load for a full-time undergraduate student is 12 credits. To be eligible for student body offices, students are required to be registered for 10 or more credits. Veterans and students eligible for a veteran's educational allowance are required to be matriculated and registered for 12 or more credits to qualify for full educational benefits.

**Auditing Classes.** If students choose to audit a course, they must register as auditors. Students would normally attend regularly scheduled class sessions. No credit will be allowed for such attendance and the regular fee will be assessed. The official forms, properly executed, must be approved by the Office of the Registrar and fees paid at the Cashiers Office before class attendance is permitted. Anyone 62 years of age and older is permitted to audit free of charge after a recording fee of \$10 per quarter has been paid.

**Pass (P), D+, D, F Option.** Students may register for a Pass (P), D+, D, F option. The grade of Pass (P) indicates academic achievement of not less than C-. The Pass (P) grade is not calculated into a student's grade point average. (See Records section for more information.)

**Adding Courses.** Courses may be added through the fifteenth day of classes. The instructor's signature is required beginning the sixth day of classes.

**Dropping Courses.** Students may drop courses without notation on the permanent record through the thirtieth day of classes. Beginning with the thirty-first day of classes, courses dropped will be entered on the student's permanent record and reflect a W (withdraw). Instructors are to provide students in undergraduate classes with significant feedback on their performance in the class (e.g., the results of at least one examination or evaluation of performance on some other major requirement(s)) prior to the drop date. An instructor's signature is not required to drop courses. Students who fail to attend a class the first five days of school may be dropped from that class by the instructor. (*This does not remove the responsibility of the student to drop classes which he or she does not plan to attend*). Students receiving Veterans Educational Benefits must notify the Office of Veterans Affairs of any change in their registration. Following the thirtieth day of classes, the student's academic dean must approve any drop request and this may be done only upon a demonstration of conditions beyond the student's control. The term "conditions beyond the student's control" includes (1) incapacitating illnesses which prevent a student from attending classes for a period of at least two weeks; (2) a death in the immediate family; (3) financial responsibilities requiring a student to alter course schedule

to secure employment; (4) change in work schedule as required by employer; or (5) other emergencies of this nature. Documentation of the circumstances cited to justify dropping after the deadline is required. Under no circumstances is dropping a course after the thirtieth day permitted for the purpose of avoiding an unsatisfactory grade; neither shall I grades be given to avoid the consequences of inadequate performance. Appeals to the dean's decision may be directed to the Provost's Office.

**Withdrawal from the University.** The student must initiate an official withdrawal from the University by appearing in person or by addressing a signed request to the Office of the Registrar. No one will be permitted to withdraw from the University once final examinations have begun. The date of the official withdrawal is the date the withdrawal form or letter is received.

**No-test Days.** A five-day period designated as No-test Days precedes the four days of final examinations which are normally scheduled at the close of each academic quarter. During No-test Days neither final examinations nor testing of any kind will be given in order that students may concentrate upon classwork, the completion of special assignments, writing projects, and other preparation for duly scheduled final examinations.

**Proof of Identification.** In order to receive University services, photo identification must be presented. Each admitted student who completes the registration process for a regular quarter will be issued a student identification card. This photo identification card is valid for the duration of the student's enrollment at Utah State University. Photo IDs are issued throughout the quarter in the Taggart Student Center, Room 204.

## Records

**Office of the Registrar:** SC 246, 750-1116

The custodian of educational records at Utah State University is the Office of the Registrar.

**Student Classification.** At the beginning of each quarter, students are classified for that quarter as follows:

Credit Hours Earned	Classification
0- 44	Freshman
45- 89	Sophomore
90-134	Junior
135 and over	Senior

**Credit Enrollment.** The quarter hour is the unit upon which credit is computed. It represents one fifty-minute class period per week per quarter or three hours of laboratory work each week for one quarter. To obtain credit, a student must be properly registered and pay fees for the course.

## Privacy Rights

The Family Educational Rights and Privacy Act is a federal law which (1) provides that eligible students will have access to inspect and review their educational records and (2) protects the rights of a student to privacy by limiting access to the educational record without express written consent.

**Definitions.** An **eligible student** is defined as any individual formally admitted to Utah State University or the parents of a dependent eligible student. Dependency is defined by Section 152 of the Internal Revenue Code of 1954. An **educational record** is any record (1) directly related to a student, and (2) maintained by Utah State University or by a party acting for the University. Two types of educational records are defined. **Directory information** (or releaseable information) is general information that may be released to anyone without the consent of the student, unless the student indicates otherwise. **Personally identifiable information** (or nonreleaseable information) includes all information not defined as directory information and may not be released without consent of the student.

**Student Access.** Students have the right to review and inspect their educational records. The procedure students must follow to access their records is available in the Office of the Registrar. **It is important to remember that, for educational purposes, University officials have access to student records.**

**Student Control of Directory Information.** Students may control the release of this information by completing forms at the Office of the Registrar.

**Releaseable Information—Directory Information.** The following guidelines are provided for release of information from student educational records:

Student's name  
Address  
Telephone number  
Date and place of birth  
Major field of study  
Participation in officially recognized activities or sports  
Weight and height of members of athletic teams  
Dates of attendance  
Degrees and awards received  
The most recent previous educational agency or institution attended by the student  
Current quarter schedule of classes  
Other similar information

**Nonreleaseable Information.** All other information.

## Grading

All grades and marks will appear on the permanent record. Grade point values attached to grades are as follows:

A	4.00	C+	2.33
A-	3.67	C	2.00
B+	3.33	C-	1.67
B	3.00	D+	1.33
B-	2.67	D	1.00
		F	0.00

**Scholastic Marks are as follows:**

I	Incomplete	P	Pass
W	Withdrawal	AU	Audit



**Grade Points.** For the purpose of computing the grade point average, grade points are assigned to each of the grades for each quarter as noted above (A, 4 points; A-, 3.67 points; B+, 3.33 points; etc.). Grade point averages are rounded to the nearest hundredth of a grade point.

**Grade Point Average.** The grade point average (GPA) is obtained by dividing the total number of grade points earned by the number of quarter credit hours graded. Other grades do not carry grade points. Quarter GPA is based on quarter credit hours. Cumulative GPA is based on total credit hours. The *P* (Pass) grade does not carry a grade point value and is not calculated into the GPA.

**Grading Options.** Ordinarily a letter grade is given upon completion of a course, unless a grading option of "Audit" or "Pass/D+, D, F" is indicated at the time of registration or within prescribed deadlines.

**Pass/D+, D, F Option.** Under this option, the grade of *P* indicates academic achievement of not less than C-. All students, including freshmen, may take courses on a *P/D+, D, F* basis. A minimum of 115 of the 186 credits required for the baccalaureate degree shall carry the A, A-, B+, B, B-, C+, C, C-, D+, D designation, unless the major department and college change this limitation. All CLEP, AP, and other special examination credits are considered *P* and are included in the total *P* grades permitted. Students exercise the *P/D+, D, F* option by submitting a request to the Office of the Registrar by the twenty-fifth class day of the quarter. The *P* shall also be used to record on the student's permanent academic record all special credit in which other grades are inappropriate. Students should note that *P* grades may not be accepted by some departments for major requirements, nor by some professional or graduate schools.

**Incomplete (I) Grade.** Students are required to complete all courses for which they are registered by the end of the quarter. In some cases, a student may be unable to complete all of the course work because of extenuating circumstances, but **not** due to poor performance. The term "extenuating" circumstances includes: (1) incapacitating illness which prevents a student from attending classes for a minimum period of two weeks, (2) a death in the immediate family, (3) financial responsibilities requiring a student to alter course schedule to secure employment, (4) change in work schedule as required by employer, or (5) other emergencies deemed appropriate by the instructor. The student may petition the instructor for time beyond the end of the quarter to finish the work. If the instructor agrees, two grades will be given, an "I" and a letter grade for the course computed as if the missing work were zero. Documentation of the circumstances cited to justify an incomplete grade is required.

The student is required to complete the work by the time agreed upon, or not longer than 12 months. If no change of grade is submitted by the instructor within the prescribed period, the "I" will be removed and the letter grade originally submitted with the "I" will remain as the permanent grade for the course.

**A student should not re-register for the course.** Arrangements to complete the missing course work should be made directly with the instructor.

**Repeating Courses.** Any student who has repeated a USU course should promptly notify the Records Office. After receiving notification from the student, the student's GPA can be recalculated. When a course is repeated, the most recent grade and credit hours are used to recalculate the student's grade point average. The previous grade and credit hours for the same course will remain on the student's academic record, but will not be calculated in the grade point average or total credit hours completed.

When a course listed in the Undergraduate Catalog has the symbol ® at the end of the course listing, it indicates that the same course may be taken more than once for credit. **When this option is exercised, the repeat grade policy does not apply.**

**Change of Grades.** The instructor of a course has the sole and final responsibility for any grade reported. Once a grade has been reported to the Office of the Registrar, it may be changed upon the signed authorization of the faculty member who issued the original grade. This applies also to the grade of Incomplete (*I*). (See USU Student Policy Handbook—Student Appeal Procedures.)

**Final Grade Report.** A current transcript will be made available at no charge to each student at the end of each quarter. If students wish their grades sent to them, they must make the request in person and leave a stamped/addressed envelope at the Records Office. **It is the responsibility of the student to keep the Office of the Registrar informed of address changes.**

**Records Hold.** The Office of the Registrar will place a "Records Hold" on the records of a student when an outstanding financial obligation or disciplinary action has been reported.

When a "hold" is placed on a record, the following results may occur: (1) An official and/or unofficial transcript may not be issued; (2) registration privileges may be suspended; (3) other student services may be revoked. The "hold" will remain effective until removed by the initiating office. It is the student's responsibility to clear the conditions causing the "hold."

**Transfer Credit.** The grades which may be transferred and recorded for transfer students shall include but not be limited to A, A-, B+, B, B-, C+, C, C-, D+, D, and F. Only grades earned at USU will be used in calculating USU grade point averages. Decisions concerning academic standing, once the student is admitted to USU, will be based solely on USU grades.

**Remedial Courses.** Courses numbered 001-099 will not satisfy baccalaureate requirements, are not transferable, and are not calculated in a student's grade point average.

**Academic Warning, Probation, and Suspension.** A student shall be on warning status at the end of the quarter in which his or her cumulative grade point average is 4 grade points less than a 2.0 grade point average. The student shall remain on warning status until his or her cumulative grade point average rises to or exceeds 2.0.

A student shall be placed on probation at the end of the quarter in which his or her cumulative grade point average is 12 or more grade points less than a 2.0 grade point average. The student shall remain on probation until his or her cumulative grade point average rises to or exceeds 2.0. Following the quarter for which a student is placed on probation, the student shall be notified of his or her status by correspondence from the appropriate academic dean. The student will be instructed to meet with his or her adviser before the end of the fifth week and to sign a statement acknowledging the terms of the probation. Signed statements shall be maintained in the academic dean's office.

A student on probation shall be suspended at the end of the quarter in which his or her grade point average for the quarter is less than 2.0.

A student who is suspended for the first time must lay out of the University for at least one quarter before being considered for readmission (unless the student is retained by his or her academic dean). A student who has been suspended two or more times will not be considered for readmission to the University for at least one year following the student's last suspension. A student who is readmitted after being suspended is required to enroll in General Registration.

### Academic Renewal

An undergraduate who has been admitted to the University after an absence of at least five years may petition the Director of Admissions and Records for academic renewal. Students may petition by requesting their academic record be reviewed in order to recalculate their grade point average in all courses where grades of D+ or lower were earned five or more years prior to the petition. After admission, but before application for renewal, the student must have completed one of the following at Utah State University:

- (A) 15 credit hours with at least a 3.00 GPA.
- (B) 30 credit hours with at least a 2.75 GPA.
- (C) 45 credit hours with at least a 2.50 GPA.

The credit hour/GPA requirement is waived for students with an absence of 10 years or more. Courses will remain on the transcript unaltered and will not be considered in satisfying requirements for graduation. Academic renewal may be applied only once and is irreversible. The academic renewal policy does not apply to graduate students or students seeking a second undergraduate degree. A \$25 evaluation fee will be assessed.

### Academic Honesty

The University expects that students and faculty alike maintain the highest standards of academic honesty. For the benefit of students

who may not be aware of specific standards of the University concerning academic honesty, the following paragraph is quoted from the *Student Policy Handbook*, Article V, Section 2, Paragraph A:

#### Section 2. Violations of University Standards

- A. The following activities have been found to interfere with University functions or threaten the well-being and the educational purposes of students and are, therefore, specifically prohibited and make the student subject to discipline.
  - 1. Cheating, falsification, plagiarism, or other forms of academic dishonesty.
    - a. Cheating includes intentionally using or attempting to use or providing others with unauthorized information, materials, or study aids in any academic exercise or activity. Substituting for another student, or permitting another student to substitute for oneself, in taking an examination or preparing academic work is also considered a form of cheating.
    - b. Falsification is the intentional and unauthorized altering or inventing of any information or citation in an academic exercise or activity.
    - c. Plagiarism is knowingly representing the words or ideas of another as one's own in any academic exercise or activity.

Violations of the above policy will subject the offender to the University discipline procedures as outlined in Article VI, Section 2 of the *Handbook*. Those procedures may lead to: (a) a reprimand; (b) a grade adjustment; (c) being placed on warning or probation; (d) suspension from the University; or (e) expulsion from the University.

**Honor Roll (Dean's List).** To qualify for the quarter honor roll (Dean's List), a student must earn a 3.5 GPA in 15 or more graded credits except for summer quarter, which is 12 graded credit hours. Scholarship "A" pins are presented to undergraduate students who have received all A grades (4.0 GPA) for 15 or more graded credits each quarter for three consecutive quarters in residence.

## Graduation Requirements

The University offers an Associate of Applied Science degree, the degrees of Bachelor of Arts, Bachelor of Fine Arts, Bachelor of Landscape Architecture, Bachelor of Music, Bachelor of Science, Master of Arts, Master of Science, Master of Accounting, Master of Agricultural Industries, Master of Business Administration, Master of Education, Master of Engineering, Master of Engineering Science, Master of Fine Arts, Master of Music, Master of Social Sciences, Master of Forestry, Master of Industrial Education, Master of Landscape Architecture, Master of Mathematics, Civil Engineer, Irrigation Engineer, Educational Specialist, Doctor of Education, and Doctor of Philosophy, and provides course work which will satisfy requirements for all professional certificates issued by the State Board of Public Instruction. Certificates, diplomas, and Associate of Applied Science degrees are offered for one- and two-year programs in certain departments.

Students are expected to familiarize themselves with the rules and regulations of both the University and their specific major. Detailed information concerning graduation requirements is available in this catalog as part of the department descriptions. *Responsibility for satisfying all graduation requirements rests upon the student. Utah State University reserves the right to change graduation requirements at any time. Changes are not applied retroactively to students already admitted to the University or to their major.*

### Certificates, Diplomas, and Associate of Applied Science Degrees

Certificates, diplomas, and Associate of Applied Science degrees are awarded for completion of less-than-baccalaureate programs at Utah State University. As defined by the Utah State Board of

Regents, a certificate is awarded upon the successful completion of a program directly oriented toward job entry when the program is of a duration of 18 months or less (1-72 credit hours). The Regents define a diploma or Associate of Applied Science program as one directly oriented toward job entry when the program is of a duration of 19-36 months (74-144 quarter credit hours).

The Colleges of Agriculture; Business; Humanities, Arts and Social Sciences; and Engineering offer one- and two-year programs leading to certificates, diplomas, and Associate of Applied Science degrees. One-year certificate programs are available in dairy technology, agricultural machinery technology, and ornamental horticulture. Diplomas and Associate of Applied Science degrees include aeronautics, technical drafting, agricultural machinery technology, secretarial/administrative support, and applied ornamental horticulture.

In most cases, the courses in the diploma and Associate of Applied Science programs are arranged so that, at a later date, the four-year baccalaureate program can be completed with a minimum loss of time.

### Associate of Applied Science Degree

A minimum of 96 credit hours is required for an Associate of Applied Science degree. Requirements include course work in the following areas: primary area of study, related area, general education, and electives.

See department offerings for specific requirements. Associate of Applied Science degrees are offered in the following areas: aeronau-

tics, technical drafting, secretarial/administrative support, applied ornamental horticulture, and agricultural machinery technology.

## **Bachelors Degrees**

The University confers the baccalaureate degree upon students who meet the specified requirements of any of the eight resident colleges.

Graduates of the Colleges of Agriculture and Engineering are eligible to receive the Bachelor of Science degree. The Bachelor of Arts degree is not offered in these colleges.

Graduates of the Colleges of Business, Education, Family Life, Natural Resources, and Science may be awarded the Bachelor of Science degree or the Bachelor of Arts degree as recommended by the student's individual department and approved by the dean of the college.

Graduates of the College of Humanities, Arts and Social Sciences may be awarded the Bachelor of Science Degree, the Bachelor of Arts degree, the Bachelor of Fine Arts degree, the Bachelor of Landscape Architecture degree, or the Bachelor of Music degree as recommended by the student's individual department and approved by the dean of the college.

All graduates, regardless of the type of degree, must satisfy University requirements in American Institutions and the college requirements in General Education and Communication Skills.

## **Bachelor of Arts Degree**

All students who receive the Bachelor of Arts degree or the Master of Arts degree must have completed two years' training or equivalent in a foreign language approved by the Languages and Philosophy Department. One year or equivalent in each of two foreign languages may also satisfy the foreign language requirement for the BA and MA degrees. Specifically, a BA or MA requirement may be completed in one of the following ways:

1. Completion of 25 credits in one foreign language.
2. Completion of 30 credits in two foreign languages.
3. Completion of language L 202 (L Fr, L Gr, etc.) in one of the foreign languages or an upper division (300-level or above) foreign language grammar or literature course. Conversation classes cannot be considered in satisfying this requirement.
4. Successful completion of the Intensive English Language Institute (IELI) program for international students.
5. TOEFL, Michigan, or IELI placement scores high enough to meet the University admission criteria.

## **Graduation Requirements and General Information**

**American Institutions Requirement.** All graduates are required to have an understanding of the fundamentals of the history, principles, form of government, and economic system of the United

States. Students may meet this requirement in any one of the following ways: (a) a passing grade in a special examination; (b) a passing grade in the Advanced Placement Examination in American History; (c) the satisfactory completion of a major or minor in economics, history, political science, or American studies; (d) the satisfactory completion of one of the following courses: History 170, American Civilization (5 credits); Political Science 110, United States Government and Politics (5 credits); or Economics 200, Economics I (5 credits); (e) satisfactory completion of a 5-credit-hour transfer course equivalent to one of the courses in (d).

**Total Credits.** A minimum of 186 credits of acceptable college work and a minimum of 150 credits with a grade of C or better are required for graduation.

**Upper Division Credit.** A minimum of 60 credits of upper division work.

**General Education.** Completion of the General Education requirements. (See pages 21-25.)

**In Residence.** Candidates for a bachelors degree must complete at least 45 credits in residence at USU's Logan campus or designated residence centers; 15 of which must be included within the last 60 credits presented for the degree.

Upon recommendation of the department and with the concurrence of the college dean, a candidate for a degree may complete, when appropriate, the residence requirements at designated residence centers.<sup>1</sup>

**Independent Study Credits.** The maximum amount of Correspondence (Independent Study) Credit which may be applied toward a bachelors degree is 45 credits.

**Extension and Independent Study.** Applicants for degrees who have taken courses for credit through extension class work or Independent Study courses are subject to regular University admission requirements and must file transcripts of all university credit with the Office of Admissions.

**Junior College Credit.** No more than 120 credits of transfer credit from junior colleges will be applied toward graduation.

**GPA Requirement.** A 2.0 GPA is the minimum University standard students must attain in order to be considered for graduation. However, many majors and professional programs have additional GPA requirements beyond this minimum standard. USU credits only are used in computing the GPA.

**Honors.** To qualify for graduation honors a student must have 60 credits in residence at Utah State University. The University designated honors at graduation are:

Summa Cum Laude	3.95 to 4.000 GPA
Magna Cum Laude	3.80 to 3.949 GPA
Cum Laude	3.50 to 3.799 GPA

The above grade point averages are USU cumulative grade point averages. The grade point average from transfer credits is not taken into consideration for University honors.

<sup>1</sup>USU Residence Centers at Vernal-Roosevelt and Moab, and other centers designated by the State Board of Regents.

**Financial Obligations.** Students are reminded that nonpayment of fees owed to the University may result in withholding of diplomas or certificates.

**Remedial Courses.** Courses numbered 0-99, which are remedial courses, will not satisfy baccalaureate requirements.

**Correspondence Courses.** Grades for Correspondence (Home Study) Courses must be completed and on file in the Records Office by the last day of the quarter of intended graduation.

**Incomplete Grades.** Incomplete grades must be made up and on file in the Records Office no later than the last day of the quarter for which the candidate is applying for graduation.

### Applying for Graduation

Candidates for graduation must file an application in the Graduation Office two quarters prior to the quarter of intended graduation. The application process must be completed and fees paid by the last day of the quarter of application. Late applicants will be assessed a \$10 late fee. Example: Students who intend to graduate spring quarter must accomplish the application process and fee payment by the last day of fall quarter.

Students must complete the application process by sequentially following these steps: (1) Request application in the Graduation Office, (2) carefully review instruction sheet for graduation application instructions, signatures, deadlines, etc., (3) submit application to department adviser and college dean for review and signatures, (4) pay application fee of \$10 in Cashiers Office. Approximately one month is needed to complete the application process. Double majors must have the appropriate signatures for each major.

**Names of the candidates will appear on the graduation lists and diplomas as they appear on the student's transcript.**

**Reapplication for Graduation.** Students who do not successfully complete graduation requirements by the end of spring quarter must reapply for graduation for the new academic year.

### Commencement

Candidates who completed requirements and received their diplomas at the end of summer, fall, or winter quarters are invited and encouraged to attend commencement exercises with the spring quarter graduates.

Attendance at Commencement is expected of all candidates. If unable to attend, the student must notify the dean of his or her college and be officially excused in advance. Also, the student must notify the Graduation Office of the address to which the diploma is to be sent. Participation in commencement exercises does not insure that the candidate has satisfied graduation requirements.

### Second Bachelors Degree

A student who wishes to qualify for a second bachelors degree must complete a minimum of 45 credits beyond those required for the first four-year degree, 30 of which must be taken in residence at USU's Logan campus, or designated residence centers.<sup>1</sup> Candidates for a second bachelors degree must file an application with the Admissions Office and obtain the recommendation of their academic

dean. Candidates must also meet the requirements of the major department.

**Note:** The first bachelors degree must have been awarded by an accredited college or university.

### Split Form (pursuing concurrent degrees)

A student who is within 45 credit hours of completing a baccalaureate degree may file a Split Form showing division of classes between two undergraduate degrees, or an undergraduate and graduate degree. **These classes must be identified each quarter on a Split Form.**

For a second bachelors degree, an application for admission to the second bachelors degree program must be submitted to the Admissions Office. A Split Form must be obtained from the Graduation Office and be filed prior to the posting of grades for the quarter in which the request is submitted. The form must be signed by the student's adviser and college dean of both majors.

For a graduate degree, an application for admission to the Graduate School must be submitted. The student must have a 3.0 grade point average. The Split Form must be signed by the Graduate School. Each Split Form must be filed prior to the posting of grades for the quarter in which the request is submitted. The form must be signed by the department head and/or undergraduate adviser and submitted to the Graduate School, where it will be processed and forwarded to the Graduation Office if it is accepted.

## Course Numbering System

USU maintains a quarterly system—four quarters or periods of class work: fall, winter, spring, and summer. Each quarter is of 10 to 12 weeks duration. Summer quarter is eight weeks with a two-week precession and a one-week postsession.

**Credit Enrollment.** The quarter hour is the unit on which credit is computed. It represents one fifty-minute class exercise per week for the duration of a quarter. To obtain credit, a student must be properly registered and pay fees for the course.

Each course listed in the catalog has a number, given immediately before the name of the course. For example in the English Department there appears:

### 109. Elements of Grammar.

This means the course, Elements of Grammar, is English 109. The numbers are useful for reference and records.

**Course Numbering Code.** A standard code employed by all institutions in the State System of Higher Education was adopted by USU in 1970, changing all previously used numbers. The present numbering system is as follows:

- 001-099 Remedial courses; will not satisfy baccalaureate requirements; nontransferable; not calculated in GPA.
- 100-279 Lower division (freshman and sophomore courses)
- 280-299 Lower division independent study designation (directed reading, individual projects, etc.)
- 300-479 Upper division (junior and senior courses)

<sup>1</sup>USU Residence Centers at Vernal-Roosevelt and Moab, and other centers designated by the State Board of Regents.

- 480-499 Upper division independent study designations (directed reading, individual projects, festival, institutes, workshops, etc.)
- 500-599 Advanced upper division (graduate credit allowed for departmental majors or by permission of student's department chairperson)
- 600-799 Graduate courses (students without baccalaureate degrees must obtain special permission to enroll)
- 590-599 Independent study designations (directed reading, individual projects, theses, dissertations, etc.)
- 690-699
- 790-799
- 680-689 Graduate seminars (includes methodology and research seminars)
- 780-789

#### Masters Thesis

- (697) Thesis research
- (699) Continuing graduate advisement

#### Doctors Dissertation

- (797) Dissertation research
- (799) Continuing graduate advisement

#### "H" following regular course designation indicates Honors Program courses.

*A freshman or sophomore may take any lower division course. If there is a prerequisite for a particular course, it will be so stated in the course description.*

*A junior or senior may take any lower or upper division course. Any prerequisites to a course will be identified in the course description. Certain graduate courses may be taken if the consent of the instructor and the adviser is obtained in advance.*

*A graduate student may take any course, but only graduate courses and individually approved undergraduate courses yield graduate credit.*

At the end of each course description are listed the number of credits given for the course and the quarter(s) it will likely be taught. The credits and the quarter(s) it will be taught are indicated in abbreviated form in parentheses. For example: (3F) indicates that the course offers three credits and will likely be taught fall quarter. The designation (5F,W,Sp,Su) indicates that the course offers 5 credits and will likely be taught all four quarters: fall, winter, spring, and summer. It *does not* mean that the student has to take the class all four quarters, but rather that he or she has a choice of any quarter. In some cases, such as (5F,W,Sp), even though more than one quarter is indicated, the course will not be given each quarter, but only one of these quarters, the exact one yet to be decided.

*For more definite up-to-date information, please refer to the University Class Schedule published prior to the beginning of each quarter. All catalog listings are subject to change. The schedule will also update policies and practices of the University as changes occur.*

Occasionally two or more closely related courses will be listed under one entry, such as Chemistry 306, 307, 308. **Physical Chemistry.** The credit entry will read: (3F) (3W) (3Sp). That means that each of the three courses offers 3 credits.

In some classes the amount of credit for which students register can be individually arranged. One student may take 2 credits, another student 3 credits, etc. Academic credit is identified in parentheses at the end of the course description, e.g. (1-3).

Preceding the number of some courses in this catalog will be either a single asterisk (\*) or a double asterisk (\*\*). Such courses are taught on alternate years. **Check the class schedule or consult the course instructor or department head.**

## Course Prefixes

- Acctg—Accounting
- ADVS—Animal, Dairy and Veterinary Sciences
- AE—Agricultural and Irrigation Engineering
- Ag Ec—Agricultural Economics (*Economics Department*)
- AgEd—Agricultural Education
- Agr—College of Agriculture
- Anthr—Anthropology (*Sociology, Social Work and Anthropology Department*)
- Art—Art
- AS—Aerospace Studies
- BA—Business Administration
- Biol—Biology
- Bimet—Biometeorology (*Plants, Soils, and Biometeorology Department*)
- BIS—Business Information Systems and Education
- Bot—Botany (*Biology Department*)
- CEE—Civil and Environmental Engineering
- Chem—Chemistry and Biochemistry
- Com D—Communicative Disorders
- Comm—Communication (*Journalism*)
- CS—Computer Science
- DE—Dance Education (*Health, Physical Education and Recreation Department*)
- DE P—Dance Education—Professional (*Health, Physical Education and Recreation Department*)
- Econ—Economics
- Educ—College of Education
- EE—Electrical Engineering
- El Ed—Elementary Education
- Engl—English
- Engr—General Engineering
- Ent—Entomology (*Biology Department*)
- FHD—Family and Human Development
- FL—College of Family Life
- FR—Forest Resources
- FW—Fisheries and Wildlife
- Geog—Geography (*Geography and Earth Resources Department*)
- Geol—Geology
- HASS—College of Humanities, Arts and Social Sciences
- HE P—Health Education—Professional (*Health, Physical Education and Recreation Department*)
- HECE—Home Economics and Consumer Education
- Hist—History
- Honor—Honors Courses
- HU—Humanities and Arts
- IELI—Intensive English Language Institute
- Ins T—Instructional Technology
- IO—Integrative Option
- ITE—Industrial Technology and Education
- LAEP—Landscape Architecture and Environmental Planning
- L Arb—Languages (Arabic)
- LAS—Liberal Arts and Sciences
- L Ch—Languages (Chinese)

L Fr—Languages (French)  
 L Gr—Languages (German)  
 L It—Languages (Italian)  
 L Jp—Languages (Japanese)  
 L Ko—Languages (Korean)  
 L Lin—Languages (Linguistics)  
 L Ln—Languages (Latin)  
 L Po—Languages (Portuguese)  
 L Ru—Languages (Russian)  
 L Sp—Languages (Spanish)  
 LS—Life Science  
 Math—Mathematics (*Mathematics and Statistics Department*)  
 ME—Mechanical Engineering (*Mechanical and Aerospace Engineering Department*)  
 Med T—Medical Technology (*Biology Department*)  
 MHR—Management and Human Resources  
 Micrb—Microbiology (*Biology Department*)  
 MS—Military Science  
 Music—Music  
 NFS—Nutrition and Food Sciences  
 NR—Natural Resources  
 PE MW—Physical Education (*Health, Physical Education and Recreation Department*)  
 PE P—Physical Education—Professional (*Health, Physical Education and Recreation Department*)  
 Phil—Philosophy (*Languages and Philosophy Department*)  
 Physl—Physiology (*Biology Department*)  
 Phyx—Physics  
 PlSci—Plant Science (*Plants, Soils, and Biometeorology Department*)  
 PolSc—Political Science  
 PR P—Parks and Recreation—Professional (*Health, Physical Education and Recreation Department*)  
 PS—Physical Science  
 Psy—Psychology  
 Pub H—Public Health (*Biology Department*)  
 RE MW—Recreation Courses (*Health, Physical Education and Recreation Department*)  
 RR—Recreation Resources (*Forest Resources Department*)  
 RS—Range Science  
 SecEd—Secondary Education  
 SK—Learning Skills  
 Soc—Sociology (*Sociology, Social Work and Anthropology Department*)  
 Sp Ed—Special Education  
 Soils—Soil Science (*Plants, Soils, and Biometeorology Department*)

Spch—Speech (*Languages and Philosophy Department*)  
 SS—Social Science  
 Stat—Statistics (*Mathematics and Statistics Department*)  
 SW—Social Work (*Sociology, Social Work and Anthropology Department*)  
 ThArt—Theatre Arts  
 WC—Written Communication  
 WS—Watershed Science (*Range Science Department and Forest Resources Department*)  
 Zool—Zoology (*Biology Department*)

## University Smoking Policy

Utah State University has established a policy regarding smoking which equitably recognizes the rights of both smokers and nonsmokers. This policy is designed to comply with the state of Utah statutory provisions regarding smoking in public buildings, storage areas, etc., as well as to adhere to state fire and safety codes. The central theme of the policy is based on mutual respect for the rights and interests of others, and is implemented on the basis that smoking is prohibited in areas where students, staff, and visitors are required to be in attendance in the normal pursuit of their University endeavors.

Accordingly, smoking is prohibited in buildings except in areas specifically designated as smoking areas. Lounge areas have been identified in strategic areas around the campus where individuals can go to smoke if they so choose.

Areas where smoking is specifically prohibited include all classrooms, conference or meeting rooms unless specifically identified for smoking, graduate study rooms and offices where multiple occupancy occurs, seminar rooms, laboratories, hallways, restrooms, elevators, teaching and research laboratories, auditoriums, theaters, projection booths, cafeterias, workshops, or other public areas used under circumstances where students, staff, and visitors have no choice but to be present. Smoking in some campus buildings is prohibited because of fire hazard or particular building use.

It is the responsibility of all staff and students to adhere to this policy and to appropriately inform campus visitors of its provisions. Deans, department heads, and other supervisory personnel are responsible for the enforcement of the policy.



# USU Written Communication and General Education Requirements

Specific Written Communication and General Education Requirements vary according to the students' Major. Each student is responsible to check the requirements for their Major. Students should make early contact with their Academic Adviser and understand the information in the Undergraduate Catalog and on their Major Requirement Sheet.

The purpose of the University is to help students acquire knowledge, skills, and attitudes that prepare them for a full life and a useful career.

Courses required for a Major program of study prepare students to be successful in their chosen profession.

The General Education Requirements help students expand their awareness of life and the world they live in by strengthening their learning skills, broadening their knowledge, and by helping them to integrate knowledge from different subject areas and gain a better understanding of cultural traditions.

Additional courses may be approved on a continuing basis by the General Education Subcommittee of the Educational Policies Committee. An updated list of courses approved for General Education will appear in the quarter class schedules.

## Written Communication Requirement (WC) 6 credits (minimum) from the list below

All students must successfully complete a minimum of 6 credits of Written English Composition. At least 3 of these credits must be in 200 level courses (above freshman level) or in higher level approved courses if the student has had the appropriate prerequisites. This minimum 6 credit requirement may be met by completing English courses from the Written Communication (English Composition) list below. Part of this requirement may be filled by examinations given in accordance with policies developed by the Board of Regents and the USU Department of English. See **Credit by Examination** on page 24. The CLEP or AP Tests may be used to fill 3 credits of this requirement at the 100 freshman level.

(Colleges and Departments may require more than 6 credits of English and may require specific additional courses to complete this requirement. See Major Requirement Sheet and adviser for specific courses allowed.)

## Written Communication (English Composition) Courses (WC)

(See Major Requirement Sheet to find out which of these courses are required for your Major.)

Engl WC 101	English Composition (3)
Engl WC 105	Vocational English (3)
Engl WC 111	Strategies of Writing (3)
Engl WC 200	Persuasive Writing (3)
Engl WC 201	Research Writing (3)
Honor WC 204	Writing Seminar (3)

## General Education Requirements (40 credits)

### Learning Skills Requirement (SK) 10 Credits

Ten total credits including:

- At least one course from Group I, and
- Courses from at least 2 of the 6 subject areas listed below in Groups I and II.

**Note:** Colleges and Departments may require specific courses in this area. See your Major Requirement Sheet and Academic Adviser.

### Learning Skills Courses (SK)

**Group I—Students must take at least one course from this group in Math or Computer Literacy or Deductive Logic.**

**Subject Areas:** (1-Math, 2-Computer Literacy, 3-Deductive Logic)

- Mathematics**  
Math 101 Introduction to College Algebra (5)  
**Or** any higher level math course requiring Math 101 as a prerequisite, including Math 201 and 202.
- Computer Literacy**  
CS SK 150 BASIC Programming (4)  
CS SK 170 Computer Science Fundamentals (4)  
CS SK 171 Computer Programming and Problem Solving Techniques (3)  
CS SK 241 FORTRAN Programming (3)  
CS SK 251 COBOL Programming (3)  
BIS SK 140 Microcomputer Applications in Business (3)
- Deductive Logic**  
Phil SK 210 Deductive Logic (5)

### Group II—Learning Skills Courses

The remainder of the 10 credits in Learning Skills may be taken in Group I or in Group II, however, the 10 credits must include courses from 2 of the 6 subject areas.

**Subject Areas:** (4-Foreign Languages, 5-Library Information Retrieval, 6-American Sign Language)

- Foreign Languages**—101 or higher level
- Library Information Retrieval**  
Ins T SK 100 Use of Libraries and Learning Resources (3)  
Honor SK 100H Library Literacy (1)
- American Sign Language**  
Com D SK 338 American Sign Language for the Deaf (338H) an Introduction (3)

**Broadening Knowledge Requirements—30 credits**

(Courses in the Major subject cannot be used to fill Broadening Knowledge Requirements.)

The courses in the Broadening Knowledge Requirement are divided into 4 Major Areas plus an Integrative Option Area. These 5 areas are:

1. **Humanities and Arts (HU):** Where aesthetic need, creative powers, and distinctive human talents are explored;
2. **Social Science (SS):** Which examines the behavior, institutions, and social structures of human beings;
3. **Life Science (LS):** Which explores the organization and vital functions of living organisms;
4. **Physical Science (PS):** Which emphasizes nature and workings of the universe;
5. **Integrative Knowledge Option (IO):** Courses which focus on the integration of knowledge from at least two of the four areas listed above.

The 30 credits required for the Broadening Knowledge Requirement are distributed across the 5 areas of Humanities and Arts (HU), Social Science (SS), Life Science (LS), Physical Science (PS), and Integrative Option (IO). Students should make sure they complete the number of credits required by their Major Area from approved lists in Humanities and Arts (HU), Social Science (SS), Life Science (LS), Physical Science (PS), and Integrative Option (IO) (see approved lists on pages 23-24). Students should check their Major Requirement Sheet for specific requirements and consult with their Academic Adviser in their Department. Engineering students should see page 25 for their General Education requirements.

**Example:** A student Majoring in the Social Science (SS) Area has a different distribution of credits than a student Majoring in the Physical Science (PS) Area.

All Academic Majors are located in one of the following four Broadening Knowledge Areas: Humanities and Arts (HU), Social Science (SS), Life Science (LS), or Physical Science (PS). The Broadening Knowledge Requirement credit distribution is different for each of the 4 Major Areas (see credit distribution tables 1 and 2 on page 23).

With college and departmental consent, students may use the Liberal Arts and Sciences Area Studies Certificate to complete the Broadening Knowledge portion of General Education. (See the Liberal Arts and Sciences section in this catalog on pages 31-32.) For more information, students should check with their departmental adviser or with the Liberal Arts and Sciences adviser, Mary Leavitt (Main 128).

**List of Undergraduate Majors**

(The following list shows each Major and its Broadening Knowledge classification by Major Area i.e. Humanities and Arts (HU) or Social Science (SS) or Life Sciences (LS) or Physical Science (PS).

**College of Agriculture**

1. International Agriculture:
  - a. Options in Animal, Dairy and Veterinary Sciences, Plant Science, Agricultural Education, LS
  - b. Options in Soil Science, PS
  - c. Options in Agricultural Economics, SS
2. Agricultural Education (all options), LS
3. Animal, Dairy and Veterinary Sciences (all majors and options), LS

4. Economics and Agricultural Economics (all majors and options), SS
5. Nutrition and Food Sciences (all majors and options), LS
6. Plants, Soils, and Biometeorology (all majors and major options), LS

**College of Business**

All majors and major options, SS

**College of Education**

1. Communicative Disorders (all options), SS
2. Elementary Education (increased requirements meet requirements for the four major areas, LS, PS, SS, HU)
3. HPER
  - a. Health Education major, LS
  - b. All other majors, SS
4. Instructional Technology (no BS degree programs)
5. Psychology (all major options), SS
6. Secondary Education (Note: All majors are associated with a program outside the department and will follow the major area of the other department)
7. Special Education (all major options), SS

**College of Engineering**

All majors and major options, PS

**College of Family Life**

1. Family and Human Development (all major options), SS
2. General Family Life (all major options), SS
3. Home Economics and Consumer Education:
  - a. Fashion Merchandising major, SS
  - b. Interior Design major, HU
  - c. All other major options, SS
4. Nutrition and Food Sciences (all majors and major options), LS

**College of Humanities, Arts and Social Sciences**

1. Aerospace studies (no degree)
2. Art (all major options), HU
3. Communication (all majors and major options), SS
4. English:
  - a. Standard English major and options, HU
  - b. English teaching major and options, HU
  - c. American Studies:
    - i. Social Science concentration, SS
    - ii. Literature, HU
5. History (all majors and major options), SS
6. Landscape Architecture and Environmental Planning (all majors and major options), HU
7. Languages and Philosophy (all majors and major options), HU
8. Military Science (no degree)
9. Liberal Arts and Sciences, HU
10. Music (all majors and major options), HU
11. Political Science (all majors and major options), SS
12. Sociology, Social Work and Anthropology (all majors and major options), SS
13. Theatre Arts (all majors and major options), HU

**College of Natural Resources**

All majors and major options satisfy the LS requirement except Geography, SS, and Forest Resources.

**Forest Resources:**

- a. Forest Resources, LS
- b. Environmental Science, LS
- c. Watershed Science, PS
- d. Recreation Resources Management, SS

**College of Science**

1. Biology (all majors and major options), LS
2. Chemistry and Biochemistry (all majors and major options), PS
3. Computer Science (all major options), PS
4. Geology (all majors and major options), PS
5. Mathematics and Statistics (all majors and major options), PS
6. Physics (all majors and major options), PS

**Honors Program (no degrees offered)**

### Specific Credit Requirements by Major Areas

Table 1 and Table 2 below show how General Education Broadening Knowledge credits are distributed for each of the four Major Areas. Distribution of credits in the Broadening Knowledge Requirement is designed to provide students with a more balanced education. Students with Majors in the related areas of Humanities and Arts, and Social Sciences, are required to complete more credits in the Sciences (Life Science and Physical Science). Students with Majors in the Sciences (Life Science and Physical Science) are required to complete more credits in the Humanities and Arts, and Social Sciences.

**Students in the Colleges of Agriculture, Business, Education, Family Life, Natural Resources, and Science, should use Broadening Knowledge Requirement Credit Distribution Table 1.**

**Students in the College of Humanities, Arts and Social Sciences use Broadening Knowledge Requirement Credit Distribution Table 2.**

**Students in the College of Engineering follow the College of Engineering General Education Requirements shown on page 25.**

### Colleges of Agriculture, Business, Education, Family Life, Natural Resources, and Science

#### Broadening Knowledge Requirement Credit Distribution Table 1.

#### Broadening Knowledge Requirement

39 Credits Required

Major Areas	HU	SS	LS	PS	IO	Total Credits
Human. & Arts (HU)	0-5*	0-6	5-16	5-16	0-9	30
Social S. (SS)	0-6	0.5*	5-16	5-16	0-9	30
Life Sc. (LS)	5-16	5-16	0-5*	0-6	0-9	30
Phys. Sc. (PS)	5-16	5-16	0-6	0-5*	0-9	30

\*Outside courses taught by the Major

### College of Humanities, Arts and Social Sciences

#### Broadening Knowledge Requirement Credit Distribution Table 2.

#### Broadening Knowledge Requirement Areas

30 Credits Required

Major Areas	HU	SS	LS	PS	IO	Total Credits
Human. & Arts (HU)	5*	6	5-14	5-14	0-9	30
Social S. (SS)	6	5*	5-14	5-14	0-9	30

\*Outside courses taught by the Major.

### Approved Broadening Knowledge Courses

**Humanities and Arts Courses (HU) Approved List (see Major Requirement Sheet and Academic Adviser for any specific courses that may be required).**

- |                               |   |
|-------------------------------|---|
| 1. Com D HU 270               | Language, Hearing, and Speech Development (5) |
| 2. HECE HU 105                | Design in Everyday Living (3) (or Art 101)    |
| 3. Art HU 101                 | Exploring Art (3)                             |
| (or HECE 105)                 |   |
| 4. Art HU 275                 | Survey of Western Art (3)                     |
| 5. Art HU 276                 | Survey of Western Art (3)                     |
| 6. Art HU 277                 | Survey of Western Art (3)                     |
| 7. Engl HU 113                | Great Literature of Europe (3)                |
| 8. Engl HU 114                | Great Literature of Britain (3)               |
| 9. Engl HU 115                | Great Literature of America (3)               |
| 10. Engl HU 120               | Great Books and Ideas (3)                     |
| 11. Engl HU 121               | Great Books and Ideas (3)                     |
| 12. Engl HU 122               | Great Books and Ideas (3)                     |
| 13. Engl (Hist) HU 124 (124H) | Introduction to Folklore (3)                  |
| 14. Engl HU 126               | Mythology (3)                                 |
| 15. Engl (Honor) HU (311H)    | Classical Mythology in Western Art (3)        |
| 16. LAEP HU 103               | Introduction to Landscape Architecture (3)    |
| 17. Phil HU 101               | Introduction to Problems of Philosophy (5)    |
| 18. Phil HU 111 (111H)        | Ethics (4)                                    |
| 19. Phil HU 215 (215H)        | Aesthetics (3)                                |
| 20. Phil (LAS) HU 337 (337H)  | Mind Sets (3)                                 |
| 21. Music HU 101              | Enjoying Music (3)                            |
| 22. Music HU 102              | Fundamentals of Music (3)                     |
| 23. Music HU 201              | Masterpieces of Music (3)                     |
| 24. Music HU 240              | Music Awareness and Response (2)              |
| 25. Music HU 300              | History of Jazz and Popular Music (3)         |
| 26. ThArt HU 101              | Understanding Theatre (5)                     |
| 27. ThArt HU 140              | Communicative Performance of Literature (5)   |
| 28. ThArt HU 201              | Understanding Movies (3)                      |
| 29. Honor HU (104H)           | Ideals of a University (1)                    |
| 30. Honor HU (316H)           | Theater Today (3)                             |
| 31. Honor HU (319H)           | The Hero Through Time (2)                     |
| 32. Honor HU (326H)           | Women: Perspectives (2)                       |

**Social Sciences Courses (SS) Approved List (see Major Requirement Sheet and Academic Adviser for any specific courses that may be required).**

- |                        |  |
|------------------------|--|
| 1. Econ SS 200         | Economics I (5)  |
| 2. Econ SS 210         | Economics II (5)   |
| 3. Econ (Ag Ec) SS 218 | Economics of Consumer Choices (3) (or BIS 314, or HECE 255, or HECE 355)       |
| 4. BA SS 135           | Introduction to Business (3)   |
| 5. BIS SS 314          | Managing Personal Finances (3) (or Econ (Ag Ec) 218, or HECE 255, or HECE 355) |
| 6. Psy SS 101          | General Psychology (5)   |
| 7. Psy SS 110          | Human Development—General (3-5) (or FHD SS 150)                                |
| 8. Psy SS 121          | Psychology of Human Adjustment (3)   |
| 9. Psy SS 140          | Analysis of Behavior: Basic Principles (4)                                     |
| 10. FHD SS 120         | Marriage and the American Family (3)   |
| 11. FHD SS 150         | Human Growth and Development (5) (or Psy SS 110)                               |
| 12. FHD SS 304         | Human Sexuality and Family Relations (3)                                       |
| 13. HECE SS 355        | Family Finance (3)   |
| or HECE SS 255         | The Consumer and the Market (3) (or BIS SS 314, or Econ (Ag Ec) SS 218)        |
| 14. Comm SS 121        | Introduction to Mass Communications (3)  |
| 15. Hist SS 104 (104H) | Western Civilizations: Ancient and Medieval (5)                                |
| 16. Hist SS 105 (105H) | Western Civilization: Modern (5)   |
| 17. Hist SS 170        | American Civilization (5)  |
| 18. Spch SS 260        | Interpersonal Communication (3)  |
| 19. PolSc SS 101       | Government and the Individual (4)  |
| 20. PolSc SS 110       | United States Government and Politics (5)                                      |
| 21. PolSc SS 210       | Introduction to International Politics (5)                                     |
| 22. PolSc SS 220       | Comparative Politics (5)   |
| 23. Soc SS 101         | Introductory Sociology (3)   |
| 24. Soc (Anthr) SS 102 | American Culture (3)   |
| 25. Soc SS 140         | Modern Social Problems (3) (or SW SS 105)                                      |
| 26. Anthr SS 101       | Introduction to Anthropology (5)   |
| 27. Anthr SS 110       | Human Origins (5)  |
| 28. Anthr SS 150       | Peoples and Cultures of the World (5)  |
| 29. SW SS 105          | Introduction to Social Welfare (3) (or Soc SS 140)                             |
| 30. Geog SS 101        | Human Geography (5)  |
| 31. Geog SS 103        | World Regional Geography (5)   |
| 32. Honor SS (303H)    | Utopia: The Ideal and Its History (2)  |

**Life Science Courses (LS) Approved List (see Major Requirement Sheet and Academic Adviser for any specific courses that may be required).**

- |                  |  |
|------------------|--|
| 1. ADVS LS 120   | Anatomy and Physiology of Animals (5)          |
| 2. NFS LS 122    | Nutrition for People (3)                       |
| 3. PISci LS 100  | Introduction to Agricultural Plant Science (4) |
| 4. FW LS 284     | General Ecology (5)                            |
| 5. Biol LS 101   | Biology and the Citizen (5)                    |
| 6. Biol LS 105   | Discovering Nature (2)                         |
| 7. Biol LS 106   | Discovering Nature (2)                         |
| 8. Biol LS 125   | General Biology I (5)                          |
| 9. Biol LS 257   | Evolution (3)                                  |
| 10. Micrb LS 111 | Elementary Microbiology (4)                    |
| or Micrb LS 301  | Microbiology I (4)                             |
| 11. Micrb LS 112 | Elementary Microbiology Laboratory (1)         |
| 12. Ent LS 229   | Insect Biology (3)                             |
| 13. Physl LS 103 | Human Anatomy (5)                              |
| or Physl LS 130  | Human Physiology (5)                           |

**Physical Science Courses (PS) Approved List (see Major Requirement Sheet and Academic Adviser for any specific courses that may be required).**

- |                        |  |
|------------------------|--|
| 1. Bimet PS 200        | Introduction to Weather (3)                                |
| 2. Bimet (Geog) PS 382 | Regional Climatology (3)                                   |
| 3. Soils PS 200        | Soils, Waters, and the Environment:<br>An Introduction (3) |
| 4. Engr PS 101         | Introduction to Engineering (2)                            |
| 5. Engr PS 105         | High Technology Society (3)                                |
| 6. Geog PS 113         | Physical Geography (5)                                     |
| 7. CS PS 101           | Using Computers (4)  |
| 8. Chemistry—one of:   |  |
| Chem PS 101            | Introduction to Chemistry (5)                              |
| Chem PS 111            | General Chemistry (5)                                      |
| Chem PS 121            | Principles of Chemistry (5)                                |
| 9. Chem PS 122         | Principles of Chemistry (4)                                |
| 10. Chem PS 124        | Chemical Principles Laboratory (1)                         |
| 11. Chem PS 141        | Elementary Organic Chemistry (4)                           |
| 12. Chem PS 142        | Elementary Biochemistry (4)                                |
| 13. Chem PS 144        | General Chemistry Laboratory (2)                           |
| 14. Chem PS 221H       | Chemical Principles—Honors (3)                             |
| 15. Chem PS 222H       | Chemical Principles—Honors (3)                             |
| 16. Geol PS 101        | Introductory Geology (5)                                   |
| or Geol PS 111         | Physical Geology (5)                                       |
| 17. Geol PS 200        | Earth History (4)  |
| 18. Phyx PS 100        | The Solar System (3)                                       |
| or Phyx PS 108         | Stars and Galaxies (3)                                     |
| or Phyx PS 200         | Astronomy (3)  |
| 19. One of:            |  |
| Phyx PS 101            | Introductory Physics (5)                                   |
| Phyx PS 111            | General Physics (5)  |
| Phyx PS 112            | General Physics (5)  |
| Phyx PS 113            | General Physics (5)  |
| Phyx PS 120            | General Physics Survey (5)                                 |
| Phyx PS 221            | General Physics—Science (5)                                |
| Phyx PS 222            | General Physics—Science (5)                                |
| Phyx PS 223            | General Physics—Science (5)                                |
| 20. Honor PS (250H)    | Planet Earth and the New Geoscience (3)                    |
| 21. Honor PS (333H)    | From Newton to Einstein (2)                                |

**Integrative Option Courses (IO) Approved List (0-9 credits).**

Up to 9 credits may be selected from the following list. A student may not use more than one Integrative Option course taught by a department in the same major area as that of the student's Major. (See Major Requirement Sheet and Adviser for any specific courses that may be required.)

- |                               |   |
|-------------------------------|---|
| 1. ADVS IO 130                | Domestic Animals and Mankind (5)        |
| 2. ADVS IO 330                | Animal Production and Public Policy (3) |
| 3. NFS IO 101                 | Food Fascinations and Fallacy (3)       |
| 4. Soils IO 400               | Soil and Water Conservation (5)         |
| 5. MHR IO 311                 | Management and Organizations (4)        |
| 6. HE P IO 250                | Health and Wellness (3)                 |
| 7. HECE (Soc) IO 238          | Sex Roles in American Society (3)       |
| 8. Engr (Hist) (Anthr) IO 526 | Legends, Myths, and Folktales (3)       |
| 9. Hist (FW) IO 395 (395H)    | Environmental History (3)               |
| 10. Hist IO 401               | The Civilizing of Human Societies (5)   |

- |                               |   |
|-------------------------------|---|
| 11. LAEP IO 105               | Introduction to Environmental Planning (3)    |
| 12. L Lin (Anthr) IO 340      | An Introduction to Linguistics (5)            |
| 13. Anthr IO 210              | Perspectives on Race (3)                      |
| 14. Anthr IO 231              | Introduction to Archaeology (5)               |
| 15. HASS (Engr) IO 320 (320H) | Technology and Human Values (3)               |
| 16. LAS IO 125 (325)          | World of Tomorrow (3)                         |
| 17. FR IO 410                 | Conservation/Environmental Education (4)      |
| 18. RR IO 250                 | Wilderness in America (3)                     |
| 19. NR IO 101                 | Natural Resources and the Future (3)          |
| 20. RS IO 329                 | Pastoralism (3)                               |
| 21. FW IO 250                 | World Wildlife (3)                            |
| 22. FW IO 260                 | Oceanography (3)                              |
| 23. Geog IO 171               | Human Impact on Environment (5)               |
| 24. Biol IO 205               | Plants and Civilization (3)                   |
| 25. Biol IO 308               | Evolution and Environmental Issues (4)        |
| 26. Biol IO 310               | Bioethics: Emerging Issues in Biomedicine (3) |
| 27. Biol IO 533 (533H)        | History of Biology (3)                        |
| 28. Physl IO 135              | Brain and Behavior (5)                        |
| 29. Phyx (ME) IO 216          | Energy (3)                                    |
| 30. Phyx IO 318               | Intelligent Life in the Universe (3)          |
| 31. Honor IO (309H)           | Science Perspective (2)                       |
| 32. Honor IO (334H)           | Frontiers in Research (2)                     |
| 33. Honor IO (390H)           | Independent Study (1-3)                       |

**Former General Education Requirements (Pre 1983)**

Students who have partially completed the former requirements for General Education may use those credits in satisfying graduation requirements. Specific General Education requirements for individual majors may be obtained from the College Academic Service Centers, the Department, or from the University Academic Service Center.

Students who began their studies under the former program may use courses which are accepted in the new program to satisfy current requirements. Students will need to select which set of General Education requirements they intend to satisfy.

**Credit by Examination**

Students may apply CLEP, Advanced Placement, and other approved examination credit toward the undergraduate degree in accordance with state Board of Regents' policy. It is possible for all General Education course work (including part of the Written Communication Requirement and all of the American Institutions requirement) to be fulfilled by examinations; however, students may elect to take General Education courses for personal and professional enrichment.

**Students Transferring to Utah State University**

If in compliance with current articulation agreements, General Education courses completed at any accredited institution of higher education in the state of Utah will fill General Education requirements, including Communication Skills. Where the designations are appropriate, courses are identified with the following prefixes: SS, Social Sciences; LS, Life (Biological) Sciences; PS, Physical Sciences; HU, Humanities.

Students with Associate of Science and Associate of Arts degrees from Utah Institutions are assumed to have completed the General Education requirements. See page 10 for Credit Transfer Policy of Utah System of Higher Education.

## College of Engineering

### Written Communication and General Education Requirements for Engineering Majors (BS Degrees)

(Students in all Majors in the Department of Industrial Technology and Education complete the standard University General Education Broadening Knowledge Requirements for Majors in the Physical Science Area of Broadening Knowledge Requirement Credit Distribution Table 1, on page 23 of this catalog. See Major Requirement Sheet and Academic Adviser.)

The Written Communication and General Education requirements for Engineering Majors in the College of Engineering are somewhat more restrictive than the general education program for the University due to accreditation standards imposed by ABET (Accreditation Board for Engineering and Technology). Students who complete the engineering program also satisfy University Written Communication and General Education requirements.

### College of Engineering Written Communication Requirements (6-9 credits)

The communication skills requirement is satisfied by completion of English 101 (English Composition) or English 111 (Strategies of Writing), and English 200 (Persuasive Writing) or English 201 (Research Writing). English 305 (Technical and Professional Writing) is also required for some majors. CLEP or AP credit may be substituted for English 101. English 200, 201, and 305 may not be taken using the *P-D-F* grading option.

Students should complete English 101 or 111 their first year at USU, English 200 or 201 their second year, and English 305 during their last two years. Transfer students who have completed a freshman and sophomore basic composition sequence of 6 or more credits may be required to take English 305 as a junior or senior to complete their communications requirement. One written communication class at the 200 level or higher is required to graduate.

### General Education Requirements for Engineering Majors Only (60 credits)

#### Learning Skills Requirement (10 credits)

Engineering students completing required courses in mathematics and computer programming satisfy this requirement.

### Physical and Life Sciences (25 credits)

Total credit hours in the physical science and life science areas must be 25 or more to meet ABET requirements.

#### Physical Science (20-25 credits)

Engineering students generally earn 25 credits by completing required courses in chemistry and physics.

#### Life Science (0-5 credits)

Engineering students will generally not need any credit in this area if they complete 25 credits in Physical Sciences. Civil Engineering students may take Microbiology 111 and 112 as part of their major requirements.

### Social Science, Humanities, and Arts (25 credits)

Total credits in Social Science, and Humanities, and Arts must be 25 or more to meet ABET requirements. Students should obtain approval from the College of Engineering in writing before selecting courses for HU/SS credit which are not on the approved list below.

#### Social Science (Select 9-16 credits)

Economics 200 (5 credit—Required)

Anthropology 101 (5)	Political Science 110 (5)
Anthropology 110 (5)	Political Science 210 (5)
Anthropology 150 (5)	Political Science 220 (5)
Economics 201 (5)	Psychology 101 (5)
Geography 101 (5)	Psychology 110 (3-5)
Geography 103 (5)	Psychology 121 (3)
History 104 (104H) (5)	Psychology 140 (4)
History 105 (105H) (5)	Social Work 105 (3)
History 170 (5)	Sociology 101 (5)
Honor 303H (2)	Soc (Anthr) 102 (3)
Political Science 101 (4)	Sociology 140 (3)

Credit received from the following tests may be used to fill part of this requirement:  
College Level Examination Program (CLEP)  
Advanced Placement (AP)

#### Humanities and Arts HU (Select 9-16 credits)

Art 101 (3)	Engl (Honor) 311H (3)
Art 275 (3)	Honor 326H (3)
Art 276 (3)	LAEP 103 (3)
Art 277 (3)	Music 101 (3)
Engl Lit 113 (3)	Music 201 (3)
Engl Lit 114 (3)	Music 300 (3)
Engl Lit 115 (3)	Philosophy 101 (5)
Engl Lit 120 (3)	Philosophy 111 (4)
Engl Lit 121 (3)	Philosophy 215 (3)
Engl Lit 122 (3)	Phil (LAS) 337 (337H) (3)
Engl Lit (Hist) 124 (3)	Theatre Arts 101 (5)
Engl Lit 126 (3)	Theatre Arts 201 (3)

Credit received from the following tests may be used to help satisfy this requirement:  
College Level Examination Program (CLEP)  
Advanced Placement (AP)



## American Institutions Requirement

The State of Utah requires all students to successfully pass an examination (see Credit by Examination below) or complete a course on American Institutions. Any one of the following courses satisfies the requirement. For most students these courses also apply to their General Education requirement in the Social Science (SS) area of the Broadening Knowledge Requirement. If one of these courses is in the student's specific Major subject, that course will not satisfy the Social Science Requirement, but it will satisfy the American Institutions Requirement.

Econ SS 200    Economics I (5)  
or  
Hist SS 170    American Civilization (5)  
or  
PolSc SS 110    United States Government and Politics (5)

The American Institutions requirement applies to both the revised (1983) General Education program and the former General Education Program.

## Academic Service Offices

The offices listed below provide students and faculty with up-to-date academic information and advisement related to student admissions, registration, and graduation at the University.

Individual Program of Study, Planning, and Progress Guides are available through the University Academic Service Center. Major Requirement Sheets are available through the academic departments or the University Academic Service Center.

**University Academic Service Center**—SC 104, 750-1128

**General Registration**—SC 104, 750-1132

### College Academic Service Offices

College of Agriculture, AG S 223, 750-2215  
College of Business, B 202, 750-2275  
College of Education, EDUC 101, 750-1437  
College of Engineering, EC 110, 750-2705  
College of Family Life, FL 205A, 750-1530  
College of Humanities, Arts and Social Sciences, M 128, 750-1198  
College of Natural Resources, NR 112, 750-2448  
College of Science, SER 101, 750-2478  
Undeclared Program, M 128, 750-3290

## Planning the Individual's Program

The student's academic adviser is the key person to assist the student in planning programs. The adviser should be consulted as early as possible in the development of a program of study.

Since the purpose of General Education is to strengthen learning skills, to integrate knowledge, and to broaden educational background, students should select from the approved courses those that will serve these functions. If a student has special interests outside his or her major, this is a chance to expand understanding of these interests. If a student has not yet chosen a major, courses may be selected which introduce the student to the fields being considered.

## Upper Division Requirements

A minimum of 60 credits of upper division work is required for graduation.

**Major Subject.** Students should select a major subject upon entering the University or early the first year, but not later than entrance into the upper division. As soon as the major subject has been selected, the student should contact the department in which he or she has decided to major. The dean or the head of the department will assign an adviser. Registration in each succeeding quarter should be carefully checked and approved by the adviser to assure proper selection and sequence of courses for satisfying institutional and departmental requirements. If more than one major is being pursued concurrently, departmental and college authorization must be obtained.

Each student must complete a major program of study. This program is comprised of up to 122 credits which includes the major, certification requirements, and all other required major course work. The program of study for each major is described in the appropriate departmental section of this catalog and on major requirement sheets, which can be obtained from the department, the college, or the University Academic Service Center.

The selection of a major(s), the fulfillment of requirements, and a choice of a career or vocation are the responsibility of the student. The University does not assume responsibility for these choices nor for successful employment upon completion of University programs. However, to aid in these choices, the University provides advising, counseling, and testing services for self-evaluation and information about careers and employment opportunities. For those who request it, the University assists students upon graduation in their search for career placement.

**Minor:** University policy does not require that all students prepare themselves in a minor field. However, certain departments and/or programs do require the completion of a minor, which is described in the catalog statement of the department or program. When a minor is required, it is part of the professional component.

In the event a student elects to complete a minor not required by the student's major department or program, the student may develop a minor from an approved major in another department. In such cases the elective minor will consist of not less than 18 credits, and the program taken must be approved by both departments.

# Special Programs

## Honors Program

The University Honors Program offers a variety of opportunities for academically motivated students in all majors. These include courses, independent study, research, and extracurricular academic, cultural, and social programs. Students are invited to join the program upon demonstration of a reasonable prospect of maintaining a 3.3 GPA at the University. In general, students completing high school with a 3.5 GPA or an ACT composite score of 26 may expect admittance, as may University and transfer students with a 3.3 GPA. Others may also apply in writing to the director.

The aim of the program is to give its students an enriched experience through the challenge of intense interaction with faculty and peer students in small group or one-on-one settings.

Students may apply much of their Honors course work to the University's general education requirement, either through broadening knowledge quadrants or through the experimental Liberal Arts and Sciences certificate. In addition, they may receive a certificate upon completion of a core curriculum.

They may also earn their bachelors degree with University Honors and/or with Honors in an academic major upon meeting defined criteria. For University Honors, these include a core curriculum, upper division Honors work, and a senior thesis and seminar to give 40 Honors credits. For Honors in an academic major, they include a combination of course work, a thesis, and a seminar, to give a total of 20 credits of upper division work in an approved plan. Plans have been approved in fifteen academic majors to date (summer 1990). A minimum GPA of 3.50, either in the major field or overall, is required as a rule. Details of specific options may be obtained from the Honors Program office.

The program is administered by a director, a University-wide faculty Honors Advisory Board, and by an elected student Honors Council. The Honors Council plans and administers many of the activities of the program and has substantial input into all academic policies.

The Honors Program is housed in the Merrill Library, room 361B. The program assistant, the director, and an honors lounge are available for student assistance and for relaxation and informal interaction.

In addition to honors sections of several departmental courses, the following courses are offered through the Honors Program. The nature of the program dictates more frequent changes in offerings than for most departments. Check with the Honors Program office for a current listing. Registration for these courses requires honors status or permission of the instructor.

## Honors Courses

**SK 100H. Library Literacy.** Information retrieval skills will be taught so students can use any major research library. (1F)

**HU 104H. Ideals of a University.** Students will be introduced to concepts of college education by reading and by participating in seminars and workshops with University faculty at the Fall Honors Retreat. Study habits will also be stressed. (1F)

**200H. Special Topics in Honors.** Lower division course designed for variable credit. To be taught on a one-time trial basis. Course may be proposed by students, faculty, or the Honors director. (2-5F,W,Sp,Su)®

**WC 204H. Writing Seminar.** Creative and expository writing, exploring publication procedures, drafting, revising, sentence building, writing with vigor, voice and paragraph building. (3W)

**PS 250H. Planet Earth and the New Geoscience.** An interdisciplinary examination of Earth incorporating the physics, chemistry, and geology of its formation, its present characteristics, and its future. Text, video, and expert guests are utilized. (3W)

**299H. Issues, Arts, and Ideas.** Designed to expose students to a broad range of cultural and social issues as presented by distinguished visitors who will appear at Convocation Series. Can be repeated for credit six times. (1F,W,Sp)®

**SS 303H. Utopia: The Ideal and Its History.** History of the utopian ideal from Plato to contemporary Socialism. (2)

**IO 309H. Science Perspective.** A critical examination of the scientific method. (2)

**HU 311H. Classical Mythology in Western Art.** An examination of certain myths of the Greeks and Romans as artistically employed or recreated in selected paintings, sculpture, music, and literary works produced in western civilization. (3)

**320H. Godel Escher Bach: An Eternal Golden Braid.** An examination of the relationship of art, music, and mathematics from the significant book by Hofstadter. (1W)

**322H. Seminar for Medical Students.** Ethical and social issues of the medical profession for students who have been admitted to medical school. Taught by practicing physicians and University faculty. (2)

**323H. Seminar for Law Students.** Ethical and social issues of law practice, for students who have been admitted to law school. Taught by practicing attorneys and University faculty. (2)

**HU 326H. Women: Perspectives.** This class examines significant literature by and about women to perceive images and roles, feminine uniqueness, perception differences, and values relevant to the struggle of women. (2)

**327H. Science and Fantasy Fiction.** Explores the history, development, directions, and themes of science, speculative, and fantasy fiction. (2)

**329H. Oregon Trail Experience.** Readings and field experience about the famous pioneer trail. (2)

**PS 333H. From Newton to Einstein.** A science seminar considering great modern scientific minds for both science and nonscience majors. (2)

**IO 334H. Frontiers in Research.** Students will examine four or five of the major research projects presently active at the University and consider their future impact. (2)

**336H. Mormon Folklore.** The substance and significance of Mormon folksongs, tales, and legends; literary, historical, and behavioral approaches to Mormon folklore study. (3)

**IO 390H. Independent Study.** Sections 1, 3, 5. A student registering for independent study is expected to work in a one-to-one relationship with a faculty member, studying material of the student's own choosing with a minimum of supervision. Independent research, both library and laboratory, as well as other forms of creative effort qualify for this credit. (1-3) ®

**400H, 401H, 402H. Reading Seminar.** An opportunity to read, discuss, and write about classic books. (1F) (1W) (1Sp)®

**420H. Special Topics in Honors.** Upper division course designed for variable credit. To be taught on a one-time trial basis. Course may be proposed by students, faculty, or the Honors director. (2-5F,W,Sp,Su)®

**470H. Honors Fellows.** An application of Honors education for senior (or sometimes junior) honors students in the assistance of leading Honors seminars and tutorials. (1-3F,W,Sp,Su)

**480H. Honors Senior Seminar.** Oral presentation and discussion of senior thesis projects. May involve guest presentations, focusing on the essential contrasts and similarities in "ways of knowing" among various academic specialties. (1Sp)

**490H. Senior Project.** All honors students are required to submit a senior project for graduation from the Honors Program. It may be in any area of the student's choice, written in cooperation with an adviser drawn from the faculty at large. (1-9)®

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

## ***Vocational-technical Education***

**Director:** Maurice G. Thomas

**Vocational Council:** Lloyd W. Bartholome, Robert C. Lamb, Jane L. McCullough, Weldon S. Sleight, Grant H. Vest

### ***Programs***

**Agricultural Machinery Technology**—Department of Agricultural Education

**Secretarial/Administrative Support**—Department of Business Information Systems and Education

**Drafting**—Department of Industrial Technology and Education

**Aeronautics**—Department of Industrial Technology and Education

**Dairy Herd Management**—Department of Animal, Dairy and Veterinary Sciences

**Ornamental Horticulture**—Department of Plants, Soils, and Biometeorology

**Nursing**—College of Science (with Weber State College)

### ***Objectives***

The primary purpose of vocational programs is to prepare people for employment. Utah State University has developed vocational programs within role assignments by the State Board of Regents with the support of the State Board of Education. Students earn certificates, diplomas, or Associate of Applied Science degrees in programs of one or two years in length.

Industry advisory committees provide valuable input to insure relevant programs. Follow-up study of graduates is used as one important method to maintain program quality.

Further information concerning these less-than-baccalaureate vocational programs may be found in the section *Certificates, Diplomas, and Associate of Applied Science Degrees* on page 16 and in the following departmental sections: Animal, Dairy and Veterinary Sciences, Agricultural Education, Plants, Soils, and Biometeorology, Business Information Systems and Education, and Industrial Technology and Education.

It is the policy of this institution not to discriminate on the basis of race, color, national origin, sex, or handicap in any vocational education program or activity.

### ***Jointly Sponsored Programs***

Utah State University participates with four school districts and the Bridgerland Applied Technology Center. Cooperatively sponsored vocational programs are offered in University facilities. These programs offer a choice to students of earning a certificate (admittance through BATC) or earning college credit and a certificate or diploma (admittance through the University).

## ***Area Studies***

Area studies is an interdisciplinary approach to the study of a geographical or thematic subject, for example, Latin American studies, Black studies, and environmental studies. A student takes courses relating to his or her interest in several fields, such as economics,

political science, literature, history, geography, and philosophy, rather than concentrate his or her study in a single field.

In addition to the self-designed Area Studies Certificate program, students may earn the following certificates: International Development, Women's Studies, Training and Development, Religion, Law and Society, and Political Communication. See program brochures for specific requirements.

A student must complete a minimum of 36 credits in the subject of his or her area study. These courses must be from a minimum of three disciplines, no more than half credited from any one discipline. The grade average on the 36 credits must be at least 3.00.

The Liberal Arts and Sciences Program is a new emphasis in Area Studies. Students take a multidisciplinary, coherent approach to learning by clustering selected courses in the humanities, social sciences, physical sciences, and life sciences around common themes such as western civilization, beauty, and science and society. Two clusters, with a combined minimum total of 40 credits, are required. Students should check with their college offices to find out if the Liberal Arts and Sciences Area Studies Certificate will complete their General Education Broadening Knowledge requirements. For the Area Studies Certificate in Liberal Arts and Sciences only, a minimum grade-point average of 2.00 is permitted. The Liberal Arts and Sciences interdisciplinary workshop (LAS 125/325, World of Tomorrow) is required as an orientation to the program.

Area studies is not a major and does not lead to a degree; the program is designed to augment the usual degree requirements. Some of the courses taken to apply to the major might also apply to the area studies program; other courses will be taken as electives. A student might expect to complete all the requirements for a degree and the area studies program within the normal graduation requirements of the University (186 credits).

A student completing the area studies program will be granted a certificate with the graduation diploma and an area studies notation will be entered on his or her transcript.

Further information may be obtained from the area studies coordinator, the Dean of HASS, in Main 131, or from the student's adviser.

## ***Cultural Exchange***

Cultural exchange opportunities are available to USU students, both in the credit and noncredit mode. The programs include quarters in Latin America, Germany, France, and Russia, as well as international and domestic tours to many countries and states. Further information can be obtained from Languages and Philosophy Department, USU, Logan, Utah 84322-0720, telephone (801) 750-1209.

## ***Disabled Student Center***

The purpose of the Disabled Student Center is to help disabled students overcome physical, educational, or attitudinal barriers preventing them from reaching their full educational potential. Staff members coordinate University support services, thus aiding disabled students to become integrated into the campus community.

The Disabled Student Center is located in Room 302 of the Taggart Student Center and can be reached by telephone by calling 750-1923 or 750-2444 voice/TDD.

Services offered by the Disabled Student Center include:

1. Campus orientation, provided by staff professionals. Accessibility map is available from the Disabled Student Center.
2. Registration assistance, including interpreters, advisers, and escorts.
3. Equipment loan available for academic use, including FM amplification systems, tape recorders, and aids for the visually impaired.
4. Referral information regarding campus and community services, including a referral registry for nonacademic interpreters, personal care attendants, and escorts.
5. Taped textbooks, provided by volunteers recruited and trained by the Disabled Student Center, in cooperation with the Utah State Library for the Blind and Physically Disabled.
6. TDD and telephone interpreting, available in the center during business hours.
7. Counseling for academic and personal needs.
8. Support service coordination with the Division of Vocational Rehabilitation for resident and nonresident students.

## General Registration

**Director:** LaMar R. Frandsen  
Office in Student Center 104

General Registration is an administrative-academic office maintained at USU for the enrollment of students who do not meet the admissions requirements of the eight academic colleges.

The primary function of the office is to assist and encourage students in the improvement of their academic status so they may transfer to a college of their choice. To accomplish this purpose, participants are urged to limit their course loads each quarter, satisfy remedial requirements when indicated, and meet frequently with an adviser or the director. Students in General Registration are encouraged to take General Education and exploratory classes and not begin taking departmental major programs until they have been admitted to a department, though they may take some lower division survey courses in their intended major. The facilities of the University Counseling, Learning Assistance, and Testing Centers are available to assist such students with career, aptitude, and study skills counseling.

The Low Scholarship and Probation Policies of the University apply to students enrolled in General Registration. When a student has satisfied remedial course requirements and has demonstrated ability to maintain a 2.0 GPA, that student may apply for admission to an academic college and department through the Director of General Registration. Regular college admissions evaluations procedures will then be made, and if there are no admissions restrictions, the student will be enrolled in the department of his or her choice.

## Cooperative Education Internship Program

The Cooperative Education Internship Program offers both undergraduate and graduate students a unique opportunity to integrate career, social, and personal development into the educational process. The program is designed to allow students to alternate classroom study with a series of paid preprofessional work experiences related to their field of study. These experiences increase in complexity as the student's background in a given field increases.

The program offers several specific benefits to students. It provides those students who have decided on an academic major an opportunity to obtain pregraduation work experience in their chosen career. The program provides those students who are unsure of their academic major an opportunity to explore several career possibilities. It provides them a chance to earn money for their education and credit toward their degree. Finally, it substantially improves the students' opportunities for employment after graduation.

The Cooperative Education Internship Program option is available in most departments on the Utah State University campus. Generally speaking, students begin their work experiences in their sophomore or junior year, although seniors can be placed. Students can undertake either part- or full-time work experiences. Work experiences are available both during the academic year and during the summer. These work experiences may be with a single employer or with different employers; increasing complexity is the critical principle. Salaries vary with the field of work and the complexity of the job.

The amount of academic credit awarded for a given work experience varies from one department to another. The decision regarding credit and the amount to be granted rests with the academic department, and specifically the faculty co-op coordinators. Students must make the credit arrangement with their faculty co-op coordinators prior to their work experience.

Students interested in entering or learning more about the program should contact their academic department or visit the Cooperative Education Internship Program Office, which is located in the basement of the University Inn, or call 750-3588.

## Learning Assistance Program

Learning how to learn is a process that continues throughout the life of an individual. The Learning Assistance Program contributes to that process by providing (1) basic learning skills training for those who feel a need for learning skills development and (2) enrichment training for those who desire to improve upon already satisfactory skills. The general goals of the Learning Assistance Program are to support the academic mission of the University and to help students succeed in their educational programs. In order to accomplish this, the specific program goals are:

1. To provide students at all levels of the University with general learning strategies and with specific skills appropriate to their needs and goals and applicable to all academic content areas. This is accomplished through remedial, preventive, and developmental services.

2. To integrate all University learning assistance and related services into a coordinated functioning team.

3. To provide students with referrals to other helpful academic and personal services when necessary.

Services available through the Learning Assistance Program include help in such skills as notetaking, test preparation, effective listening, concentration and memory improvement, reading improvement, etc. Tutoring help is also available through the program.

The Learning Assistance Program is administered through the Division of Academic Support Services and is located in Student Center 104.

## ***Reserve Officers Training Programs***

Curricula in Aerospace Studies and Military Science are divided into basic and advanced courses. The first two years (basic) total 12 credits (Air Force) and 9 credits (Army). Up to 24 credits are given for both the Air Force and Army advanced courses. Enrollment in the basic course is voluntary and incurs no military obligation. The Air Force advanced course incurs an active duty obligation. Army advanced course cadets may apply for active duty or for duty with the Army Reserve or National Guard. They may also participate in a unique opportunity to maximize the financial benefits of ROTC while in college through simultaneous enrollment in the Army ROTC advanced course and the National Guard or Reserve.

There are sufficient elective credits within most degrees offered by the University for a student to apply ROTC credits (maximum of 37 Air Force or 34 Army) towards a degree.

A student should consult an adviser to determine which ROTC credits can be applied toward a specific degree. For detailed ROTC requirements and course information, see the Department of Aerospace Studies and Department of Military Science sections of this catalog.

Academic minors are available in Aerospace Studies and Military Science. Interested students should check with the appropriate department for details.

## ***Marine Corps***

The U.S. Marine Corps offers commissions to a limited number of qualified college students through the Platoon Leaders Class and the Officer Candidate Class programs.

Students may enroll in the Platoon Leaders Class while freshmen, sophomores, or juniors. All precommissioning training is completed by attending two six-week training periods during the summer. Members of the Platoon Leaders Class receive commissions as Second Lieutenants upon graduation from college.

Students must maintain a C average or better and be at least 17 years of age. More information may be obtained from any Marine Corps Officer Selection Officer.

## ***SILEX Program***

The SILEX program (Student Initiated Learning Experiences) was first offered in 1970 to encourage student concern and interest in the content of their university education. Through SILEX, students may propose courses not presently offered. SILEX may provide for (1) investigation of subject matter not available in the existing courses, (2) study of new problems emerging in the world, and (3) encouragement of student initiative in learning.

SILEX courses count as electives. The number of credits offered will depend upon the nature of each course proposed. SILEX courses are approved for one year.

The program is administered through the dean's office, College of Humanities, Arts and Social Sciences. For additional information a student may contact the University Academic Service Center or a college academic service center.

## ***Special Certificate Programs***

Special Certificates may be awarded as supplements to degree programs when authorized by the University. Currently Special Certificates are granted to recognize areas of emphasis and interdisciplinary concentrations. These include the Area Studies Certificate; the Gerontology Certificate; the International Relations Certificate; the Music Certificate in Pedagogy of Piano, Organ, or Guitar; and the Public Administration Certificate, all in the College of Humanities, Arts and Social Sciences.

## ***Women's Studies***

**Program Coordination:** College of Humanities, Arts and Social Sciences  
Office in Main 131

The Women's Studies program is multidisciplinary and focuses on the changing roles of women and men in society. It provides the individual student an opportunity to become academically involved in a program which deals with the socialization and gender roles of adults together with analyses of these roles and changes from early childhood. The program also emphasizes the contributions of women in the past, during the present, and toward the future. By providing insight into the effects of changing role patterns on both women and men, the Women's Studies program prepares students to better cope with current and future changes and to become an influential force in the shaping of those changes.

A number of Women's Studies courses are being taught by faculty members in departments throughout the campus each quarter, and more courses are being developed to meet the current and future needs of the program.

Students may enroll in individual courses or apply course work toward either a minor in Women's Studies or an Area Studies certificate.

Further information may be obtained from the Women's Studies coordinator, Pamela Riley, Department of Sociology, Social Work and Anthropology.



# Liberal Arts and Sciences Program

**Director:** Ann Leffler  
Office in Main 131

**Associate Director:** Norman L. Jones  
Office in Main 317E

**Associate Director:** Joseph G. Morse  
Office in Library 361B

**Adviser:** Mary E. Leavitt  
Office in Main 128

The Liberal Arts and Sciences Program (LASP) was cited in 1990 by the American Association for the Advancement of Science as one of four national model major programs integrating the sciences and liberal arts. It has also received a National Endowment for the Humanities award. With college and departmental consent, its Area Studies Certificate may be used in place of the General Education broadening knowledge requirements described in the General Education section of this catalog. The LASP General Education option becomes effective with fall 1990 incoming students.

LASP is an exciting new combination of courses combining "back to basics" rigor with an interdisciplinary emphasis on themes for the twenty-first century. While LASP offers a major and a minor, its emphasis and pride is the Area Studies Certificate. The LASP Area Studies Certificate marks a track through the *Broadening Knowledge* portion of General Education which is imbued with the spirit of numerous national calls for educational reforms. Corporate executives, community leaders, and national educators increasingly recognize that in a society where one-fourth of today's jobs did not exist fifteen years ago, a broad background in liberal arts and sciences is the best possible training for productivity. LASP offers USU students training to contribute effectively in the organizations, professions, and communities of tomorrow.

To encourage interdisciplinary learning and curricular coherence, sets of LASP courses are clustered around common themes. This cluster organization encourages students to combine insights across the sciences and liberal arts and to regard education as a tool for addressing central issues rather than as a disparate array of unrelated courses. Each course cluster concludes with a capstone course connecting what students have learned in the cluster. Each aims to help students pursue the LASP objectives listed below.

## Objectives of the Liberal Arts and Sciences Program

Promoting interdisciplinary learning, LASP encourages students to develop the following:

- (1) Abilities for critical thinking and communication
- (2) An understanding of numerical data
- (3) An understanding of the methods and systems of natural science
- (4) Historical consciousness
- (5) An understanding of social science
- (6) An awareness of ethics

(7) A recognition of multicultural contexts

(8) An appreciation and experience of fine arts

## Curricula in Liberal Arts and Sciences

The Liberal Arts and Sciences Area Studies Certificate provides a track through the *Broadening Knowledge* portion of General Education requirements. This certificate is described below. In addition, the Liberal Arts and Sciences major offers two degree programs, each leading to a bachelor of arts degree. These too are described below.

### I. Liberal Arts and Sciences Program

**(A) Liberal Arts and Sciences Area Studies Certificate.** This route through the *Broadening Knowledge* portion of General Education requires the LASP orientation course, LAS 125, as well as two LAS clusters. The minimum number of credits required is 43. As of spring 1990, three clusters were available: Beauty, Civilization, and Science and Society. Please consult the LASP adviser (Ms. Mary Leavitt, Main 128) or another LASP staff member for current information on cluster status and requirements.

Students completing the LASP Area Studies Certificate will receive notice of its completion on their transcripts.

**(B) Liberal Arts and Sciences Minor.** While gaining a perspective on the liberal arts and sciences, students may want to explore more than two clusters. The minor supplements students' academic majors by widening employment options. It consists of LAS 125, three clusters, and at least 63 credits. Please consult the LASP adviser, Ms. Mary Leavitt, or another LASP staff member for details.

**(C) Liberal Arts and Sciences Option: The Major.** The LASP major allows students to explore and integrate the sciences and the liberal arts in depth. It requires LAS 125, two clusters, and some combination of specific courses in the languages, mathematics, deductive logic, computer science, depth of knowledge credits, field or laboratory courses, self-expression courses, literature study, research methods, and a senior thesis. Again, please consult the LASP adviser or another LASP staff member for details.

### II. Liberal Arts Option

The Liberal Arts option is a separate track under the Liberal Arts and Sciences Major. This option allows the student to develop an individualized curriculum in consultation with the program adviser, Ms. Mary Leavitt (Main 128). Unlike Liberal Arts and Sciences, it does **not** offer a route through General Education directly.

Although the emphasis of the program is in the humanities, arts, and social sciences, the student is encouraged to seek out other educational interests as part of an academic program. The following credit distribution will be typical of most students:

**General Education** (46 credits)

**Foreign Language** (25 credits)

**Liberal Arts Emphases** (30 credits of social sciences and 30 credits of humanities and arts)

Students will plan a multidisciplinary academic program which provides a focus for study, with emphasis in primarily social sciences and humanities and arts.

**Preprofessional and Elective Credits (55 credits)**

Depending on a student's career objectives, a student may take courses leading to further study in medicine, law, business, or other graduate programs, or continue to study in a number of different disciplines.

***Liberal Arts and Sciences Courses***

**IO 125 (d325). World of Tomorrow.** Orientation to the Liberal Arts and Sciences Program. Focuses on major themes in thought, creativity, and public life as preparation for responsible participation in the world of the twenty-first century (3F,W,Sp)

**HU 337. Mind Sets.** Study of the contrast between the classical analytical perspective in western culture and the recent synthetic perspective. The contrast will be explored in terms of the philosophy of science from Descartes to Toulmin and corresponding perspectives in literature from the seventeenth century to the postsurrealistic period. (3Sp)

**490. Independent Workshop/Study.** Independent, interdisciplinary study resulting in an original work. After obtaining permission from a Liberal Arts and Sciences adviser to take this course under the supervision of a particular instructor, the student must also obtain the instructor's permission. (1-5F,W,Sp)®

# *Colleges*

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# College of Agriculture

**Dean:** Doyle J. Matthews  
Office in Agricultural Science 223

**Assistant Dean for Resident Instruction:** Weldon S. Sleight  
**Associate Dean for Extension:** Gerald R. Olson  
**Associate Dean for Research and Director, Agricultural Experiment Station:** H. Paul Rasmussen

The College of Agriculture includes the following departments:

**Agricultural Education**  
**Animal, Dairy and Veterinary Sciences**  
**Economics<sup>1</sup> (Agricultural Economics)**  
**Nutrition and Food Sciences<sup>2</sup>**  
**Plants, Soils, and Biometeorology**

Degrees and curriculum options are listed in the department section of this catalog. In addition to programs in the departments, there are two curricula that involve more than one department: (1) a BS degree in international agriculture and (2) MS and PhD degrees in toxicology.

Agriculture today is a dynamic, rapidly changing industry. It includes more than farming or producing food and fiber. It embodies all the occupations connected with the production, processing, and distribution of farm products.

Agriculture is the nation's largest industry. Of the 85 million people employed in the United States, about 21 million (24 percent) work in agriculture. This includes about half a million scientists who serve agriculture directly or indirectly. The agricultural industry is the biggest buyer, seller, and borrower in the United States, and it has the largest investment of any industry.

Today's agriculture offers graduates challenging opportunities in a highly technological and competitive society. Students must be prepared to interact in such a society when they complete their formal education.

The success of various curricula in agriculture is manifest by the achievements of the graduates. They are setting new standards for agricultural production and in positions as professional specialists, teachers, research investigators, and leaders in agriculture and related industries locally, nationally, and internationally.

Education in agriculture includes fundamental science as well as applied business and technology. Many graduates continue their education for advanced degrees and other specialized education and training.

## Admission Requirements

Undergraduate students accepted in good standing by the University are eligible for admission to the College of Agriculture.

<sup>1</sup>Jointly administered with the College of Business.

<sup>2</sup>Jointly administered with the College of Family Life.

## Facilities and Equipment

The Agricultural Science Building houses the administrative offices of the College of Agriculture, the Agricultural Experiment Station, and University Extension, as well as the Departments of Agricultural Education, and Plants, Soils, and Biometeorology. The Animal, Dairy and Veterinary Sciences Department personnel are housed in the Agricultural Science Building, the Animal Sciences Building, and the Veterinary Science Building. Economics is housed in the Business Building. The Department of Nutrition and Food Sciences is housed in the Nutrition and Food Sciences Building. Some classes and laboratories are located on Agricultural Experiment Station facilities near the campus, where research and teaching interact. Research units located in more distant areas of the state provide research opportunities for graduate students and faculty members.

## Curricula in Agriculture

Students may work toward the Bachelor of Science degree in any of the departments of the College of Agriculture. Pre-veterinary training is offered in the Department of Animal, Dairy and Veterinary Sciences.

There are three basic curricula offered by most departments, viz: (1) science, (2) general or production, and (3) business. Departmental listings detail the requirements for earning a degree in these curricula.

**Science.** Students who choose the science curriculum are taught the fundamentals of physical and biological sciences that are significant to agriculture. In the basic science courses, students prepare themselves for graduate work and eventually research and teaching careers in the natural sciences. Graduates in science curricula are also prepared to do research or technical work in agriculturally oriented businesses such as farm chemicals, livestock health, feed processing and marketing, crop breeding, water use, and food processing.

Science curricula are offered in the Departments of Animal, Dairy and Veterinary Sciences, Nutrition and Food Sciences, and Plants, Soils, and Biometeorology.

**General or Production.** This curriculum is designed to educate students to meet the special demands of today's agriculture. Successful modern agricultural production requires an understanding of the latest scientific knowledge and an ability to apply the information. The production curriculum will satisfy the needs of a student who plans to be involved in production agriculture, to be a farm manager, or to work directly with farm operators as a businessman or as a government or farm organization employee.

This curriculum is offered in the Departments of Agricultural Education, Plants, Soils, and Biometeorology, and in animal and dairy majors of the ADVS Department.

**Business.** The businesses and industries that buy from, sell to, and provide service for people involved in production agriculture are expanding the need for men and women educated in agriculture. These enterprises include feed, fertilizer, machinery, and chemical

firms that supply the producer's needs, as well as marketing firms that assemble, process, ship, and merchandise agricultural products. Managers of large-scale farm enterprises also profit from the kind of education provided by the business curriculum. Students who want to capitalize on their agricultural background while pursuing a business or industrial career should consider the business option.

This curriculum is offered in the Departments of Economics, Agricultural Education, Nutrition and Food Sciences, Plants, Soils, and Biometeorology, and in the animal and dairy majors of the ADVS Department.

Interdepartmental and intercollege cooperation has and will continue to facilitate the development of various other curricula. Students should not hesitate to inquire about the possibilities of following a curriculum that would allow for special needs. Advisers in each department are available and should be consulted for guidance in scheduling classes and in planning careers.

### **Interdepartmental Major in International Agriculture**

There is a great opportunity today for professional agriculturists to serve in foreign countries. There are more than 100 developing countries in the world who welcome help. The interdepartmental major in international agriculture is designed to prepare dedicated students for service abroad. Students choosing international agriculture as a major may specialize in (1) animal and dairy sciences, (2) agricultural economics, (3) plant science, (4) soil science, or (5) agricultural education.

To be sure that all candidates for a degree in international agriculture acquire the essential social and cultural background, a core curriculum of courses is required of all students regardless of technical option. This curriculum and the specific number of credits required for each technical option are as follows:

**Core Curriculum.** General Education, 40 credits; Written Communication, 9 credits; Agriculture and Agriculture Related, 45 credits. These credits must include: ADVS 111 and 245, 9 credits; PISci 100, 4 credits; Soils 358, 4 credits; Ag Ed 101, 300, 301, 345, and 360, 18 credits; ADVS 300, 4 credits; and Ag Ec 210, 260, 6 credits.

**Specializations.** The following specializations are available and should be worked out between the student and a departmental adviser.

**Animal, Dairy and Veterinary Sciences.** ADVS: 208, 209, 212, 213, 218, 219, 220, 245, 350, 351, 420, 421, 39 credits; ADVS<sup>3</sup>: 508, 509, 512, 513, 518, 519, 3-16 credits.

**Plant or Soil Science.** Bimet 200, 3 credits; Soils 470, 555, and 556, 9 credits; Soils 513, or 565 and 566, 5 credits; PISci 350, 432, 440, 450, 555, 565, 23 credits.

**Agricultural Economics.** Econ 500, 501, 515, 540, 560, 19 credits; Hist 104, 105, 10 credits; and Ag Ec 320, 411, 510, 520, 560, 580, 18 credits.

**Agricultural Education.** PISci 430, 432, 7 credits; ADVS (4 of 6 production practices courses), 12-13 credits; Ag Ec 580, 3 credits; and Ag Ed 101, 170, 300, 301, 303, 360, 511, 551, 26 credits.

### **Financial Support**

The College of Agriculture and the agricultural industry in the Intermountain West annually sponsor over 100 scholarships, internships, and assistantships. The college and the local agribusinesses also support many students through work experience programs. For further information, contact the College of Agriculture Dean's Office (Agricultural Science 223) and/or individual department offices.

### **Safety and Liability in Classes and Laboratories**

Certain classes and laboratories involve a risk of bodily injury or of damage to clothing. Students should take appropriate precautions and wear suitable protective clothing. Some of the risks include handling or being near animals, slick floors or corrals, use of toxic or corrosive substances, and the use of sharp or breakable instruments and equipment. Students should take safety precautions during demonstrations or work with animal tissues or operative procedures. Students must assume their own liability protection for travel to and from classes, laboratories, and field trips. The University and its employees assume no liability in the performance of classroom or laboratory instruction or on scheduled field trips, or for other dangerous activities. The student, by voluntarily participating in these classes and activities, agrees to assume the risk and not hold USU or its staff liable.

### **Agriculture Course**

**191. Orientation to Agriculture.** Orients freshman and transfer students to College of Agriculture disciplines, academic and student services, professional organizations, and career choices for students with degrees in Agriculture. (2F)

<sup>3</sup>For those desiring advanced animal management courses. Check prerequisites for all courses.

## *College of* **Business**

**Dean:** David B. Stephens  
Office in Business 202-210

**Senior Associate Dean:** John R. Cragun  
**Associate Dean for Business Relations:** Ross E. Robson

**Director of Business and Economic Development Services:**

Gary B. Hansen

**Director of the Management Institute:** Michael E. Ballif

**Director of the Small Business Development Center:**

Franklin C. Prante

**Director of the Academic Service Center:** Karen W. Peterson

The College of Business includes the following academic departments and program areas:

#### **Accountancy, School of**

Bachelor of Science (BS) and Bachelor of Arts (BA) in Accounting  
Master of Accounting (MAcc)

#### **Business Information Systems and Education**

Bachelor of Science (BS) and Bachelor of Arts (BA) in the following major fields: Business Education, Marketing Education, and Business Information Systems  
Master of Science (MS) in Business Information Systems and Education with concentrations in Business Information Systems, Business Education, Marketing Education  
Master of Education (MEd) in Secondary Education with emphasis in Business Education  
Doctor of Philosophy (PhD) and Doctorate of Education (EdD) in Business Information Systems and Education in cooperation with the College of Education  
Associate of Applied Science (AAS) in Secretarial/Administrative Support

#### **Business Administration**

Bachelor of Science (BS) and Bachelor of Arts (BA) in the following major fields: Business Administration, Finance, Marketing, and Production Management

#### **Economics**

Bachelor of Science (BS) in Agribusiness, Agricultural Economics<sup>1</sup>  
Bachelor of Science (BS) and Bachelor of Arts (BA) in Economics  
Master of Science (MS) in Agricultural Economics<sup>1</sup>  
Master of Science (MS) and Master of Arts (MA) in Economics  
Master of Agricultural Industries (MAI)<sup>1</sup>  
Master of Social Science (MSS)  
Doctor of Philosophy (PhD) in Economics with emphasis in Economics or Agricultural Economics

#### **Management and Human Resources**

Bachelor of Science (BS) and Bachelor of Arts (BA) in the following major fields: Management and Personnel/Human Resource Management

#### **College Program**

Bachelor of Science (BS) and Bachelor of Arts (BA) in Business are available as a second bachelors degree or as a dual major. To qualify as a dual major, the primary major must be outside the College of Business.

Master of Business Administration (MBA) with areas of specialization tailored to student's needs

Nondegree programs include a wide variety of seminars and development programs sponsored by the Management Institute, the Business Relations unit of the college, and various academic departments.

A variety of specialized diagnostic, consultative, manpower development, and industrial development services are rendered to individual businesses and industry groups both on site and on campus through the Small Business Development Center (SBDC).

The research arm of the college provides assistance to all units by insuring state-of-the-art competence of faculty and the appropriate technical base for both academic and outreach programs.

All bachelors and masters degree programs in business are accredited by the American Assembly of Collegiate Schools of Business (AACSB), the professional accrediting agency in business. This status facilitates transferability of credits to other institutions and acceptance of the credentials of graduates by the business community.

#### **Objectives**

The college is engaged in the following three primary areas of activity: education, outreach, and research.

Its **educational objectives** emphasize preparation for professional careers in business. However, the managerial and technical skills associated with such preparation may also lead to careers in other types of organizations such as health service, government, and education. The preparation is directed at both entry-level and midcareer qualifications. Thus, students can be immediately productive on a new job assignment and at the same time have the depth and breadth of education to assume increasing responsibilities. Additionally, experienced managers and business people can pick up needed new capabilities and renew their educational backgrounds. An extensive offering of vocationally oriented programs in clerical and technical fields is also provided. Besides its career orientation, the College of Business educational objectives include a commitment to enhancing the lifelong learning opportunities for responsible citizenship and personal satisfaction where economic and business dimensions are critical ingredients.

In implementing its **outreach objectives** the college extends its resources and services to off-campus patrons by sponsoring regional centers and by conducting on-site visits to individual firms and organizations and thereby enhancing the quality of life and economic well-being of citizens of the state.

The college is committed to an aggressive program of **research** to insure the continued enlargement of the base of understanding about business, government, and other complex institutions; about the processes of managing; and about the economic foundations upon which they function.

#### **Admission and Graduation Requirements**

Entering freshmen students accepted in good standing by the University are eligible for admission to the College of Business. Transfer students, whether from other universities or from other USU colleges, must have an overall grade point average of at least 2.20 for admission to the College of Business. Upon admission, all degree-seeking students will be identified with the College of Business **Prespecialization Unit** for the purpose of qualifying for advanced standing within their chosen major field. The College of Business Academic Service Center administers the prespecialization program for the college and provides initial counseling and guidance until such time as a student declares a major. Students may declare a major upon admission but will receive advisement through the Academic Service Center while preparing for advanced standing. Nondegree-seeking students and Associate of Applied Science students will bypass the prespecialization unit and work directly with the selected program administrators.

<sup>1</sup>See College of Agriculture for economic programs related to agriculture.



**Scholarship Requirements for Admission to Core Courses.**

Admission to the college does not insure access to the core courses required for graduation. Only those students who have completed a minimum of thirty (30) quarter credits of accepted college-level course work with a total cumulative grade point average of 2.20 or better will be admitted into 200- and 300-level core courses in the School of Accountancy, the Department of Business Administration, the Department of Business Information Systems and Education, and the Department of Management and Human Resources. (See departmental write-ups for core course listings.)

**Scholarship Requirements for Admission to 300-level Courses.**

Access to 300-level courses in the College of Business was restricted with the beginning of fall quarter 1988. Only those students who completed a minimum of sixty (60) quarter credits with a minimum GPA of 2.20 were allowed to enroll in 300-level Business Administration, Business Information Systems, and Management and Human Resources courses. The admission standard for enrollment in 300-level Accounting courses is an overall GPA of 2.50 and completion of sixty (60) quarter credits. The exceptions to this restriction were Acctg 311; BIS 300, 303, 340, and 362; and BA 346. Beginning fall quarter of 1990, an overall GPA of 2.50 will be required for admission into 300- and 400-level Business Administration and Management and Human Resources courses. A GPA of 2.20 will still be required for admission into 300-level BIS courses.

**Communication Skills and General Education Requirements.**

All students entering USU prior to fall quarter 1983, having partially completed the general education under the former program, may graduate using those requirements.

All students who enter USU beginning fall quarter 1983, seeking a degree from the College of Business, must complete the new general education requirements listed by the college.

Specific requirements for the College of Business are identified in the Communication Skills and Learning Skills areas listed below.

The Communication requirement consists of nine credit hours: Engl 101 or 111 (3 credits), Engl 200 or 201 (3 credits) and BIS 255 (3 credits).

The Learning Skills area consists of 12 credit hours: Math 105 (5 credits), BIS 140 (3 credits), and CS 150 or 170 (4 credits).

The Broadening Knowledge area of general education consists of 30 credit hours divided among four quadrants and the Integrative Option. Credit distribution for the broadening knowledge requirement for the College of Business is as follows: Humanities and Arts (0-6 credits), Social Sciences (0-5 credits), Life Sciences (5-16 credits), and Physical Sciences (5-16 credits).

A maximum of 9 of the 30 required credits in the broadening knowledge area may be in the Integrative Option courses.

**Prespecialization Program.** All degree-seeking students in the college are required to take the following core program prior to admission to "advanced standing" within the chosen departmental major field: Acctg 201, 202 (6 credits), BIS 255 (3 credits), Econ 200, 201 (10 credits), Math 105 (5 credits), MHR 299 (4 credits), Stat 230 (5 credits), CS 150 or 170 (4 credits), BIS 140 (3 credits), and either Acctg, BIS, BA, Econ, or MHR 100 (1 credit). In addition to the foregoing common core of classes for all College of Business degree-seeking students, each major field requires a unique set of prespecialization courses to qualify for advanced standing within the program area. Refer to the appropriate departmental and program section of this catalog for details concerning courses and GPA requirements.

**Advanced Standing.** The following general requirements must be met before acceptance into advanced standing in any major field:

1. Completion of 85 credits of college-level courses (or equivalent) with a cumulative grade point average of 2.50 or better is required. This will include all transfer credits. The college and major field prespecialization core program must be included. The current quarter registration may be included in the 85 credits; however, final approval of advanced standing will be contingent upon successful completion of the current quarter with the required grades.

2. Completion of the prespecialization program—both the college core and the major field core—with the following departmental required grade point average:<sup>2</sup>

- a. Accounting—2.50
- b. Business Administration—2.50
- c. Business Information Systems and Education—2.30
- d. Economics—2.50
- e. Management and Human Resources—2.50

3. Filing of a request for "advanced standing" with the College of Business Academic Service Center.

Upon completion of the prespecialization program, students who choose not to enter a major field program or who do not qualify for advanced standing within a major field will be counseled regarding alternative courses of action.

**Course Restrictions.** All 400-level and 500-level courses within the School of Accountancy, the Department of Business Administration, the Department of Business Information Systems and Education, and the Department of Management and Human Resources are restricted to the following categories of students:

- 1. Those having been admitted into advanced standing.
- 2. Graduate students.
- 3. Those requiring the course for a minor, or to meet requirements of other majors. All course prerequisites must be satisfied.

**Residency Requirement.** Forty-five of the last 90 quarter credit hours must be taken in residence at the Utah State University campus or at a designated residence center.

**Optional P/D+, D, F Grade Restriction.** This option (see general University "Grading Policy") is not available for any required courses for majors in the School of Accountancy, the Department of Business Administration, the Department of Business Information Systems and Education, and the Department of Management and Human Resources.

**College of Business Stop-out Policy.** Students who have a break in their educational experience in excess of one year will be subject to the college and department requirements in effect at the time of their return. However, if a student has received unconditional advanced standing under a previous set of requirements, this will be honored even though advanced standing requirements may have changed.

**Graduation.** Students must satisfy all University, college, and departmental major field requirements in order to be eligible for graduation. Refer to appropriate sections of the catalog for details. The College of Business requires that at least 40 percent of the credit

<sup>2</sup>Operational starting summer quarter 1984. Information concerning any change in grade point requirements is available through the individual departments and the College of Business Academic Service Center.



hours of course work required for graduation be devoted to business-related studies offered by the college, and at least 40 percent devoted to nonbusiness studies offered by other units of the University. As many as 14 credits in lower division economics may be counted in either curriculum segment. For GPA requirements in the various majors, see departmental write-ups in this catalog.

### **Minor in Business**

Some training in business is popular with students majoring in other colleges such as Agriculture, Natural Resources, Science, and Engineering. Contact departmental offices for details about requirements for a minor in business.

### **Dual Major and Second Bachelors Degree**

Beginning the summer of 1990, the College of Business will offer both a dual major and a second bachelors degree in Business. This particular option requires a broad course distribution among the departments of the college. It is therefore administered by the college, rather than by a specific department. Requirement information is available in the College of Business Academic Service Center.

See departmental sections of this catalog for requirement information concerning other second bachelors or dual major degrees within the college.

### **Graduate Study**

For information on graduate programs, see the graduate catalog.

### **Professional Organizations**

The following student organizations are available for membership, depending upon student objectives and qualifications:

American Marketing Association (AMA): Organization for marketing and marketing education majors in the College of Business.

American Production and Inventory Control Society (APICS): Professional society for production majors.

American Society for Personnel Administrators (ASPA): Organization for majors in fields of personnel and human resource management.

Beta Alpha Psi: Honorary professional accounting fraternity.

Beta Gamma Sigma: Honorary business fraternity.

Data Processing Management Association (DPMA): Organization for students planning careers in information processing and information systems management.

Delta Pi Epsilon (DPE): National graduate honorary fraternity in business education.

Economics Club: Organization for students majoring in economics.

Finance Club: Organization for students majoring in finance.

National Association of Accountants (NAA): Organization designed for accounting majors.

Phi Beta Lambda (PBL): Organization designed for business or business education majors.

MBA Association: Organization for MBA graduate students.

### **Scholarships, Fellowships, and Assistantships**

A number of scholarships and assistantships are available to College of Business students at both the undergraduate and graduate levels. See catalog section on "Scholarships and Grants-in-aid." There are also opportunities for employment on research projects and other activities. Assistantships for graduate students are available both for teaching and research. Application may be made directly to the department concerned or to the dean's office.

## **College of Education**

**Dean:** Oral L. Ballam  
Office in Emma Eccles Jones Education 109

**Associate Dean for Teacher Education and Certification:**  
Izar A. Martinez

**Associate Dean for Continuing Education and Field Services:**  
Varnell A. Bench

**Associate Dean for Research:** James P. Shaver

The College of Education has the following departments:

**Communicative Disorders**  
**Elementary Education**  
**Health, Physical Education and Recreation**  
**Instructional Technology**  
**Psychology**  
**Secondary Education**  
**Special Education**

The College of Education, in cooperation with other colleges of the University and the School of Graduate Studies, provides preparation programs for prospective teachers, for counselors and other professional personnel in education, for professionals in the human services area, and for educators placed in corporate settings. Students are urged to refer to the more detailed descriptions of programs, majors, and areas of specialization contained in this catalog. Teacher preparation programs are also offered in the following departments in other colleges: Agricultural Education, Business Information Systems and Education, Industrial Technology and Education, and Home Economics and Consumer Education.

**Accreditation.** Utah State University is a member of the American Association of Colleges for Teacher Education and is accredited by the National Council for Accreditation of Teacher Education and the Utah State Board of Education. Students who are certified to teach in the state of Utah may qualify for certification in many other states and the District of Columbia.

**General Education/Communication Skills Requirements.** All students graduating from the College of Education must complete the 40 credits of General Education required by the University and complete a 12-credit program in written communications. Students should work closely with their advisers in planning programs of study to meet all requirements.

**Admission Requirements to Teacher Education.** Students wishing to enter the Teacher Education Program at Utah State University must formally apply for admittance and be approved by the Office of the Associate Dean for Teacher Education and Certification as well as the department where the teaching major is being offered. All applicants are required to submit a record of their ACT scores. With the exception of EI Ed 100 and SecEd 201, students are not permitted to enroll in any professional education courses in Elementary and Secondary Education, nor in PE P 460, Psy 366, Sp Ed 301, and Com D 365 prior to being admitted into the Teacher Education Program. Secondary Education majors must take the writing diagnostic exam prior to being admitted to the Teacher Education program. Any writing deficiencies must be made up before student teaching.

Detailed information on the specific requirements for admission to the Teacher Education Program should be obtained from a departmental adviser or from the Office of the Associate Dean for Teacher Education and Certification.

Application for admission to professional curricula should be made before the end of the sophomore year, earlier if possible. Transfer students who have had one year of collegiate work may apply during their first quarter at USU.

**Teacher Certification.** The Dean, College of Education is assigned responsibility for the development, approval, and administration of Teacher Certification requirements for students.

The College of Education currently offers preservice teacher preparation leading to certification in 31 different areas. In addition, advanced programs leading to professional certification are available for administrators, supervisors, school counselors, school psychologists, instructional technology specialists, speech pathologists and audiologists, and specialists in special education.

Specific requirements for each certificate may be obtained from the Office of the Associate Dean of the College of Education or from the department in which the major work is offered.

For the early childhood, elementary, or secondary certificate, a closely supervised program of student teaching is conducted in selected schools throughout the state. Students should be financially

prepared to live off campus during the quarter selected as their professional quarter of student teaching.

The Bachelor of Science degree with a major in elementary or secondary education is designed for a student preparing to teach in either of these fields. Students majoring in other departments of the University who wish to prepare for teaching are admitted to teacher education curricula as heretofore described.

**Dual Certification.** A student desiring to obtain early childhood and elementary education, elementary education and middle school, or elementary and secondary certificates should consult with an adviser in the education departments early in his or her program. Ordinarily, dual certification will require at least one additional quarter of work.

**Teacher Placement Service.** The Teacher Placement Service functions as an integral part of the University Placement Center. Students who qualify for a teaching or other professional certificate may register with the service, which will help in compiling the proper credentials to be used in placement interviews. Application for placement services should be made prior to student teaching whenever possible. No fee is charged for joining the center.

**Facilities.** A nursery school is operated on campus by the Department of Family and Human Development in the College of Family Life. Here teacher education focuses on the preschool child.

The College of Education Edith Bowen Laboratory School is a functioning elementary school on the University campus, serving as a research, demonstration, and teacher training center.

The Developmental Center for Handicapped Persons is a multi-discipline training, research, and service center where students engage in activities of observing, tutoring, practicums, interning, and working individually with materials designed especially for disadvantaged youth and adults.

## **Graduate Study**

Programs at the graduate level, leading to advanced professional degrees and/or certification, are available in the administrative, supervisory, human services, clinical, and counseling areas. The MEd, MS, and MA degrees are offered in most departments. An Educational Specialist (sixth-year) program may be available in some departments. Both a Doctorate of Education (EdD) and a Doctorate of Philosophy (PhD) degree are available with emphasis in the areas of Business Information Systems and Education, Curriculum and Instruction, Educational Audiology, Elementary Education, Instructional Technology, Occupational and Adult Education, Research and Evaluation, Secondary Education, and Special Education. A PhD degree in Psychology is also offered. This catalog contains only the numbers and titles for graduate courses in the 600 and 700 series; the Graduate Catalog contains more detailed information concerning graduate study, including course descriptions.

## **Education Courses**

**500H. Senior Honors Seminar.** For students in the College of Education to explore an honors interdisciplinary theme selected by the Honors Committee as a culmination of an Honors experience. (3Sp)

**556. Practice in Improving School System Programs.** Seminar focused upon different phases of the instruction program and upon new and persisting problems in teaching. (1-6)

601. Introduction to Evaluation: Evaluation Models and Practical Guidelines. (3Su)
608. The School Principalship—Elementary, Middle, and Secondary. (3Su)
610. Theories of Supervision. (3Su)
641. Social, Cultural, and Philosophical Foundations of Education. (3Su)
654. Organization and Control of Public Schools. (3Su)
656. Practicum in the Improvement of Instruction. (1-6)
660. Correlation and Regression in Psychology and Education. Prerequisite: Psy 380. (3W,Su)
661. Inferential Statistics in Psychology and Education. Prerequisite: Psy 380. (3F,Sp)
666. Research for Classroom Teachers. (3F,W,Su)
667. Introduction to Educational and Psychological Research. Prerequisite: Psy 380. (3F,Sp,Su)
669. Introduction to Comparative and International Education. (3Su)
674. School Law. (3Su)

677. Qualitative Research. (3Sp)
680. Special Topics Seminar. (1-3F,W,Sp,Su)®
684. Workshop in Gifted and Talented Education. (1-3Su)
703. Data Collection Techniques in Evaluation. Prerequisite: SecEd 604. (3Sp)
710. Practices of Supervision. Prerequisite: Educ 610. (3F)
730. Philosophical, Historical, and Social Foundations of Education. Prerequisite: Educ 641. (6)
731. Teaching-learning Foundations in Education. Required EdD seminar. Prerequisite: Graduate general course in educational psychology. (6)
732. Supervision of Instruction. Prerequisite: Educ 710. (6)
750. School Finance. (3Su)
767. Designing Educational and Psychological Research. Prerequisites: Psy 660, 661, and 667. (3Sp,Su)

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

## College of *Engineering*

**Dean:** A. Bruce Bishop  
Office in Engineering Class 110

**Associate Dean:** Loren R. Anderson  
**Associate Dean:** Ronald L. Thurgood  
**Academic Adviser:** Kathleen E. Bayn  
**Industry and Professional Relations Director:** Robert L. Davis

The College of Engineering includes the following research units:

**Space Dynamics Laboratory:** Allan J. Steed, Director  
**International Irrigation Center:** Gaylord V. Skogerboe, Director  
**Utah Water Research Laboratory:** L. Douglas James, Director  
**Engineering Experiment Station:** A. Bruce Bishop, Director  
**Center for Space Engineering:** Frank J. Redd, Director

Interdepartmental research programs under the Engineering Experiment Station are:

Center for Computer Information Networks Research  
Center for Computer Aided Design and Manufacturing  
Center for Development of Advanced Composite Products  
Advanced Transportation Center

The College of Engineering includes the following academic departments:

Agricultural and Irrigation Engineering  
Civil and Environmental Engineering  
Electrical Engineering  
Industrial Technology and Education  
Mechanical and Aerospace Engineering

All of the undergraduate engineering programs offered by USU are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC/ABET). The BS, ME, MS, and PhD degrees are offered within specific majors. The various departments are nationally recognized for their instructional and research programs. Recent examples of note include scientific experiments of both faculty and students carried aboard the space shuttle and a major initiation grant from industry establishing a modern computer-aided design and manufacturing facility. Engineering seniors continually rank very high nationally in the Fundamentals of Engineering exam which is required for professional engineering registration. Graduates from the college hold prominent positions within industry, education, and government.

The Industrial Technology and Education Department offers the BS in Industrial Technology or Industrial Teacher Education, and the Master of Science in Industrial Education. Associate of Applied Science (AAS) degrees are available in aeronautics and drafting.

For details of the various majors and specialties offered by the above departments, see the respective departmental sections in this catalog.

### Objectives

The purposes of the college are (1) to provide students with professional competence which will enable them to enter and progress rapidly in their professional careers, (2) to provide an understanding of the physical and social world in which they live, and (3) to provide a basis for continued intellectual growth, professionally and socially.

In engineering, the course of study includes mathematics and basic science, engineering science, engineering analysis and design, English, humanities, and social sciences.

Industrial Teacher Education prepares and qualifies graduates to teach industrial and technical education in the secondary schools. In addition, a highly specialized program prepares teachers for post-high school technical college teaching.

The Industrial Technology program provides both general education and specialized training to qualify graduates for high-level technical and supervisory positions in industry.

See **Industrial Technology and Education** listing in this catalog for details on admission, academic requirements, and General Education for Technology majors.

## Admission

**Engineering Requirements.** In addition to the policies of the University concerning admission of students, the following regulations apply to the College of Engineering:

1. In order to complete the engineering curriculum in four years, high school students must complete at least two years of algebra, one year of geometry, one-half year of trigonometry, four years of English, and courses in computers, chemistry, and physics. If these courses are not taken in high school, they must be taken in college prior to starting the regular engineering programs. Students with deficiencies in several areas will probably require five years to complete graduation requirements.

Students can earn university credits in English, humanities, and social sciences by receiving appropriate scores on the College Level Examination Program (CLEP) tests. Advanced placement (AP) credit may be obtained in Calculus, Chemistry, Computer Science, English, History, and Physics.

2. Transfer students from other colleges or universities will be referred to the College of Engineering Admission Committee for evaluation. Criteria considered in admission decisions for transfer students include resources available in the requested department and the transfer GPA, along with an evaluation of the program of the former college or university. Decisions concerning academic standing once the student is admitted to USU will be based solely on USU grades.

3. Students who are registered on campus (including General Registration) must be approved by the College of Engineering Admission Committee before transferring to the College of Engineering. Students in this category must have demonstrated by courses taken at USU a potential to succeed in the major of their choice.

## Professional Engineering Program

**Introduction.** The purpose of the Professional Engineering Program (PEP) is to provide a quality education for engineering students by requiring that students be fully prepared for upper division engineering course work by having satisfactorily completed all required preprofessional courses; and by limiting enrollment in upper division courses consistent with resources available within the departments and the college.

**Policy.** Enrollment in upper division engineering courses (300-level and above) is available only to students who have been accepted into the PEP or an appropriate graduate program or have a nonengineering major which requires a specific engineering class.

**Application Requirements.** Current PEP applications listing the required PEP courses and admission standards are available from the

various departments and the office of the Dean of Engineering. The minimum requirements a student must satisfy in order to be eligible to apply for admission to a professional program are:

1. The student must be in good academic standing in the University and the college.
2. The student must achieve a grade of C- or better in every required preprofessional course. The P/D+, D, F grading option may not be used except in English composition.
3. The student must achieve an overall grade point average of 2.3 or better for all required preprofessional course work completed at USU.

**Repeated Course Work.** A student can repeat no more than three of the required preprofessional courses in order to satisfy the PEP application and eligibility requirements. Multiple repeats of the same course are included in the total of three repeats. Audits count as a time taking a class unless prior written approval is obtained from the college academic adviser.

**Transfer Credit.** Transfer credit accepted by the department and the college may be applied toward meeting the requirements for admission into the PEP; however, the grades received will not be used in the USU GPA calculation. For students with transfer credits, a final decision on admission into the PEP will not be made until after the applicant has completed at least 15 credits of acceptable engineering, math, and science course work at USU. Some of this course work may include upper division classes taken by permission.

**Applications.** Students should apply to the Professional Program midway through the quarter in which they will complete all preprofessional courses. Students may request permission to take a limited number (not to exceed 15 credits) of upper division courses if they are within 10 credit hours of completing the necessary requirements and have submitted a PEP application. The final decision on granting permission to take upper division classes before admission to the PEP rests with the appropriate department head and the Dean of Engineering.

**Admission Procedures.** Satisfying minimum eligibility requirements does not ensure that a student will be admitted to a PEP program in a specific department. The number of students accepted into the Professional Engineering Program of a department will be based upon the number of students that can be accommodated in upper division classes. Applicants will be ranked and selected in order of their academic standing in the required preprofessional courses. Admission into a PEP program is for a period of three years. Students unable to complete graduation requirements during this time will be interviewed by the department head to determine whether special circumstances justify their continuance in the program.

## Academic Requirements

The Dean's Office of the College of Engineering maintains a handout sheet giving current details of all academic regulations of the college. **It is the responsibility of the student to know the current regulations and to follow these regulations.**

**Preprofessional Program.** Students must maintain a USU GPA of 2.0 to remain in good standing both in the college and the University. Students in a preprofessional program who are not making satisfactory progress toward acceptance into a professional program or who become ineligible to enter a professional program will be suspended from the college. Students in good standing in a

preprofessional program must still meet the entrance requirements for admission into a professional program.

**Professional Program.** For all engineering majors in the professional program the following academic regulations apply in addition to University regulations:

1. A GPA of 2.0 or higher must be maintained in all engineering/math/science courses required for, or used as technical electives in, the chosen major. Courses which were part of the preprofessional program requirements and general education courses are not included in this GPA calculation.

2. No more than 10 hours of *D* or *D+* credit may be applied toward meeting graduation requirements in engineering/math/science classes.

3. College of Engineering courses may be repeated only once. Audits count as a time taking a class unless prior written approval is obtained from the department head. A maximum of three required or elective courses completed as part of a professional program can be repeated in order to meet graduation requirements. (Courses completed as part of a preprofessional program are not included in this total of three repeats.)

4. The *P/D+*, *D*, *F* grading option may not be used in required or elective courses completed as part of a professional program. (The *P/D+*, *D*, *F* grading option is approved for General Education Courses.)

5. The academic regulations listed above (1-4) apply to required course work and any elective engineering/math/science course which could be used to satisfy graduation requirements for the chosen degree. That is, once a student completes a particular technical elective, it becomes a required course for that student.

6. Students in violation of departmental or college academic regulations, no longer eligible for graduation, or not making satisfactory progress toward a degree, will be placed on probation.

a. Students will be placed on probation if they (i) earn an *F* in an engineering/math/science course which could be used to satisfy graduation requirements for the chosen degree (see No. 5 above); (ii) have more than 10 hours of *D* credit (see No. 2 above); or (iii) have a GPA of less than 2.0 (see No. 1 above).

b. Students remain on probation until they improve their standing by repeating and passing all failed classes, repeating classes to reduce the number of *D* credits to 10 or less, and/or by raising their GPA above 2.0.

c. While on probation, a student must earn a quarterly GPA of 2.0 or higher in engineering/math/science classes and must not earn any *D*'s or *F*'s.

While on probation, a student may not preregister. The student's major code will be changed to a preprofessional code. The student must meet at least quarterly with the college academic adviser to work out a schedule having the primary goal of correcting the existing academic problems.

## General Education

General Education requirements in the College of Engineering are somewhat more restrictive than University requirements. Students who meet the engineering requirements satisfy the University requirements. Engineering students should obtain detailed information concerning General Education from the college academic adviser.

## General Engineering

Engineering students are encouraged to select a major as soon as possible. Most of the courses taken during the freshman year are common to all engineering majors; however, there are significant differences in the courses taken during the sophomore year. Students who have not selected a specific major should meet with the college academic adviser for assistance in planning a personalized program. Students who choose to remain in general engineering must be prepared to meet the specific requirements of a professional program in the department of their choice. Detailed course requirements for admission into the professional programs are given in the departmental sections of this catalog.

### Common General Engineering Program

**Freshman year:** Math 220, 221, 222; Chem 121, 122, 124; Phyx 221; Engl 101 or 111; General Education (6-9 credits); engineering courses (6-9 credits); Computer Science (0-4 credits). Total credits, 46-49.

**Sophomore year:** Math 320, 321, 322; Phyx 222, 223; Engr 200, 202; Engl 200 or 201; Electrical Engineering (3-4 credits); General Education (3-10 credits); engineering courses (9-15 credits); Computer Science (0-7 credits). Total credits, 48-54.

## General Engineering Courses

**PS 101. Introduction to Engineering.** Introduction to engineering with basic problems and solutions. Course structured for the nonengineering student. Prerequisites: some trigonometry or instructor's permission. (2F,W,Sp)

**103. Digital Computer Utilization.** Introduction to computer programming and the use of digital computers in engineering problem solving and data processing. Prerequisite: Math 220. (3F,W,Sp)

**PS 105. High Technology Society.** High technology developments and their impact on society are explored. Specific areas of study include communication systems, computer utilization, laser technology, robotics, energy development, waste treatment, and food production. (3)

**200. Engineering Mechanics Statics.** Resultants and equilibrium of force systems, friction centroids, moments of inertia, method of work. Prerequisite: Math 221. (3F,W,Sp)©

**202. Engineering Mechanics Dynamics.** Kinematics, and force-mass-acceleration. Prerequisite: Engr 200. (3F,W,Sp)©

**203. Engineering Mechanics Dynamics.** Work-kinetic energy, impulse momentum, and vibrations. Prerequisite: Engr 202. (3F,W,Sp)

**204. Mechanics of Solids.** Stress, strain, and deflection due to tension, compression, and torsion. Mohr's circle for stress and strain. Prerequisite: Engr 200. (3F,W,Sp)

**270. Electrical Engineering.** Analysis of electrical circuits, transient and steady-state AC response, digital and analog electronics, electrical energy generation, transmission, and utilization. Prerequisites: Phyx 222 and Math 222. (4Sp)

**293. Special Problems.** Independent or group student study of engineering problems not covered in regular course offerings. (1-3F,W,Sp)

**330. Thermodynamics.** First and second laws of thermodynamics. Prerequisite: Math 322. (3F,Sp)

## Additional Engineering Information

**Professional Societies.** Faculty members of the departments hold memberships in various professional societies and organizations.

Student chapters or societies include American Society of Agricultural Engineers, American Institute of Aeronautical and Astronautical Engineers, American Society of Civil Engineers, Institute of Electrical and Electronic Engineers, Society of Manufacturing Engineers, American Society of Mechanical Engineers, American Water Resources Association, Tau Beta Pi, Vocational Industrial Clubs of America, American Welding Society, Alpha Eta Rho, and Society of Women Engineers. Students are encouraged to affiliate with appropriate student societies.

The Engineering Council is comprised of a student from each department and a staff member from the Dean's Office. The college senator is chairperson. The council meets regularly to provide effective student-staff-administration liaison.

**ROTC.** Many engineering students find satisfaction in serving their country in the Reserve Officers Training Program (ROTC) and as reserve officers after graduation. Junior and senior ROTC students receive compensation equivalent to a substantial scholarship. See Military Science and Aerospace Studies department listings.

**Scholarships, Fellowships, and Assistantships.** A number of scholarships and assistantships are available to College of Engineering students. Interested high school seniors are encouraged to write to the Financial Aid Office of the University before March 1 of the year they wish to receive assistance. See Awards, Honors, Scholarships, and Grants-in-aid section of this catalog. There are also opportunities for employment on research projects and other activities.

**Graduate Assistantships and Fellowships.** Excellent graduate assistantships, fellowships, and scholarships are available in all departments. Assistantships are available both for teaching and research. Applications should be made directly to the department concerned.

**Interdepartmental Curriculum in Environmental Engineering.** The Interdepartmental Curriculum in Environmental Engineering is an interdisciplinary graduate level program. A student who has decided upon a career in environmental engineering will find it advantageous to contact the Environmental Engineering Division within the Civil and Environmental Engineering Department at the earliest opportunity to plan a program that will prepare him or her to enter the graduate program for the fifth year of engineering education. (See Graduate Catalog for details).

**Research.** The College of Engineering maintains an extensive program of research through the Engineering Experiment Station and the various departments and laboratories. There are opportunities for graduate students to participate, and many undergraduates can find employment in research programs.

**Space Dynamics Laboratory.** The research laboratories which comprise the Space Dynamics Laboratory (SDL) are located on the USU campus at Logan and at Bedford, Massachusetts. The faculty members of these laboratories hold academic appointments as appropriate in the Electrical Engineering, Mechanical and Aerospace Engineering, and Physics Departments, and working assistantships are available for good undergraduate and graduate students in these and closely related departments. The faculty and staff specialize in upper atmospheric and space measurements using electro-optical and electro-dynamical instrumentation flown on rockets, satellites, aircraft, and balloons. A current major project is flying a cryogenically cooled interferometer spectrometer aboard the space shuttle.

**International Irrigation Center.** The International Irrigation Center conducts an extensive program of irrigation training and technology transfer through multi-lingual courses and through research. The center contributes significantly to improved irrigation practice, water management, and food production through these activities.

**Utah Water Research Laboratory.** The Utah Water Research Laboratory offers facilities and student support for water research, including surface and ground water resources management and use. Strong programs have been developed through multiple projects in weather modification, water quality control, waste water treatment, hydraulics, flood and erosion control, hydrology, groundwater modeling, salinity control, water use in energy development, water systems optimization, and the socioeconomic aspects of water resources planning. Studies are coordinated with academic programs in the Departments of Civil and Environmental Engineering, Agricultural and Irrigation Engineering, and related departments in other colleges.

**Engineering Experiment Station.** The Engineering Experiment Station furthers engineering science, education, and practice through a variety of research programs to serve the needs of Utah and the nation. The experiment station especially encourages the development of interdisciplinary, interdepartmental research. Major activities are currently underway in the Center for Computer Aided Design and Manufacturing, the Center for Computer Information Networks Research, and the Center for Development of Advanced Composite Products.

**Graduate Study.** The college offers graduate study programs leading to the ME, MES, MS, CE, IE, and PhD degrees. For further information and details, see the Graduate Catalog.

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©This course is also offered by correspondence through the Life Span Learning Independent Study Division.

## *College of* **Family Life**

**Dean:** Bonita W. Wyse  
Office in Family Life 203B

**Associate Dean for Extension:** Marilyn B. Noyes

The College of Family Life has the following departments and areas of specialization:

### **Family and Human Development**

Family and Human Development, with emphases in Human Development

Marriage and Family Relationships  
Early Childhood Education<sup>1</sup>

## General Family Life<sup>2</sup>

### Home Economics and Consumer Education

Home Economics Education  
Fashion Merchandising  
Interior Design

### Nutrition and Food Sciences<sup>3</sup>

Nutrition and Food Sciences, with options in  
Food Science, Consumer Food Science, Business Food  
Science, Dietetics, and Nutrition Science

## Objectives

The College of Family Life views the family as the major source of nurturance, protection, and support for the individual. The basic mission of the College of Family Life is to improve the quality of human life in the context of family living, through maximizing the input and communication of relevant knowledge via teaching, research, extension, and other outreach programs.

Programs in the College of Family Life are designed to achieve three objectives:

1. to prepare professionals to assume leadership and service roles in society by preparing them for careers in community agencies, teaching, industry, and business.
2. to provide quality community services to families.
3. to provide relevant general education for all University students and the community.

## Degrees

Degrees offered in the College of Family Life include the Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), Doctor of Philosophy (PhD) in Nutrition and Food Sciences, and PhD in Family Life. The Family Life PhD was established in the fall of 1985 and can be earned with an emphasis in Family and Human Development at the present time.

## Admission Requirements

Students accepted in good standing by the University are eligible for admission to the College of Family Life.

## Academic Requirements

In addition to the University requirement of 40 credits of General Education, the College of Family Life requires 9 credits of written communication. This requirement may be filled by completing Engl 101 or 111; Engl 200 or 201; and Engl 301 or 305. The 100-level requirement is waived if the student scores 25 or higher on the English section of the ACT Exam, receives a 3 or higher on the English Advanced Placement Exam, or scores 610 or higher on the English section of the CLEP Test.

Academic requirements vary as a function of each department's

standards and policies. It is the responsibility of the student to be informed about departmental requirements and regulations. For complete information, consult with departmental adviser.

A 2.5 grade point average is required in the major area. A 2.0 overall grade point average, consistent with the University requirement for graduation, is required by the College.

*Pass/D+, D, F* option may not be used in major courses or in supporting courses, unless authorized by departments.

The number of credits required for a major will be specified by area of concentration, subject to minimum University requirements.

To provide a common base of understanding, all majors in the College of Family Life will complete 13-15 credits (depending upon the choices made) selected from the following groups of courses:

## Required Courses

1. Roles and interrelationships of families (1 of 3): FHD 120, 150, or 304.
2. Management and decision making in family development and daily living (1 of 3): HECE 255, 349, or 355.
3. Aesthetic qualities of the environment (1 of 3): HECE 105, 215, 265.
4. Nutrition in human growth and development (1 of 3): NFS 122, 222, or 440.
5. Develop an understanding of the interdisciplinary nature of the College and its programs. Required course: FL 110.

## General Family Life Major

This program is designed for the person who does not wish to specialize but desires a basic understanding of the various areas of family life: Nutrition and Food Sciences; Family and Human Development; Interior Design; and Fashion Merchandising.

Seventy-five credit hours—with not less than 12 in each of the subject matter areas of the College of Family Life—are required for the major. A student must complete all prerequisites required by the courses chosen. Students are encouraged to supplement the subject matter program with course work or a minor in journalism, social work, or business. Courses may be selected from those offered by the individual departments.

Graduates should seek positions for which a general background is required, such as social services, journalism, government service, international service, and business.

As soon as possible after choosing this major, the student should consult with an adviser.

## Graduate Study

All departments within the College of Family Life offer a graduate program. See the graduate catalog for more detailed information.

## Family Life Course

**110. College of Family Life Orientation.** Provides an understanding of the interdisciplinary nature of the college, its programs, and its faculty. (1W)

<sup>1</sup>Jointly administered with the Department of Elementary Education in the College of Education.

<sup>2</sup>An interdepartmental major administered by the Department of Home Economics and Consumer Education.



## College of

# Humanities, Arts and Social Sciences

**Dean:** Robert A. Hoover

**Associate Dean:** Richard C. Haycock

**Associate Dean:** Joyce Kinhead

**Associate Dean for Research and International Education:**

Brian L. Pitcher

**Administrative Assistant:** Remona Atkinson

**Supervisor, College Graduation and Academic Services:**

Jennifer W. Tingey

**College Adviser and Coordinator of Undeclared Advising:**

Mary E. Leavitt

Office in Main 131

The College of Humanities, Arts and Social Sciences has the following departments and programs:

**Aerospace Studies**

**Art**

**Communication**

**English**

**History**

**Intensive English Language Institute**

**Landscape Architecture and Environmental Planning**

**Languages and Philosophy**

**Liberal Arts and Sciences Program<sup>1</sup>**

**Military Science**

**Music**

**Political Science**

**Sociology, Social Work and Anthropology**

**Theatre Arts**

**Undeclared**

A listing of majors and degrees can be found under each department or program.

Within the College of Humanities, Arts and Social Sciences are found those departments which provide career preparation in some of the most interesting and vital academic fields. The study of society, the governing of society and its history, communication in a number of languages, the various aspects of culture—all these appeal to an increasing number of undergraduate and graduate students. Many train for careers in these fields; more—scientists, engineers, etc.—take courses to broaden their horizons and add interest to their lives.

It is probably fair to say that the social trend is toward an awareness that while material things are important they are not enough for a full life. For this, the individual may turn to literature, art, music, and theatre. Concern with environmental problems may lead the student to an investigation of landscape architecture. The complexities of modern life necessitate an understanding of the social sciences and history. It is within the College of Humanities, Arts and Social Sciences that these needs may be fulfilled.

## Admission and Graduation Requirements

Students accepted in good standing by the University are eligible for admission to the College of Humanities, Arts and Social Sci-

ences. Because of limitations of faculty and/or space, a few departments within the college, such as Art and LAEP, limit enrollment in their professional programs. See the departmental sections in the catalog and the department head for information regarding these limitations and/or requirements in addition to the University graduation requirements.

## Undeclared

**Coordinator:** Mary E. Leavitt

Office in Main 128

The chief function of the Undeclared program is the advisement of students who have not decided upon a major or area of specialization. The Undeclared coordinator finds a suitable adviser for each of these students. With the aid of this adviser, the coordinator looks after the student's academic interests and encourages him or her to pursue a general education program while exploring his or her own aptitudes and various career opportunities in order to choose a major field.

Students who are enrolled in another department but believe they have chosen their major unwisely may transfer to the Undeclared program upon receiving permission from the dean of the College of Humanities, Arts and Social Sciences.

No degree is offered through the Undeclared program; however, the courses taken will count toward graduation credit. Students should plan to transfer into an academic field offering a degree before the end of the sophomore year.

## Women's Studies

**Program Coordination:** College of Humanities, Arts and Social Sciences

Office in Main 131

The Women's Studies program is multidisciplinary and focuses on the changing roles of women and men in society. It provides the individual student an opportunity to become academically involved in a program which deals with the socialization and gender roles of adults together with analyses of these roles and changes from early childhood. The program also emphasizes the contributions of women in the past, during the present, and toward the future. By providing insight into the effects of changing role patterns on both men and women, the Women's Studies program prepares students to better cope with current and future changes and to become an influential force in the shaping of those changes.

A number of Women's Studies courses are being taught by faculty members in departments throughout the campus each quarter, and more courses are being developed to meet the current and future needs of the program.

Students may enroll in individual courses or apply course work toward either a minor in Women's Studies or an Area Studies certificate. For further information see the program brochure or

<sup>1</sup>Jointly administered with the College of Science.

contact Pamela Riley, Department of Sociology, Social Work and Anthropology, or the dean of the College of Humanities, Arts and Social Sciences.

**Minor in Women's Studies.** Students may obtain a minor in Women's Studies by completing a total of 18 credits in the field. HECE/Soc 238 is the only required course. The remaining credits should be selected from the following courses: Anthr 407/607, PE P 407, PolSc 319, HECE 355, Soc 473/673, HE P 420, Soc 680, Engl 330, El Ed 620, Honor HU 326, and Hist 460.

## Mountain West Center for Regional Studies

**Director:** F. Ross Peterson

**Associate Director:** Shannon R. Hoskins  
Office in Main 248

The Mountain West Center for Regional Studies gathers scholars, departments, and resources of Utah State University to facilitate an interdisciplinary approach to regional studies. The center is founded on three assumptions: that the humanities are essential to the fulfillment of the University's mission, that regional studies make possible a better understanding of the values and assumptions that shape society, and that such studies are strengthened by communication and cooperation among academic departments.

The center brings together scholars from the areas of history, folklife and folklore, anthropology, art, and literature. It develops programs, administers scholarships, and provides support for research on the Mountain West. It makes possible symposia, publication, interpretation, preservation, public outreach, and graduate student training in the humanities.

## College of Natural Resources

**Dean:** Joseph A. Chapman  
Office in Natural Resources 108

**Associate Dean:** Frederic H. Wagner  
**Assistant to the Dean:** Charles W. Gay  
**Development and Public Relations:** Mary Lu Roskelley  
**Coordinator of Outreach Education:** Sharon L. Ohlhorst  
**Academic Services Adviser:** Mary Morton

The College of Natural Resources has the following departments:

**Forest Resources**  
**Range Science**  
**Fisheries and Wildlife**  
**Geography and Earth Resources**

The cooperating programs of the center include the David and Beatrice Evans Biography Award, the Fife Folklore Program and Archives, the Nora Eccles Harrison Museum of Art, the Ronald V. Jensen Living Historical Farm, the Merrill Library Special Collections, the Utah History Fair, the Utah State University Anthropology Museum, the Utah State University Press, *Western American Literature*, the *Western Historical Quarterly*, and the Western Writers' Conference.

## Humanities, Arts and Social Sciences Courses

The College of Humanities, Arts and Social Sciences offers interdisciplinary courses which combine the humanities, arts, and social sciences and which are team taught, drawing faculty from among the departments of the college.

**125. Interdisciplinary Workshop.** (1-6)

**129. Women's Studies: Special Topics.** An interdisciplinary course to present current issues and topics in Women's Studies. (1-9)

**225. Introductory Internship/Coop.** Introductory level educational work experience in an internship/cooperative education position approved by the departments in the College of Humanities, Arts and Social Sciences. (1-6)

**425. Advanced Internship/Coop.** Internship/cooperative education work experience; increased complexity and a more professional level of experience as a student advances toward completion of the program. (1-15)

**480H. Honors Senior Seminar.** Oral presentations and discussion of senior thesis projects and some guest presentations on ways of knowing among various academic specialties. (3Sp)

**525. Interdisciplinary Workshop.** (1-6)

**529. Women's Studies: Special Topics.** An interdisciplinary course to present current issues and topics in Women's Studies. (1-9)

**625. Graduate Internship/Coop.** (1-15)

A list of degrees and areas of emphasis can be found in the section for each department. The college also has two interdisciplinary programs: a program in environmental studies leading to the BS degree and a program in watershed science leading to BS, MS, and PhD degrees.

The College of Natural Resources provides programs of study and professional training in the use and management of natural resources. Natural resources deals with renewable land and water resources and their management for food, fiber, water, and recreation in a relatively natural setting. The forests, rangelands, wildlife, fisheries, watersheds, and recreation resources comprise the natural

resources in which the college has developed professional competence. The college's competence in geography provides the link between the management of these resources and their value to our society and other cultures in time and place.

The favorable geographical location of the college provides exceptional facilities for field experience. Forest and range lands in Utah comprise more than 90 percent of the total state area. The Wasatch National Forest, within two miles of the school, the Bear River Migratory Bird Refuge and Bear Lake, within 40 miles, and vast areas of natural lands provide forest, range, soil conservation, and fisheries and wildlife problems, and offer unlimited study projects and opportunities for demonstration. Herds of elk and deer can be studied close to the campus during the winter. Primitive areas, Yellowstone Park, and other national parks are within one day's driving distance.

**Career Opportunities.** The curricula of the college prepare men and women for positions with federal or state agencies, for private work in natural resources management and administration, and for positions in education.

Students in the Department of Forest Resources may choose from four majors: one designed to train for general forest management work typified by that in public land management agencies, one in watershed science, one in environmental studies, and one in recreation resources. The general forest science curriculum has programs of emphasis in forest biology, forest management, forest recreation, and forest watershed management. The recreation resource curriculum has programs of emphasis in interpretation, tourism, and management.

Students in Range Science may select from programs of emphasis in range management, forest-range management, range watershed management, range resource economics, international range management, game-range management, range livestock production, or rangeland rehabilitation. The Fisheries and Wildlife Department offers specialization in the areas of terrestrial wildlife and fisheries management, with emphases in law enforcement and graduate school preparation. Within terrestrial wildlife, one may emphasize waterfowl management, big game management, upland game management, or game pathology. Within fisheries management, one may emphasize fish pathology, fishery research, water pollution biology, or limnology. The Geography and Earth Resources Department offers students the opportunity to specialize in remote sensing, geographic information systems (GIS), cartography, environmental modeling, international development, community and rural planning, and geographic education.

Students will make more satisfactory progress if they have had two years of high school algebra, geometry, and also chemistry, physics, typing, and biology. Four years of English are also desirable. An interest in and an aptitude for studying natural science are important. Mere field ability is not sufficient. Prospective students should realize that natural resource fields are highly technical professions. They require high aptitude for scholarship and technical development. Success is correlated also with an ability to deal well with people.

**Admission.** Application forms may be obtained from the Admissions Office. Transfer students should send their college transcripts, with their application for admission, to the Office of Admissions and Records.

Students accepted in good standing by the University are eligible for admission to the College of Natural Resources. Departments may

impose additional requirements; refer to departmental sections for information.

**Summer Camp.** Successful completion of field instruction at the college-operated summer camp is required of students who plan to major in the forestry curricula in the Forest Resources Department or Range Science. In order to be admitted into summer camp, which is normally attended at the end of the sophomore year, a student must have achieved a 2.2 grade point average and have completed most of the course work required in the first two years. The camp opens early in June (usually the first Monday after the end of spring quarter) and continues for six weeks. Nine credits are allowed for the complete program. In addition to the regular summer quarter fees, a fee is charged for each of the four courses. Board is provided on a cost basis; lodging is without cost.

Transfer students should note that (1) the camp program is a prerequisite to some professional forestry course work in the junior year; and (2) in addition to completion of two years of college work, the pattern of courses taken at another college should essentially duplicate that required of freshmen and sophomores in this college.

**Field Trips.** Several are planned each year as part of regular class instruction. Besides short trips scheduled for individual courses, some departments conduct extensive field problems trips. Fees are usually charged each student to defray expenses of the trips.

**Loan Funds.** Several sources of funds are available on a loan basis to worthy, deserving upper division students in the College of Natural Resources. These include the W. B. Rice Memorial Loan Fund, the Lewis Turner Memorial Fund, the Arthur Pirsko Loan Fund, the George H. Kelker Loan Fund, and the East Carbon Wildlife Federation Loan Fund. Loans are made for short periods. Application should be made through the dean's office.

**Scholarships and Assistantships.** A number of scholarships and assistantships are available to students in the college. Interested high school seniors and transfer students are encouraged to write to the dean's office regarding these. See also Awards, Honors, Scholarships, and Grants-in-aid.

**Graduation Requirements.** The following general requirements must be met for graduation from the College of Natural Resources: (1) 195 credits in the Department of Forest Resources depending on major, and 186 credits in the Department of Fisheries and Wildlife, the Department of Range Science, and the Department of Geography and Earth Resources; (2) all courses prescribed under the study program of one's chosen field; (3) fulfillment of the General Education requirements of the University; (4) proficiency in written and spoken English (if deficient in English, a student is required to pass certain supplementary or corrective courses in addition to regular requirements); (5) a grade point average of 2.2 in professional courses and 2.0 in all University courses, except that geography majors and teaching minors are required to maintain a 2.5 grade point average in all geography courses. A deficiency in grade point may be remedied by taking additional professional courses or by repeating professional courses for which a low grade was received.

### **Natural Resources Courses**

The College offers the following interdepartmental courses tying together basic concepts, problems, and purposes in the various natural resource fields:

**IO 101. Natural Resources and the Future.** Relationship of resource availability, population levels, policy decisions, and life-styles to carrying capacity. Manipulation of natural resources to reach given objectives. (3F)

**102. Natural Resources and the Future—Discussion Session.** This course is the discussion session for NR 101 and is optional for all but Natural Resources majors; not recommended for General Education Integrative Option students. (1)

**201. Computer Techniques.** In a "user friendly" manner, shows students how to use a variety of computer hardware and software features that are necessary for upper division natural resources courses. (4Sp)

**360. Quantitative Analysis for Natural Resource Management.** Review, application, and extension of quantitative skills into natural resource management areas. Prerequisites: Math 215; Stat 201 and 501, or Stat 502 or equivalent; NR 201; FORTRAN. (5)

**370. Quantitative Methods for Natural Resource Management II.** Application of quantitative methods to problem-solving in natural resources inventory, assessment, management, and research. Prerequisites: College algebra, calculus, and NR 360. (5Sp)

**380. Natural Resource Management.** Problem identification, problem solving, planning, and decision making presented in the context of the land manager. Theory, quantitative analysis, and application to natural resource management situations. Concurrently with NR 390. Prerequisite: NR 360. (4W)

**390. Natural Resource Policy.** Politics of policy process for natural resources, from agenda setting to implementation; current resource issues and unique aspects of policy making for natural resources. (4Sp)

**501. Natural Resources for Teachers.** Field course designed to acquaint teachers with natural resource issues, teaching methods, and materials. (4Su)

**576. Modeling Biological Systems.** Introduction to mathematical and computer modeling of biological systems, emphasizing ecological systems. Prerequisites: Math 216 or 221, at least one upper division course in Natural Resources or Biology, Stat 201, and computer programming or permission of instructor. Three lectures, one recitation. (4F)

**577. Modeling Forest Dynamics.** Theory and methods of forest succession modeling. Analysis and construction of tree and forest ecosystem simulation models. Emphasis on methods and application. Prerequisites: General Ecology, Math 215, Stat 501 or equivalent, CS 241, or consent of instructor. (3Sp)

### Graduate<sup>1</sup>

**601. Directed Teaching in Natural Resources.** (1-5)

<sup>1</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

## College of Science

**Dean:** James A. MacMahon  
Office in Science Engineering Research 101

**Associate Dean:** Antone H. Bringhurst

The College of Science has the following departments, center, and program:

Biology  
Chemistry and Biochemistry  
Computer Science  
Geology  
Mathematics and Statistics  
Physics  
Center for Atmospheric and Space Sciences  
Cooperative Nursing Program

Degrees, areas of specialization, and program descriptions are listed with the departments, CASS, and the Nursing Program. In addition, there are three interdisciplinary programs which involve the college. The Molecular Biology (MB) Program consolidates and provides emphasis for research and teaching related to molecules in biological systems. Students in the college majoring in either Biology or Biochemistry can receive advanced degrees with a molecular biology/biochemistry emphasis. The Department of Biology participates in the Interdepartmental Graduate Program in Toxicology. This program offers research opportunities leading to advanced

degrees within several specialties of toxicology. The College also participates in an interdisciplinary, interdepartmental program in ecology which operates under the Ecology Center. The Ecology Center brings distinguished scientists to campus, fosters faculty research, and enhances graduate education in all areas of ecology.

### Objectives

USU has always given a high place to the sciences. Modern civilization is based on science, most facets of which are fundamental in a land-grant university.

Opportunities for rewarding careers are excellent in the fields of science. These opportunities exist in education, research, conservation, service, and industry.

The curricula of the science departments are designed to achieve five purposes:

First, they serve all students. No college graduate can be considered educated without an appreciation of scientific principles.

Second, the college trains teachers of science at all levels of education. Highly competent teachers are absolutely essential to the continued well-being and development of society.

Third, students are prepared to take positions in industry and business in a highly technological world.

Fourth, education is provided in the health fields both at the pre-professional and entry level. The college has excellent programs in pre dental and premedical education with an exceptional record of placing students in dental and medical schools. Undergraduate degrees in the various departments of the college can be tailored to include pre dental and premedical training. Other programs prepare graduates to enter the health profession directly upon graduation.

Fifth, the College of Science educates research scholars in many fields of science. This is accomplished by completing a sound undergraduate degree in the field, followed by years of graduate specialization.

Students planning to enter the sciences are urged to discuss their plans and goals early with advisers, who are available in each academic department. Basic course work in mathematics, chemistry, physics, and computer science is essential to most areas of science.

### Admission Requirements

Students accepted in good standing by the University are eligible for admission to all departments in the College of Science. Students majoring in Computer Science must qualify for advanced standing status on the basis of their academic performance. Specific details are given in the Computer Science section of this catalog.

### Advanced Placement Credit

Students who have taken advanced placement courses in science, computer science, or mathematics and who have scored sufficiently high on the AP exams are given credit toward graduation. These students should check with the individual departments to determine where they should be placed in their courses.

### General College Requirements

**Written Communications Requirement.** In addition to the University's written communication requirement, the college requires a junior level writing class. This requirement may be filled by completing either English 301 or 305.

**Bachelor of Science Requirements.** Students working toward the Bachelor of Science degree must complete the following courses:

- A. Math 220 and 221.
- B. Either Stat 201 or CS 171.
- C. One of the following sequences: (1) Biol 125 and either Biol 126 or Biol 127; (2) Chem 121, 122, and 124; (3) Geol 111 and 200; (4) Phyx 221 and 222.

Majors in Biology, Chemistry and Biochemistry, Geology, and Physics **cannot** satisfy requirement C by taking a sequence in their own discipline. Higher level courses than the ones listed in the three categories above may be substituted in some instances. Approval for any substitutions must be obtained in advance.

**Note:** The above Bachelor of Science requirements are **not** in effect for the Bachelor of Arts degree.

### Science Majors

A lower division student who wishes to major in science, but who has not selected a specific major, may register in the college as a

science major. During the freshman year, a course of study will be taken which will prepare the student for further study in any of the departments within the college. At the end of one year of study, the student should transfer to a specific department.

**Scholarships.** Each year, the college offers a four-year scholarship to an outstanding freshman entering the University. The scholarship consists of up to 12 quarters of tuition waivers plus \$2,000 given over four years (\$500 per year). The scholarship is awarded on the basis of performance on a College of Science exam, ACT scores, and grades received in high school. The College of Science Scholarship exam is given at the time of the University Scholar Competition. Other scholarships are available through some of the departments in the college. See the Awards, Honors, Scholarships, and Grants-in-aid section of this catalog.

**Graduate Assistantships and Fellowships.** Excellent graduate assistantships and fellowships are available in all departments. Assistantships are available both for teaching and research. Applications should be made directly to the department concerned.

**Graduate Study.** Graduate study programs leading to the MS degree are available in each department in the college. In addition, the Department of Mathematics and Statistics offers a MMath (Master of Mathematics) degree. The departments of Biology, Chemistry and Biochemistry, Mathematics and Statistics, and Physics offer programs leading to the PhD degree. See the graduate catalog for more information on these programs.

### Liberal Arts and Sciences Program

The College of Science, in cooperation with the College of Humanities, Arts, and Social Sciences, sponsors the Liberal Arts and Sciences Program (LASP). LASP promotes integrated learning across the life sciences, humanities, physical sciences, arts, and social sciences. All USU students are welcome in LASP. With college and departmental consent, the LASP Area Studies Certificate may be used in place of the *Broadening Knowledge* portion of General Education. The certificate, along with the LASP minor and major, are described on pages 31-32.

### Honors Program

Several departments in the college participate in the University Honors Program by offering special honors courses and by sponsoring an option for graduation with departmental honors.

### Undergraduate Research

The sciences provide an ideal setting for research. Many departments within the College of Science provide opportunities for undergraduate students to participate in research activities. Interested students should discuss this option with their academic adviser.

### Science Courses

**301. Science Colloquium.** A course offered in connection with the Ralph Johnson Summer Lecture Series. (1-2)

**430. Science in Society.** An investigation of the interactions between current scientific topics and societal goals and concerns. Intended as a capstone for the LASP Science and Society cluster and science teaching majors. Prerequisite: senior standing and consent of instructor. (3F,Sp)

# Departments

## *College of Agriculture*

- 54 Agricultural Education
- 57 Animal, Dairy and Veterinary Sciences
- 93 Economics
- 167 Nutrition and Food Sciences
- 173 Plants, Soils, and Biometeorology

## *College of Business*

- 49 Accountancy, School of
- 72 Business Administration
- 75 Business Information Systems and Education
- 93 Economics
- 151 Management and Human Resources

## *College of Education*

- 88 Communicative Disorders
- 101 Elementary Education
- 121 Health, Physical Education and Recreation
- 140 Instructional Technology
- 181 Psychology
- 185 Secondary Education
- 193 Special Education

## *College of Engineering*

- 53 Agricultural and Irrigation Engineering
- 82 Civil and Environmental Engineering
- 98 Electrical Engineering
- 135 Industrial Technology and Education
- 158 Mechanical and Aerospace Engineering

## *College of Family Life*

- 108 Family and Human Development
- 131 Home Economics and Consumer Education
- 167 Nutrition and Food Sciences

## *College of Humanities, Arts and Social Sciences*

- 51 Aerospace Studies
- 62 Art
- 86 Communication
- 103 English
- 128 History
- 143 Intensive English Language Institute
- 144 Landscape Architecture and Environmental Planning
- 146 Languages and Philosophy
- 161 Military Science
- 163 Music
- 177 Political Science
- 188 Sociology, Social Work and Anthropology
- 196 Theatre Arts

## *College of Natural Resources*

- 111 Fisheries and Wildlife
- 113 Forest Resources
- 117 Geography and Earth Resources
- 183 Range Science

## *College of Science*

- 66 Biology
- 79 Chemistry and Biochemistry
- 91 Computer Science
- 119 Geology
- 154 Mathematics and Statistics
- 170 Physics
- 199 Cooperative Nursing Program

# School of Accountancy

## College of Business

**Head:** Professor Clifford R. Skousen  
Office in Business 515

**Professors** Frank A. Condie, David H. Luthy, Richard L. Ratliff; **Arthur Andersen Executive Professor** Jay H. Price, Jr.; **Associate Professors** James W. Brackner, I. Richard Johnson; **Assistant Professors** E. Vance Grange, Richard L. Jensen; **Adjunct Assistant Professor** Dale G. Siler; **Instructors** Rosemary R. Daniels, Ralph L. Peck, Jack W. Peterson; **Adjunct Lecturer** M. Kay Jeppesen

**Degrees offered:** Bachelor of Science (BS), and Bachelor of Arts (BA) in Accounting; Master of Accounting (MAcc)

### Objectives

The objectives of the accounting program emphasize preparation for professional careers in accounting. Two professional programs are offered which are designed to prepare students to commence or continue to develop professional accounting careers in industry, nonbusiness organizations, and public practice. Students may complete a baccalaureate program or, by integrating the baccalaureate requirements with an additional year of study, students may receive a Master of Accounting degree.

The objective of the baccalaureate program is to provide basic conceptual accounting and business knowledge as a foundation for accounting career development. The objective of the Master of Accounting program is to provide candidates with greater breadth and depth in accounting education than is possible in the baccalaureate program. Students are encouraged to continue their study beyond the baccalaureate degree for in-depth study of one or more of the following areas of accounting specialization: (1) financial/audit, (2) taxation, (3) managerial accounting, or (4) accounting information systems.

### Admission and Graduation Requirements

Freshmen students accepted in good standing by the University are eligible for admission to the College of Business. All transfer students, whether transferring within USU or from other colleges or universities, must have an overall minimum GPA of 2.20 to be accepted into the College of Business. Transfer students and others desiring to be admitted to the School of Accountancy must have a minimum GPA of 2.5 and must meet the prespecialization requirements for advanced standing stated below.

The accounting curriculum is designed to prepare the student to meet the changing patterns in social, economic, and technological development. Academic course requirements for the bachelors degree include general education, as described elsewhere in this catalog, supporting courses in mathematics, economics, computer science, business communication, and business administration, and professional accounting courses. The program provides opportunity to take elective credits. (Read very carefully the College of Business requirements on pages 34-37.)

**Prespecialization Requirements.** The student must have completed or be registered for 85 credits and have maintained an overall GPA of at least 2.50 and an accounting GPA of at least 2.50 for all credit hours of study taken up to the time the petition for advanced standing is made. This will include all transfer credits. The College of Business Prespecialization Core and the School of Accountancy Prespecialization requirements must be included within the 85-credit requirement with a minimum grade point average of 2.50 for both areas combined.

At the time of advanced standing approval, accounting majors will have the opportunity to indicate whether they plan to complete the two-year or three-year Professional Accounting program. The two-year program leads to the bachelors degree; the three-year program leads to the Master of Accounting degree.

**1. College of Business Prespecialization Core:** \*Acctg 100, 201, 202 (7 credits); \*BIS 255 (3 credits); \*Econ 200<sup>1</sup>, 201<sup>1</sup> (10 credits); \*Math 105 and Stat 230 (10 credits); \*MHR 299 (4 credits); \*CS 150\*\*<sup>2</sup>, BIS 340\*\*\* (7 credits); 41 credits total.

**2. School of Accountancy Prespecialization Requirements:** \*Acctg 203, 311 (7 credits); Math 215 (3 credits); Spch 305 (3 credits); Psy or Soc courses (5 credits); LAS 125 (3 credits); 21 credits total.

Completion of 30 credit hours of university work with a minimum GPA of 2.2 is necessary before a student is allowed to enroll for BIS 255; Acctg 201, 202, 203, and 311; and MHR 299.

Access to 300-level courses in the School of Accountancy is restricted. Only those students who have completed a minimum of sixty (60) quarter credits with a minimum GPA of 2.50 will be allowed to enroll in 300-level Accounting courses, with the exception of Acctg 311.

**Advanced Standing.** Formal application must be made for advanced standing. After admission to advanced standing in the School of Accountancy, the following courses are required:

**1. Advanced College of Business Core Courses:** Econ 401; CS 251 or CS 170, 241, 260; BIS 440; BA 308, 340, 350, 370, 378; MHR 311, 412, and 489.

**2. Professional Accounting Courses:** Acctg 312, 313, 331, 421, 422, 441, 442, 451, 461, and 481.

**Second bachelors degree in accounting.** Admission to the program for a second bachelors degree in accounting must be approved by the School of Accountancy. The student must have maintained a minimum of a 2.50 grade point average for the first bachelors degree. The second bachelors student must meet the same requirements for advanced standing (exclusive of general education) before 400-level

\*Common body of knowledge courses.

\*\*CS 150 is the preferred course for all Accounting majors.

\*\*\*BIS 140 is a prerequisite to BIS 340. BIS 140 can be tested out if a student has previous experience or training.

<sup>1</sup>Econ 200 and 201, CS 150, and Math 105 may be included as part of the General Education requirements.

<sup>2</sup>If student is working for a second bachelors degree, Acctg 601 or 602 may be substituted for Acctg 201, 202, and 203.



accounting courses may be taken, and must complete the program for second bachelors in accounting prescribed by the School of Accountancy, which includes the College of Business core courses as well as courses for the accounting major. (Ask for second bachelors check sheet.)

**Accounting as a minor.** Admission to a minor program in accounting must be approved by the School of Accountancy so that class space can be planned. Students seeking a minor in accounting must maintain a 2.50 grade point average for accounting courses taken. The following courses are approved for a minor in accounting: Acctg 201<sup>1</sup>, 202<sup>2</sup>, 203<sup>2</sup>, 311, 312, 313, and 331; 23 credits total.

**Selection of a minor.** Accounting majors may select a minor in any area, provided the program in the minor area meets University requirements and is approved by the minor department and the student's adviser.

**Graduation Requirements.** To be recommended for graduation by the School of Accountancy, accounting majors who are candidates for the undergraduate degree must have a minimum grade point average of 2.50 in accounting courses (Acctg prefix), and a minimum overall grade point average of 2.50. The School of Accountancy requires that at least 40 percent of the credit hours of course work required for graduation be devoted to business-related studies offered by the College of Business and that at least 40 percent be devoted to nonbusiness studies offered by other units of the University. As many as 14 credits in lower division economics may be counted in either curriculum segment.

Second bachelors in accounting must meet the same minimum grade point average requirements (2.50 in accounting courses and 2.50 overall) for graduation.

**Repeating courses.** Accounting majors will be permitted to repeat a specific accounting course only once.

## **Graduate Program**

The fifth year of the professional accounting program leads to the Master of Accounting (MAcc) degree. The program provides four areas of specialization: (1) financial/audit; (2) taxation; (3) managerial accounting; and (4) accounting information systems. Students with an undergraduate degree in accounting which meets the USU undergraduate accounting program requirements will be expected to complete 45 credits of graduate work in order to qualify for the MAcc. Students with less than the equivalent of the undergraduate program will be expected to make up any deficiencies in addition to completion of 45 credits in the graduate program. Students may apply for admission to the graduate program during their fourth undergraduate year.

## **Beta Alpha Psi**

Delta Omega Chapter of Beta Alpha Psi, the national honorary and professional accounting fraternity, provides many professional accounting experiences for accounting students throughout their academic program.

## **National Association of Accountants**

A student chapter of NAA provides professional experiences in the area of management accounting. This is especially for students interested in careers in industry.

## **Accounting Courses**

**100. Business Orientation.** Orients freshmen and transfer students to College of Business programs, academic and student services, professional organizations, and career possibilities. (1)

**105. Survey of Accounting.** An overview of accounting concepts with special emphasis on practical applications. (4F,W,Sp)

**201, 202. Introductory Accounting.** Accounting concepts and techniques essential to administration of a business enterprise and periodic determination of income and financial position. (3F,W,Sp,Su) (3F,W,Sp,Su)©

**203. Managerial Accounting.** Internal managerial uses of accounting information including planning (budgeting), controlling, and decision making. Prerequisite: Acctg 202. (3F,W,Sp,Su)©

**225. Introductory Internship.** An introductory level experience in a career-related internship position approved by the cooperative internship office. One credit for every 75 hours of internship experience. Maximum 6 credits. (1-6F,W,Sp,Su)

**311, 312, 313. Intermediate Accounting.** Generally accepted accounting principles required for public reporting to outside statement users. Prerequisite: Acctg 203. (4F,W,Sp,Su) (3F,W,Sp,Su) (3F,W,Sp,Su)

**325. Discussions with Business Leaders.** Examines new methods for improving U.S. competitiveness by attending the Partners Program seminar sessions and hosting visiting executives from top U.S. companies. Repeatable to a maximum of 6 credits. (1F,W,Sp,Su)©

**331. Industrial Cost Accounting.** Designed to develop an understanding of the use of accounting in planning and controlling the business operation. Includes job order costing, process costs, standard costs, budgeting, and capital budgeting. Prerequisites: Acctg 203 and a working knowledge of Lotus 1-2-3. (4W,Sp,Su)©

**396. Placement Planning.** Self-assessment; survey and evaluation of job market; matching-skills with the job market; job strategies and contacts, including resumes, letters, interviewing, follow-up, wage negotiation. (1)

**421. Advanced Accounting.** Accounting for partnerships, fiduciaries, and special sales contracts. Also, an introduction to nonprofit and regulatory accounting. Prerequisite: Acctg 313. (3F,Sp)

**422. Advanced Accounting.** Accounting for mergers and acquisitions, preparation of consolidated financial statements, accounting for branches and international operations. Prerequisite: Acctg 313. (3F,W,Su)

**441. Income Tax Accounting.** Deals primarily with taxation of the individual, determination of income, deductions, and filing of the return. Prerequisite: Acctg 313. (4F,Sp)

**442. Income Tax Accounting.** Deals with partnerships, estates and trusts, corporations, and other matters. Prerequisite: Acctg 313. (4W,Su)

**451. Auditing Theory and Practice.** Study of the independent auditor and his or her attest function. Includes auditing standards and procedures, rules of professional conduct, internal control, nature of evidence, and problem solving. Prerequisites: Acctg 311, 312, 313, 331. (4F,Sp)

**461. Accounting Theory.** Historical development of accounting theory and in-depth analysis of financial accounting standards which guide financial reporting. Prerequisites: Acctg 311, 312, 313, 331. (4F,W)

**479. Internship in Accounting.** Experience with public accounting firms and approved business concerns in the intermountain and Pacific coast regions. Prerequisite: Acctg 451. (1-7F,W,Sp,Su)

**481. Accounting Systems and Automation.** Theoretical concepts underlying management information systems analysis and design, system controls, and auditing EDP systems. Prerequisites: Acctg 313, CS 241 or 251. (4F,Sp)

**490. Independent Research and Readings.** Selected reading and research individually assigned, handled, and directed. Problems of mutual interest to students and the instructor are investigated and reported. (3F,W,Sp,Su)

**565 (d665).<sup>1</sup> Public Utility Accounting.** Utility regulation, financing, economics and ratemaking; accounting for construction, depreciation, income taxes, etc.; current issues affecting rate base, rate of return, and expenses. (3)

**574. Auditing II.** An analysis and application of the theory and techniques of auditing applied to an audit practice case. Includes internal control flowcharting, professional ethics, statistical sampling, and report writing. Prerequisite: Acctg 451. (3W,Su)

**595 (d695). Seminar in Accounting.** (1)

*Graduate<sup>2</sup>*

- 601, 602 (501, 502). Accounting for Management Control. (3F) (3W)
620. Accounting Policy. (3Sp)
625. Computer Auditing Methodology. Prerequisites: Acctg 331, 451, and 481. (3F)
626. Nonbusiness Accounting. Prerequisite: Acctg 421. (3W,Sp)
630. Advanced Cost Accounting. Prerequisite: Acctg 331. (3W,Su)
631. Cases in Management Accounting and Control. Prerequisites: Acctg 331, 630. (3Sp)
635. Seminar in Controllorship. Prerequisite: Acctg 331. (3F)
641. Tax Research and Procedures. Prerequisites: Acctg 441 and 442. (3F,W,Sp)
642. Taxation: Corporation and Shareholders. Prerequisites: Acctg 441 and 442. (3W)
643. Tax Policy and Planning. Prerequisites: Acctg 441 and 442. (3W)
644. Taxation: Partnerships, Estates, and Trusts. Prerequisites: Acctg 441 and 442. (3F)
645. Taxation: Property, Oil, and Gas. Prerequisites: Acctg 441 and 442. (3Sp)
646. Estate Planning and Tax Topics. Prerequisites: Acctg 441 and 442. (3Sp)
654. Seminar in Auditing. Prerequisites: Acctg 313 and 451. (3Sp)

661. Theory and Professional Issues. Prerequisites: Acctg 313 and 461. (3Sp)
662. Practical Accounting Research Seminar. Prerequisites: Acctg 313, 421, 422, 451, and 461. (3Sp)
- 665 (d565). Public Utility Accounting. (3)
679. Internship in Accounting. (1-7F,W,Sp,Su)
681. Accounting Systems Seminar. Prerequisites: Acctg 331, 451, 481. (3W,Su)®
690. Independent Reading and Research. (1-6)®
- 695 (d595). Seminar in Accounting. (1)
697. Thesis. (1-12)®
699. Continuing Graduate Advisement. (1-3)®

<sup>1</sup>Parenthetical numbers preceded by *d* indicate a *dual* listing; parenthetical numbers preceded by an *f* are the *former* course numbers.

<sup>2</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

©This course is also offered by correspondence through the Life Span Learning Independent Study Division.

*Department of**Aerospace Studies**College of Humanities, Arts and Social Sciences*

**Head:** Professor and Colonel Stephen B. Sniteman  
Office in Military Science Building

**Assistant Professors** Captain Dean A. Wheelwright, Captain Martin F. Kulikowski

*Objectives*

Air Force ROTC provides educational experiences that develop skills and attitudes vital to the career of an Air Force officer. The purpose of the course is to give an understanding of the mission and the global responsibilities of the United States Air Force. The academic phase develops background in national and international affairs to help understand and evaluate world events. In addition, the curriculum includes experiences designed to stimulate and develop an interest in the Air Force (e.g., orientation flights and visits to Air Force bases); opportunities to apply the principles of leadership, human relations, management, and staff work in practical situations, and other related experiences.

*Requirements*

**Physical Requirements.** All cadets must meet the physical standards for general military service.

**Age Limitations.** To qualify as a pilot or navigator, cadets must be able to finish the aerospace studies program and graduate from the University before age 26 1/2 years. Other cadets must complete the military program and graduate from the University prior to reaching the age of 30.

**Academic Requirements.** Once a student enters the last two years of AFROTC, successful completion of the course becomes a requirement for commissioning. In addition, when entering the final two years, a student must agree to accept an Air Force commission if it is offered and to serve on active duty if directed to do so. Upon initial enrollment at the University, students should schedule aerospace classes to be completed simultaneously with requirements for a degree.

Although the AFROTC program is designed primarily for the student to complete in four years, all requirements for commissioning may be completed in two years. Students interested in the two-year program should apply prior to the January which precedes their final two years of college. Screening of candidates for the two-year program will conform to the same requirements as for selecting advanced students in the four-year program. Prior to formal enrollment in the two-year program, each student must successfully

complete six weeks of field training. The course of instruction is the same as that required for the four-year program, which includes a four-week summer field training session, with the classwork being covered in two additional weeks of field training.

**Minor.** To obtain an undergraduate minor in aerospace studies, a student is expected to complete at least 18 credits of the following courses: AS 301, 302, 303, 340, 360, 401, 402, and 403. Approval of aerospace studies and major department advisers is required. Minor will be awarded upon completion of commissioning requirements.

**Veterans.** A veteran may apply for the AFROTC program if he or she can complete the program prior to reaching age 30. Parts of the general military course may be waived for prior military service. If accepted as a pilot candidate, he or she can participate in the flight instruction program in the junior year, provided he or she will be commissioned before age 26 1/2 years (one-year waiver possible). Veterans normally will be entered in the two-year program.

**Women.** Female students are eligible and encouraged to participate in both the two-year and four-year programs.

### *Scholarships and Financial Aid*

**Financial Aid.** AFROTC cadets will normally receive a \$100 per month allowance during their last two years of AFROTC. Also, cadets are paid approximately \$480 per month and are provided free room, board, and transportation during the summer field training sessions.

**Scholarships.** AFROTC college scholarships are available on a competitive basis. These scholarships pay all tuition and fees, provide textbook allowances, and \$100 per month nontaxable. (USU matches this with a partial room and board scholarship.) Eligible freshmen and sophomores should apply directly to the head of the Aerospace Studies Department. High school seniors should normally apply for four-year scholarships during the fall of their senior year. Scholarship recipients must complete English composition, mathematical reasoning, and foreign language course requirements as established by AFROTC.

**Uniforms and Texts.** All Air Force texts and uniforms are furnished at no expense to the student.

### *Miscellaneous Information*

**All Cadets.** To meet the challenge of the aerospace age, its technological advances, and its ever-broadening horizons, officers possessing a variety of skills are required by the Air Force. These skills cover the exact sciences and social sciences, but are not limited to these study areas. After being called to active duty, cadets will serve four years. Interested students should contact the AFROTC Department for information on the Air Force specialist fields related to their academic major.

**Delay of Entry on Active Duty.** If cadets complete the AFROTC program and receive commissions, they may request a delay in call to active duty if they desire to continue studies toward a graduate degree. The length of the delay depends upon current AFROTC regulations. Students entering flight training must do so before reaching 26 1/2 years of age.

**Summer Training.** (a) Field Training (six weeks) is a prerequisite for cadets entering the AFROTC two-year program. Training

will be given at an Air Force base and will last for six weeks. Ten university credits are granted for this training.

(b) Field Training (four weeks). All cadets in the four-year program will attend a four-week summer training camp. Attendance at this camp is between the sophomore and junior years at a selected Air Force base. Six credits are granted for this training.

**Leadership Laboratory.** A Leadership Laboratory is required each week during the fall, winter, and spring quarters for each year of aerospace studies. This is held at 11:30 on Thursdays.

### *Aerospace Studies Courses*

**101. The U.S. Air Force Today.** Doctrine, mission, organization of the U.S. Air Force. (1-2F)<sup>1</sup>

**102. The U.S. Air Force Today.** Functions of strategic offensive forces, strategic defensive forces, and general purpose forces. (1-2W)<sup>1</sup>

**103. The U.S. Air Force Today.** Functions of U.S. aerospace support forces. (1-2Sp)<sup>1</sup>

**201. Development of Air Power.** Historical study of the development of air power from the first flight experiments of the eighteenth century through World War II. (1-2F)<sup>1</sup>

**202. Development of Air Power.** Historical study of the development of air power after World War II through the Korean War and air power effects on cold war strategy during the Berlin Airlift. (1-2W)<sup>1</sup>

**203. Development of Air Power.** Study of air power during the Cuban missile crisis of 1962, the war in Southeast Asia, and its use in nonmilitary operations. (1-2Sp)<sup>1</sup>

**301. Management and Leadership Theory.** Includes the study and application of concepts of human behavior and human relations or organizational situations. Discusses the need and means for maintaining individual and organizational discipline. (3-4F)<sup>2</sup>

**302. Management and Leadership Theory.** Includes the study of theoretical and practical management as applied in the Air Force. Introduces information systems, quantitative approaches to decision-making, and resource control techniques. Includes problem solving exercises, field trips, oral and written reports. (3-4W)<sup>2</sup>

**303. Management and Leadership Theory.** A study of the execution phase of management in the Air Force. Primary emphasis on management methods used in the Air Force for management and control of personnel, material, and monetary resources. (3-4Sp)<sup>2</sup>

**340. Field Training** (four weeks). Students in the four-year program participate in four weeks of Field Training. The major areas of study include junior officer training, aircraft and aircrew orientation, career orientation, survival training, base functions and Air Force environment, and physical training. (6Su)

**360. Field Training** (six weeks). Two-year program. The major areas of study included in the six-week Field Training program are essentially the same as those conducted at four-week Field Training and in the General Military Course including Leadership Laboratory. (10Su)

**401. National Security Forces in Contemporary American Society.** Compares the traditionalist image of the military with more contemporary views. Outlines trends in professional development with emphasis on current socialization factors. (3-4F)<sup>2</sup>

**402. National Security Forces in Contemporary American Society.** Includes the study of formulation of defense strategy and how it evolves. Shows how technological change, bureaucracies, and other factors interact in formulating strategy. (3-4W)<sup>2</sup>

**403. National Security Forces in Contemporary American Society.** A study of the interplay of organizational and bureaucratic factors that combine to implement policies. Review of the military justice system. Study of the Department of Defense, National Security Council, the Congress, and the Presidency. Selected case studies. (3-4Sp)<sup>2</sup>

<sup>1</sup>This course is available for variable credit. In order to receive two credits, the student must register for and attend the Leadership Lab.

<sup>2</sup>This course is available for credit under the Honors Program. To receive four credits, the requirements set by the department for honors credit must be met.

## Department of

# Agricultural and Irrigation Engineering

## College of Engineering

**Head:** Professor Wynn R. Walker  
Office in Engineering Class 216

**Professors** Robert W. Hill, Gaylord V. Skogerboe, Lyman S. Willardson; **Professors Emeritus** Bruce H. Anderson, Bertis L. Embry, Richard E. Griffin, George H. Hargreaves, Von H. Jarrett, Jack Keller, Howard B. Peterson, Wayne B. Ringer, Glen E. Stringham; **Associate Professors** Edwin C. Olsen III, Richard C. Peralta; **Research Associate Professor** R. Kern Stutler; **Assistant Professors** Richard G. Allen, Christopher M. Neale; **Research Assistant Professor** Gary P. Merkley; **Research Engineer** L. Neil Allen

**Degrees offered:** Bachelor of Science (BS), Master of Science (MS), and Doctor of Philosophy (PhD) in Agricultural and Irrigation Engineering; Master of Science (MS) in Irrigation Science

### Objectives

Agricultural engineering applies the art and science of engineering principles to the solution of agricultural problems. Basic knowledge from almost all fields of engineering is used. The agricultural engineering curriculum at USU emphasizes irrigation and drainage engineering. Special emphasis is given to irrigation system design and evaluation, irrigation project planning, irrigation system operation and management, optimal groundwater management strategies, and remote sensing of agricultural systems. It draws freely from hydrology, hydraulic engineering, soil science and biometeorology, and agricultural economics. The curriculum is designed to prepare students for the wide variety of professional jobs related to management and use of the water resources in agriculture.

The Bachelor of Science program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC/ABET).

### Admission and Graduation Requirements

The student who is majoring in or planning to major in agricultural and irrigation engineering needs to be aware of the College of Engineering requirements concerning admission to the college, preengineering, admission to the professional engineering school, general education, and other academic requirements. Additional information concerning these items is given in the College of Engineering write-up on pages 39-42. It is the responsibility of the student to be aware of these rules and regulations. Beginning fall quarter 1990, all undergraduate students in AIE will be required to own an HP-48SX calculator.

**Bachelor of Science.** The four-year program suggested below will satisfy the requirements for a BS degree in agricultural and irrigation engineering. The academic work, particularly in the junior and senior years, is supplemented by field trips which are required as part of the course work. Modification in the program to meet special needs and priorities of a student may be obtained with the approval of the adviser.

### Agricultural and Irrigation Engineering Curriculum

**Freshman Year:** AE 187; CEE 187, 224, 227; Chem 121, 122, 124; Econ 200; Engl 101; Math 220, 221, 222; Phyx 221; PISci 250; 3 credits of HU/SS.

**Sophomore Year:** CEE 205; EE 251; Engl 201; Engr 103, 200, 202, 204, 270; Math 320, 321, 322; Phyx 222, 223; 5 credits of HU/SS.

**Junior Year:** AE 308; CEE 305, 306, 308, 343, 350, 351; Engl 305; Engr 330; Soils 358, 359; 8 credits of HU/SS; 6 credits of technical electives.

**Senior Year:** AE 543, 545, 546, 547, 548, 550, 560; CEE 420, 425, 430; 6 credits of HU/SS; 6 credits of technical electives.

**Acceptable Technical Electives** (12 credit hours total): AE 556, CEE 303, ME 571, or any professional AE, CEE, EE, or ME course at the 300-level or higher, except seminars and special studies courses; AgEd 551; Stat 501, 502; FW 284; Bimet 382; Bot 440; BA 308; Econ 501, 550; Geog 571, 575, 595; Geol 111, 546; Soils 505, 513, 555, 556, 565, 566.

Students receiving credit from the College Level Examination Program (CLEP) may complete a BS degree program in less than four years.

This department cooperates with the Department of Plants, Soils, and Biometeorology to offer a BS degree program with a major in irrigation and soils. The course program includes some of the applied irrigation engineering courses, as well as basic courses in mathematics, science, and soils. A complete outline of the program in irrigation and soils can be found under the Plants, Soils, and Biometeorology Department.

### Graduate Study

The Department of Agricultural and Irrigation Engineering offers two graduate degrees: Master of Science and Doctor of Philosophy. See the graduate catalog for prerequisites and further information concerning procedures and course descriptions.

### Agricultural and Irrigation Engineering Courses

**187. Agricultural and Irrigation Engineering Freshman Seminar.** Provides orientation in the heritage of the AE profession and irrigation engineering at USU. Develops basic skills and perspectives needed for first year. (1F)

**308. Engineering Aspects of Soil and Water Conservation.** Erosion control structures, terraces, and outlets, grassed waterways, soil saving dams. Tillage and farming methods including strip cropping, contouring, and land forming. Three lectures, one lab. (4Sp)

**310. Irrigation Principles.** For students in colleges other than engineering; surveying, water measurement, conveyance, application, consumptive use, requirements, pumping, drainage, and soil-water relationships. Prerequisite: Math 101. Two lectures, one lab. (3F)

**493. Special Studies.** Independent or group study of agricultural and irrigation engineering subjects not covered in regular course offerings. (1-6F,W,Sp,Su)

**543 (d603).<sup>1</sup> Principles of Irrigation Engineering.** For engineering students. Soil-water-plant relationships; water requirements; efficiency of water use; flow of water in soils; effects of irrigation on water quality. Prerequisites: Engr 103 or CS 241; CEE 343, 352, or 550. (3F)

**545 (d605). Drainage Engineering.** Introduction to principles and practices of drainage. Engineering investigation and design of open drains and wells. Prerequisite: CEE 352 or 550. Three lectures, one lab. (4Sp)

**546 (d606). Water Supply Development and Conveyance Systems.** Development of surface and ground water supplies. Capacity requirements and outlet conduits for storage reservoirs. Design of wells and pump selection. Design of canals, pipelines, flumes, and inverted siphons. Water measurement. Prerequisite: CEE 343, 352, or 550. (3W)

**547 (d607). Sprinkle and Trickle Irrigation.** Sprinkle and trickle irrigation system demand, system selection and configuration, emitter and sprinkler characteristics and sizing, uniformity and efficiency, pipe network layout and sizing, and system operation, management, and maintenance. Prerequisites: AE 543, CEE 350 or 352. (5W)

**548 (d608). Surface Irrigation Design.** Design, evaluation, and management of basin, border, and furrow irrigation systems. Field measurements in evaluating system performance and design. Land leveling computation and equipment. Headland and tailwater facilities. Automation. Prerequisite: AE 543. (3Sp)

**550 (d610). Irrigation System Analysis.** Field lab with formal reports covering water measurement; soil-water management, land leveling, and evaluation of border, furrow, sprinkle, and trickle systems. One recitation, one double lab. Prerequisites: AE 543, 547, 548 or concurrent registration. (3Sp)

**556 (d616). Design of Water Control Structures.** Design of transitions, drops, chutes, spillways, checks, headgates, and other control structures for water conveyance systems. Prerequisite: CEE 352 or 550. (2Sp)

**560 (d620). Water Management.** Organization and administration of water distribution institutions. Financing for construction and operation, maintenance of canals, flumes, pipelines, dams, regulating reservoirs, and other water facilities. Prerequisite: AE 543. (3W)

## Graduate<sup>2</sup>

**603 (d543). Principles of Irrigation Engineering.** (3F)

**605 (d545). Drainage Engineering.** (4Sp)

**606 (d546). Water Supply Development and Conveyance Systems.** (3W)

**607 (d547). Sprinkle and Trickle Irrigation.** (5W)

**608 (d548). Surface Irrigation Design.** (3Sp)

**610 (d550). Irrigation System Analysis.** (3Sp)

**616 (d556). Design of Water Control Structures.** (2Sp)

**620 (d560). Water Management.** (3W)

**631. Field Irrigation Management.** (3F)

**645. Drainage Principles.** (3F)

**680. Seminar.** (1-2F,W,Sp)@

**693. Special Problems in Agricultural Engineering.** (1-5F,W,Sp,Su)@

**696. Supervised Teaching in Irrigation.** (2-3F,W,Sp)

**697. Thesis Research.** (1-9F,W,Sp,Su)@

**699. Continuing Graduate Advisement.** (1-12F,W,Sp,Su)@

**\*732. Sprinkle Irrigation Engineering.** (3W)

**\*733. Surface Irrigation Engineering.** (3Sp)

**735. Conjunctive Water Management.** (3F)

**745. Drainage Investigation and Design.** (3W)

**\*\*760. Irrigation System Operations.** (3Sp)

**780. Seminar.** (1F,W,Sp)@

**797. Dissertation Research.** (1-15F,W,Sp,Su)@

**799. Continuing Graduate Advisement.** (1-12F,W,Sp,Su)@

<sup>1</sup>Parentetical numbers preceded by a *d* indicate a *dual* listing.

<sup>2</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

@Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

\*Taught 1990-91.

\*\*Taught 1991-92.

## Department of

# Agricultural Education

## College of Agriculture

**Head:** Associate Professor Weldon S. Sleight  
Office in Agricultural Science 218

**Professor** Gilbert A. Long; **Associate Professor** Albert "Pat" Pruitt; **Associate Professor Emeritus** Keith W. Hatch; **Assistant Professors** Stephen E. Poe, Gary S. Straquadine; **Lecturers** Darwin S. Jolley, Evan P. Parker

**Degrees offered:** Bachelor of Science (BS) and Master of Science (MS) in Agricultural Education; MS with Agricultural Mechanization Option; MS with International Extension Option; Doctorate of Education (EdD) with emphasis in Vocational Education

**One-year Certificate and Associate of Applied Science (AAS):**  
Agricultural Machinery Technology

## Objectives

The programs offered in Agricultural Education are for students who are preparing for positions as agricultural science and technology teachers and positions in agricultural extension, agricultural mechanization, agribusiness, and agricultural production.

The facilities for this program include laboratories with specially designed equipment for practical instruction in agricultural mechanization, which includes diesel engines, electricity, farmstead mechanization, agricultural buildings, mechanic skills, hydraulics, machinery, and metallurgy. The farms and research laboratories available in the College of Agriculture support high-

tech instruction in plant science, animal science, soils, and agribusiness.

## Requirements

**Departmental Admission Requirements.** Admission requirements for the Department of Agricultural Education are the same as those described for the University on pages 8-11. Students in good standing may apply for admission to the Agricultural Education Department.

**Bachelor of Science in Agricultural Education.** Preparation in agricultural education includes technical agriculture, economics, and business. Students selecting the teaching option will also enroll in principles and techniques of teaching courses.

Students interested in teaching agricultural production, agricultural business, agricultural mechanics, or other phases of agriculture will be guided into areas of their major interest. Agricultural backgrounds or summer agricultural experiences are necessary for teacher certification.

An application for admission to teacher education should ordinarily be completed before the junior year (see College of Education requirements). Approval for admission to teacher education is a prerequisite to certification candidacy and to enrollment in education and psychology courses.

Requirements for the **Bachelor of Science in Agricultural Education** are listed briefly below. For more detailed information on courses and the recommended sequence for taking them, see the major requirement sheet available from the Agricultural Education Department.

Ag Ed 101, 301, 303, 304, 324, 325, 344, 345, 360, 371, 450, 460, 511; BIS 140; Chem 111; Ag Ec 310; Ins T 442; Math 101; PISci 310, 430, 555; Psy 101, 366; SecEd 301, 302, 404, 510; and Soils 358, 359, 400.

Students must also fulfill University General Education requirements, and select other courses from Agricultural Economics, Business Administration, Animal or Dairy Science, Plant Science, Agricultural Mechanics, and Natural Resources.

The **Agricultural Education Business Option** includes the following courses: BA 350, 370; MHR 235, 311, 364; Acctg 201, 202, 203; Ag Ec 310; Ag Ed 300, 360; ADVS 245; AE 310; Soils 358, 359; and one additional Soils course. Additional requirements in Animal Science, Plant Science, and Range Science must also be met. In addition, students must complete designated electives and the University General Education requirements.

The **Associate of Applied Science Degree in Agricultural Mechanization** will include a minimum of 24 credits in General Education classes, 33 credits in Agricultural Education, 19 credits in business and related classes, and 10 credits of elective course work. For more detailed information on courses, see the requirement sheet available from the Agricultural Education Department.

**Agricultural Machinery Technology Certificate/Diploma.** The one-year agricultural program will meet the needs of persons interested in employment opportunities with agricultural dealerships and companies in the areas of parts and service, as well as with farm suppliers, feed and fertilizer agencies, corporate farms and ranches, and other related industries. The vocationally oriented agricultural technology program includes a cooperative occupational experience placement at the end of the first year of instruction.

Requirements for the one-year program include: Ag Ed 101, 112, 113, 114, 161, 162, 163, 225, 303; and Engl 105 (Vocational).

See major requirement sheet, available from the department, for more detailed information.

**Minor in Agricultural Education.** A minimum of 18 upper division credits approved by a faculty adviser are required.

## Graduate Study

The department offers the Master of Science degree. See graduate catalog for more information.

## Agricultural Education Courses

**101. Fundamentals of Agricultural Mechanization.** Shop safety; selection, care, and use of materials, tools, and equipment used in the agricultural mechanics industry. (3F)

**103. Introduction to Home Maintenance and Repair.** Fundamentals of inspection, adjustment, maintenance, and repair or replacement in a typical home. (3Sp)

**112. Specialized Forage Equipment.** Theoretical principles and applied technology of forage and harvesting equipment. (3F)

**113. Agricultural Planting and Tillage Equipment.** The fundamentals and principles in the operation, maintenance, and repair of agricultural, planting, and tillage equipment. (3Sp)

**114. Agricultural Power Units Overhaul.** Principles involved in overhauling and reconditioning agricultural power units including engines and subassemblies. Prerequisites: Ag Ed 101 and 103. (6F)

**161. Agricultural Electrical Components.** The various types of electrical components are studied as they are applied on agricultural equipment and power units. (3F)

**162. Agricultural Machinery Power Lifts.** Principles utilized in the hydraulic load and draft control systems as related to agricultural equipment. (3W)

**163. Tractor Power Trains.** The fundamental principles in the transmittal of power from the tractor power unit to the implement. (5W)

**170. Maintenance of Horticultural Equipment.** Preventive maintenance of small engines and machinery related to ornamental horticulture. Includes steam pipe fitting and glazing. (3Sp)

**171. Fundamentals of Motorized Lawn, Garden, and Recreation Equipment.** Principles involved in the adjustment, operation, and maintenance of lawn and garden equipment. (5W)

**196. Agricultural Equipment and Technology Seminar.** Advanced readings, discussion, and planned panel reports concerning job opportunities and practices in the agricultural equipment field. Problems typically encountered by those working in this field. (2F)

**200. Maintenance of Dairy Equipment.** Principles involved in maintenance of dairy equipment and facilities including electricity, plumbing, refrigeration, air and vacuum, and feeding equipment. (3W)

**225. Occupational Experience in Agriculture.** Supervised occupational experiences for technical vocational preparation. (1-5F,W,Sp,Su)@

**283. Introductory Internship and Agribusiness Skill Preparation.** Preparation for a successful supervised work experience in agriculture. Introduction to a changing agricultural production, processing, sales, and service industry. (2-5F,Sp)

**293. Individualized Projects in Agricultural Mechanics.** Basic skill preparation for employment in agricultural industry. (1-5F,W,Sp,Su)@

**300. Operation and Field Adjustments of Agricultural Tractors and Implements.** Principles and techniques in the operation and preventive maintenance of agricultural tractors and implements. (1-2F,Sp)

**301. Agricultural Construction.** Planning, estimating, layout, construction materials, painting, wiring, plumbing, concrete, and masonry. Three lectures, two labs. (5Sp)

**303. Agricultural Maintenance Repair Welding.** General overview of various welding processes. Provides manipulative experience and instruction for beginners and veterans with up-to-date technical information in the welding industry. (3F)

**304. Field-based Experience for Agriculture Preservice Teachers in Secondary Schools.** Field-based experiences in vocational agricultural secondary programs prior to student teaching. (1F,W,Sp)

**305. Technical Writing in Agriculture.** Theory, analysis, and guided practice of designing, writing, and editing agricultural business correspondence and technical reports based on the subject, purpose of the writing, and audience needs. (3F,W,Sp)

**310. Program Leadership.** Study of leadership styles; practice in selection and use of role playing, personal agenda, and brainstorming; and study of parliamentary procedure for chairing formal meetings. (3W,Sp)

**321. Methods of Teaching Natural Resources.** Curriculum development and teaching methods, testing, and evaluation of natural resource skills as they relate to education in agriculture. (4F)

**322. Methods of Teaching Plant Science.** Curriculum development and teaching methods, testing, and evaluation of plant science skills as they relate to education in agriculture. (4W)

**323. Methods of Teaching Animal Science.** Curriculum development and teaching methods, testing, and evaluation of animal science skills as they relate to education in agriculture. (4Sp)

**324. Methods of Teaching Agricultural Mechanics.** Developing an understanding of the organization and management of a school shop. Lesson planning, shop equipment and supplies, skill requirements, and supervised practice. (4F)

**325. Methods of Teaching Agriculture.** Principles and practices for cooperative occupational experience, curriculum development and teaching methods, testing and evaluating as they relate to education in agriculture. (4F)

**344. Small Gasoline Engines, Theory and Practice.** Emphasis is placed on understanding small engine theory and operation in addition to providing practical experience in disassembly and reassembly. (3F)

**345. Agricultural Power Unit Overhaul and Equipment Preventive Maintenance.** Performance of preventive maintenance practices on agricultural equipment, and principles involved in overhauling and reconditioning agricultural engines. Prerequisite: Ag Ed 101 or equivalent. (5W)

**360. Agricultural Machinery Management.** Principles of agricultural machinery management consisting of factors in lengthening agricultural equipment life and/or purchasing used and new equipment. (3Sp)

**361. Supervised Occupational Experience.** Professional internship for the purpose of preparing for vocational teaching or extension. (1-8F,W,Sp,Su)®

**362. Future Farmers of America Program Advisement.** An activity-centered curriculum to prepare teachers for Future Farmers of America advising. (1F,W,Sp,Su)

**371. Orientation to Agricultural Education.** A planned supervised field experience program for the purpose of gaining youth advising skills and gaining early entry into schools or preparation for extension youth assignment. (2F)

**372. Agricultural Equipment Testing and Diagnosis, Electrical.** Techniques in diagnosing malfunctions and related failures will be explored. A system diagnostic method will be developed. (3F)

**373. Agricultural Equipment Testing and Diagnosis, Hydraulics.** Techniques in diagnosing hydraulic malfunctions and related failures will be explored. A system diagnostic method will be developed. (3W)

**374. Tractor Systems Analysis.** Testing and diagnosis of both gas and diesel tractors with related systems pertaining to implement control. Simple and complex testing techniques will be developed for proper operational adjustments and analyzing malfunctions. (5Sp)

**390. Special Problems in Agriculture Education.** Students conduct short-term studies and/or literature review with critical analysis of special topics. Formal written reports required. Prerequisite: approval of instructor. (1-5)®

**425. Occupational Experience in Agriculture.** Supervised occupational experience for technical and professional preparation in teacher education and/or agricultural business. (3-9F,W,Sp,Su)®

**450. Secondary Curriculum Seminar.** Studies and reports on research and new developments. One quarter required for all majors in agricultural education. (3W)

**460. Student Teaching in Secondary Schools.** Students will leave the campus for 8 to 11 weeks. (12W)

**490. Undergraduate Research and Creative Opportunity.** (1-5)®

**493. Senior Project.** Returning student teachers will work to strengthen their weaknesses in areas such as scaled drawing, cost estimating, machine shop practices, construction, small engines, etc. (1-5)®

**511 (d611)<sup>1</sup>. Vocational Technical Program Planning and Evaluation.** Program planning and evaluation strategies are studied. Local manpower surveys and evaluation questionnaires are designed. Job analysis as a basis for curriculum planning. (4Sp)

**551 (d651). Principles and Practices of Extension Education.** In-depth inquiry into the history, philosophy, and organizational structure of the Cooperative Extension Service programming philosophy and methodology and teaching techniques. (3F)

### *Graduate<sup>2</sup>*

**600. Methods of Equipment Testing, Diagnosis, and Repair.** (3Sp)

**601. Secondary Agricultural Education Curriculum Development.** (Ag Mechanics). (1-3Su)®

**602. Secondary Agricultural Education Curriculum Development (Economics).** (1-3Su)®

**603. Secondary Agricultural Education Curriculum Development (Range Science).** (1-3Su)®

**604. Secondary Agricultural Education Curriculum Development (Entomology).** (1-3Su)®

**605. Secondary Agricultural Education Curriculum Development (Plant Pathology).** (1-3Su)®

**606. Secondary Agricultural Education Curriculum Development (Animal Science).** (1-3Su)®

**607. Program and Curriculum Development in Vocational Education.** (1-3F,W,Sp,Su)

**610. Supervision in Extension.** (3W)

**611 (d511). Vocational Technical Education Program Planning and Evaluation.** (4Sp)

**612. Administration of Extension.** (3Sp)

**613. Electrical and Hydraulic Component Testing, Diagnosis, and Repair.** (3W)

**614 (f514). Extension Program Planning and Evaluation.** (4Sp)

**624. Advanced Methods of Teaching Agriculture.** (3F)

**625. Special Problems in Agricultural Education.** (1-5F,W,Sp,Su)

**630 (f530). Foundations of Adult Education Programs.** (3F)

**651 (d551). Principles and Practices of Extension Education.** (3F)

**660. Analysis of Machinery Management and Decision Making Processes.** (3Sp)

**670. Introduction to Research Methodology in Ag Education.** (1-3Sp)

**690. Agricultural Machinery Technology Research and Application.** (3Su)

**691. Special Problems for Vocational Teachers.** (1-5Su)

**697. Research and Thesis.** (1-9F,W,Sp,Su)®

**699. Continuing Graduate Advisement.** (1-3F,W,Sp,Su)®

**781. Seminar.** (4F,W,Sp)

**797. Dissertation Research.** (1-18F,W,Sp,Su)

<sup>1</sup>Parentetical numbers preceded by *d* indicate a *dual* listing; parentetical numbers preceded by an *f* are the *former* course numbers.

<sup>2</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.



*Department of*

# *Animal, Dairy and Veterinary Sciences*

## *College of Agriculture*

**Acting Head: Adjunct Research Professor Robert C. Lamb**  
Office in Agricultural Science 230

**Professors** Stanley D. Allen, Jay W. Call, Grant M. Esplin, Doyle J. Matthews, Lyle G. McNeal, R. Dean Plowman, Raghubir P. Sharma, Robert W. Sidwell, Ross A. Smart, Norris J. Stenquist; **Professors Emeritus** Jay O. Anderson, James A. Bennett, Joseph T. Blake, John E. Butcher, C. Elmer Clark, Warren C. Foote, Lorin E. Harris, Lloyd R. Hunsaker, Merthyr L. Miner, James LeGrande Shupe, George E. Stoddard, Don W. Thomas; **Adjunct Professors** Michael R. Franklin, Hudson A. Glimp, E. Marlowe Goble, Lynn F. James, Richard F. Keeler, Nicholas C. Leone, Clair E. Terrill; **Adjunct Research Professors** Royal A. Bagley, Dale C. Baker, Henry Goot, Michael R. Marshall, Glenn N. Taylor; **Associate Professors** Michael J. Arambel, Clive W. Arave, Clell V. Bagley, Thomas D. Bunch, W. Craig Burrell, Roger A. Coulombe, Jr., Donald C. Dobson, Mark C. Healey, Haven B. Hendricks, Nyle J. Matthews, Larry M. Slade, Wallace R. Taylor; **Associate Professors Emeritus** Charles H. Mickelsen, J. Alan Thomas; **Adjunct Associate Professor** Calvin C. Willhite; **Research Associate Professors** Melvin J. Anderson, Ronald L. Boman, Anthony R. Torres; **Adjunct Research Associate Professor** John D. Olsen; **Assistant Professors** Dean E. Bell, F. Dustan Clark, Howard M. Deer, David P. Marcinkowski, Noelle E. Muggli-Cockett, Randy D. Wiedmeier; **Research Assistant Professors** Dale L. Barnard, Robert J. Callan, Stanley L. Henderson, John H. Huffman, M. Keven Jackson, John D. Morrey, Donald F. Smee, Jeffrey L. Walters, Robert E. Warnick; **Research Assistant Professors Emeritus** Paul V. Fannesbeck, Leonard C. Kearn; **Adjunct Assistant Professors** David H. Clark, Ann S. Macaulay, Randy D. White, Scott R. Woodward; **Adjunct Research Assistant Professor** Kip E. Panter; **Instructors** Parl Galloway, James W. Stevens, John B. Swain; **Lecturer** J'Wayne McArthur; **Research Associates** Sherwin J. Atkinson, R. Cole Evans, Alma Maciulis, Lee G. Wood

**Degrees offered:** Bachelor of Science (BS) in Animal Science, Dairy Science, Bioveterinary Science; Master of Science (MS) in Animal Science, Dairy Science, Bioveterinary Science; Doctor of Philosophy (PhD) in Animal Science; MS and PhD degrees in Toxicology are available through the Interdepartmental Toxicology program

**Areas of specialization:** Animal Science; Dairy Science; Animal Biology; Animal and Dairy Breeding, Nutrition, Reproductive Physiology, Business and Economics, Management, and Behavior

**Certificate Program:** Dairy Herdsman

### *Objectives*

BS degree students majoring in animal or dairy sciences may choose a program from six career emphasis areas: (1) production/management, (2) business, (3) research, (4) extension, (5) communications, and (6) international work. Preveterinary students may

earn a BS degree in bioveterinary science, animal science, dairy science, or other related degree programs.

### *Animal and Dairy Sciences*

**Production/Management Emphasis.** In addition to the required core courses, this emphasis area provides some freedom for students to take course work in subjects of special interest. In consultation with their advisers, students may schedule directed elective courses to help them prepare for professional careers. Additional courses in animal, dairy, or veterinary sciences, as well as classes in crop production, range science, accounting, business, agricultural engineering, and machinery, may be useful for those planning to operate or manage farms or ranches.

**Business Emphasis.** Students may select the business emphasis area to prepare for professional herd management, consulting, corporate animal agriculture, sales and service businesses, commercial banking and credit, and other businesses related to livestock production, processing, and marketing. Students must complete the basic core curriculum and other courses in the department, as well as those in economics, agricultural economics, business, computer science, and accounting.

**Research and/or Extension Emphasis.** For students desiring education beyond the BS degree, these emphasis areas prepare for graduate studies in specialized areas such as breeding, nutrition, physiology of reproduction, behavior, or preveterinary science. On completing their graduate studies, students will be prepared for employment in research, teaching, extension service, government agencies, or private corporate business.

**Communications Emphasis.** Students interested in preparing for a career in animal agricultural communications can receive basic training in the areas of public relations, journalism, broadcast agricultural news with TV or radio, or news editorial work. This emphasis can lead to positions with livestock breed associations, livestock publications, and any of the multitude of media forms utilized to inform the masses about animal agriculture. The basic core curriculum is also required for this emphasis area.

**International Emphasis.** Today many opportunities exist for animal agriculturists in international work with foreign countries. In addition to completing the basic required core curriculum, students in this area interface closely with the USU College of Agriculture requirements for an international agriculture degree. Students concentrating in either the Animal or Dairy Sciences discipline will have sufficient background training to be prepared for professional employment in international corporate work, such as animal feeds/nutrition, animal health, livestock exporting, technical assistance to developing countries, United Nations FAO programs, and the Peace Corps.

### *Preveterinary Program*

Preveterinary students take courses required by veterinary schools. Classes should be planned to assure meeting the current requirements for the veterinary schools to which the student will apply for admission. In most cases, preveterinary

preparation requires a major portion of three academic years. With careful planning and counsel, students can meet all requirements for Colorado State University, Washington State University, and Oregon State University in two years. Students accepted into veterinary school prior to completion of their BS degree may transfer credits back to USU for completion of their BS degree in bioveterinary science.

Preveterinary students who want to obtain a BS degree within the ADVS department may elect a major in bioveterinary science. They may also obtain a BS degree in animal science or dairy science with a preveterinary option.

Other majors may also be obtained by meeting the requirements for the degree and the preveterinary requirements to satisfy the option.

Utah participates in WICHE (Western Interstate Commission for Higher Education) which provides state subsidization of Utah resident (5 years or longer) students entering any veterinary school that is a WICHE-participating school. At present this includes Colorado State University, Washington State University, Oregon State University, and University of California at Davis. Students may also apply to other veterinary schools as out-of-state applicants.

### Vocational Subbaccalaureate Program

**Dairy Herdsman Certificate.** Students completing the required courses and experience in the Dairy Herdsman's curriculum usually find employment with a commercial or family dairy. Some enter dairy-related businesses. Students desiring to continue their dairy education may complete a BS degree in three additional years with proper planning and suitable academic performance.

## Requirements

**Departmental Admission Requirements.** Undergraduate admission requirements for the Department of Animal, Dairy and Veterinary Sciences are the same as those described for the University. Students in good standing may apply for admission to the department.

**Departmental Standards.** All graduates from the department in *animal* or *dairy sciences* must complete the basic animal science or dairy science core curriculum and meet the following two minimum requirements: (1) Courses required for the major may be repeated only once to improve a grade; and (2) Courses required for the major may not be taken for pass-fail credit.

**Academic Advising.** The format of the animal and dairy science core curriculum with emphasis areas has reduced the required course/credit load, opening up new areas to provide greater opportunities and flexibility in the majors. However, the "core concept" with "emphasis areas" requires that a very close student-academic adviser relationship be established and continued through each student's bachelors degree program. Each student must take the responsibility of establishing this close working relationship with his or her adviser. Doing this soon after the student's entry into the department can keep academic problems to a minimum.

## Graduation Requirements

Courses required and recommended for meeting BS degree graduation requirements in the various options available in the department are as follows:

### Animal/Dairy Science Core Requirements

**Freshman year:** ADVS 108, 111, 120, 125, 213 (D), 251; minimum of two ADVS production practices courses chosen from ADVS 208, 209, 212, 213, 218, or 219 (A); Biol 125; Chem 111, 141, 144; Math 101; Engl 101 or 111; 3-9 credits of General Education, ADVS directed electives, and emphasis area electives\*.

**Sophomore year:** ADVS 202, 300, 350, 351, 365 (A); NFS 340 (D); Stat 201; Engl 200 or 201; 18-22 credits of General Education, ADVS directed electives, and emphasis area electives\*.

**Junior year:** ADVS 420, 421, minimum of 3 credits from 425 or 480, 435 (D), 456, 457, 491; Engl 301 or 305 or Ag Ed 305; 31-34 credits of General Education, ADVS directed electives, and emphasis area electives\*.

**Senior year:** ADVS 492; any two ADVS upper division animal species management courses (A); ADVS 513 (D); 26-39 credits of General Education, ADVS directed electives, and emphasis area electives\*.

### Suggested Support Courses for Animal/Dairy Science Emphasis Areas

Courses selected from the following are in addition to the Animal or Dairy Science core curriculum.

**Production Management Emphasis.** ADVS 101, 165 or 265 (A), 166 or 271 (A), 225, 270 (A), 272 (D), 309 (A), 330, 366, 375, 553 or 554; AE 310; Ag Ed 200 (D), 303, 360; MHR 235, 311; Ag Ec 210, 317, 331, 410, 411, 510; Acctg 201, 202; NFS 503 (D); PISci 100, 430, 432; Soils 358, 359.

**Business Emphasis.** Acctg 201, 202; ADVS 330, 375; BA 340, 350; MHR 299, 311, 360; BIS 255; Ag Ec 210, 260, 331, 535; Econ 200.

**Research Emphasis.** ADVS 366, 375, 548, 549, 552, 582; Biol 319, 519; Physl 401; Chem 370, 371; Micrb 301; Stat 501, 502; Phys 111, 112, 113; Psy 101.

**Extension Emphasis.** Ag Ed 310, 551; ADVS 270 (A), 271 (A), 272 (D), 330, 425, 565; Comm 130, 206, 384. Additional credits in computer technology, ADVS Production and Management courses, BA and Ag Ec courses.

**Communication Emphasis.** Comm 121, 130, 210, 283, 420, 452, 502, 560, 580, 587; Spch 325.

**International Work Emphasis.** ADVS 130, 270 (A), 271 (A), 272 (D), 375, 565; Ag Ed 101, 200, 301, 551; Ag Ec 210, 260; PISci 100; Soils 358, 359.

### ADVS Minors

A minor can be valuable when associated with a major in agricultural education, agricultural economics, plant science, nutrition and food science, business, economics, computer science, range science, and in other disciplines where the animal industry has direct or indirect involvement.

Requirements for specialty or emphasis area minors are listed below. All credits for an approved minor must have an A, B, or C grade. Students also have the option to develop their own

(A) Required of Animal Science majors.

(D) Required of Dairy Science majors.

\*Students must see academic advisers for approved courses.

minor program in consultation with an ADVS departmental adviser. In this case, a core requirement of ADVS 111, 245, and one basic specie production practices course would be required with the balance of credits taken from other ADVS courses.

### Requirements for Minors

The following is a listing of courses for the various minor emphasis areas.

**General Animal Science:** ADVS 111, 245; choose one or more courses from ADVS 208, 209, 212, 218 or 219; 12 elective ADVS credits, with approval of an animal science adviser.

**General Dairy Science:** ADVS 111, 213, 245; 12 elective ADVS credits, with approval of a dairy science adviser.

**Bioveterinary Science:** ADVS 120, 300, 420; any supporting elective ADVS credits, with approval of a bioveterinary science adviser.

**Swine Production:** ADVS 111, 212, 225 (coop experience with swine), 245, and 271.

**Beef Production:** ADVS 111, 208, 225 (coop experience with beef), 245, and 271.

**Horse Production:** ADVS 111, 165, 219, 225 (coop experience with horses), and 245.

**Horse Training:** ADVS 111, 165, 219, 265; 5-credit elective chosen from ADVS 166, 225 (coop experience with horses), 266, 301, or 390.

**Animal Genetics:** ADVS 111, 456, 457; Biol 125; Stat 201.

**Animal Nutrition:** ADVS 111, 225, 251, 350, 351 (ruminant), and 351 (nonruminant); select one of ADVS 208, 209, 212, 213, 218, or 219.

**Domestic Animal Reproduction:** ADVS 101, 111, 120, 420, and 421.

**Sheep and Wool Production:** ADVS 111, 129, 209, 225 (coop experience with sheep/wool), 245, 271, 309.

**Meats:** ADVS 111, 270, 365, and 390; NFS 345.

**Animal Industry Computer Applications:** ADVS 111 and 375; Ag Ec 317; select one of ADVS 208, 209, 212, 213, 218, or 219.

**Dairy Herdsman:** ADVS 102, 103, 104, 105, 109, 113; Ag Ed 200. (Not available to Dairy Science majors.)

Transfer students must have a minimum of one 3-credit upper division course in residency with the approval of an ADVS adviser.

### Bioveterinary Science

This plan includes those courses required for application to WICHE veterinary schools after three years. Requirements are as follows:

**Freshman year:** Engl 101 or 111; Math 105, 106; Chem 111, 121, 122, 124; ADVS 108, 111 or 130, 120; 3 credits of Humanities electives.

**Sophomore year:** Chem 331 and 334, 332 and 335, 370 and 371; Biol 125, 126, 127; ADVS 202, 392; 3 credits of Humanities electives; Econ 200 or Hist 170 or PolSc 110.

**Junior year:** BIS 140; Phyx 111, 112, 113; Biol 319; Engl 200 or 201; Stat 201; ADVS 251, 300, 392; 5 credits of Social Science electives; 3 credits of Humanities electives.

**Senior year:** ADVS 350, 351, 420, 421, 548, 549, 570, 571, plus 3 credits from ADVS 390, 391 and 480; Engl 301 or 305; Micrb 301; Zool 555; 3 credits other electives.

### Safety and Liability in Classes and Laboratories

Certain classes and laboratories involve a risk of bodily injury or of damage to clothing. Students should take appropriate precautions and wear suitable protective clothing. Some of the risks include handling or being near animals, slick floors or corrals, use of toxic or corrosive substances, and the use of sharp or breakable instruments and equipment. Students should take precautions to avoid fainting during demonstrations or work with animal tissues or operative procedures. Students must assume their own liability protection for travel to and from classes, laboratories, and field trips. The University and its employees assume no liability in the performance of classroom or laboratory instruction or on scheduled field trips, or for other dangerous activities. The student, by voluntarily participating in these classes and activities, agrees to assume the risk and not hold USU or its staff liable.

### Financial Support

In addition to the scholarships and other financial aid available through the University, the department awards designated scholarships to qualified students (for details, refer to Scholarships and Awards in the College of Agriculture in the Financial Aid section of this catalog). The department employs students on a part-time basis to assist with its research and operate its animal facilities. The department also coordinates cooperative education and internship employment opportunities for students.

### Graduate Studies

Masters (MS) and doctorate (PhD) degrees are offered in specialized professional fields of study. Nutrition, breeding, reproductive physiology, toxicology, management (including animal behavior) are among those disciplines offered within the department and jointly with other departments on campus. For further details, see the Utah State University graduate catalog.

See the Interdepartmental Toxicology Program for details on graduate studies in toxicology or molecular biology/biochemistry (toxicology).

### ADVS Courses

**100. Supervised Dairy Work Experience.** Placement on a dairy with supervision for the purpose of preparing for dairy herd management. (2-6F, W, Sp, Su)®

**101. Artificial Insemination of Dairy Cattle.** Principles of reproduction, artificial insemination, and the handling of semen. Anatomy and physiology of the bovine reproductive tract and reproductive management. Practice in artificial insemination. (3F)

**102. Dairy Cattle Nutrition and Feeding.** Nutrients, feeds, digestion, and utilization by dairy animals. Feeding practices. (4F)

**103. Lactation and Milking Systems.** The mammary gland, udder health, mastitis, and its control. Milking equipment selection, care, operation, and maintenance. Milk quality and marketing. (4W)

**104. Dairy Herd Records.** Record keeping systems, tax records, estate planning, DHI records. Principles of credit and finance, and loan sources. (3W)

**105. Dairy Cattle Genetics and Breeding.** Principles of dairy genetics, mating, pedigrees, and breeding. Purebred cattle, type traits, and classification. (4Sp)

**108. Introduction to Animal Agriculture.** Introduction to the professions and opportunities in animal agriculture, nationally and internationally, and the Animal, Dairy and Veterinary Sciences Department. (1F)

**109. Dairy Herd Health.** Herd health, diseases, disease prevention and treatment. Working with a veterinarian in setting up a herd health program. (2Sp)

**111. Animal, Dairy, and Poultry Production.** An overview of animal production with a detailed examination of the influences of science, marketing, and regulatory policies on animal production. (5F,W)

**112. Fitting and Showing Dairy Cattle.** Fitting, grooming, feeding, and showing dairy cattle at regional and state shows. (1Sp)

**113. Dairy Production Practices.** Basic skills needed to carry out day-to-day operations on a dairy farm. Dehorning, extra teat removal, herd health care, foot care. (2F)

**114. Applied Feeding and Management of Dairy Calves.** Practical experience in feeding and management of calves from birth to weaning. Students will be required to design a calf raising program and carry this program out during the quarter. (2Sp)

**LS 120. Anatomy and Physiology of Animals.** Normal structure and function studied systematically. Comparative livestock, poultry, pleasure and companion animals, laboratory animals, and man. A basic biology course. Four lectures and one lab. (5W)

**125. Applied Agricultural Computations.** Intended to develop understanding and proficiency in the application of mathematical skills to practical computations required in agricultural science. (3F,Sp)

**129. Elements of Sheep Shearing.** Laboratory course with emphasis on wool harvesting technology: sharpening of combs and cutters, operation of equipment, shearing procedures, proper handling of sheep and the fleece. Lab fee. Prerequisite: permission of instructor. (1Sp)

**IO 130. Domestic Animals and Mankind.** Integration of historical and current perspectives on interactions between humans and domestic animals with consideration of their biological, economic, social, esthetic, and ethical significance. (5F,Sp)

**165. Western Horsemanship I.** Grooming, saddling, bridling, mounting, seats and hands, horseback riding both bareback and on western saddle. For students with limited or no previous riding experience. Three labs. Western-type riding boots and health insurance required. Lab fee. (3F,Sp)

**166. Horse Judging, Fitting, and Showing.** Judging halter and performance horse classes. Fitting and showing horses at halter. Lab fee. (3W)

**172. Dairy Cattle Evaluation and Judging.** Introduction to evaluation and selection of dairy cattle. Selection of functional type in commercial operations is emphasized. (1F)

**202. Biotechnology in Agriculture.** Classroom instruction will be used to introduce the student to the basic principles and concepts of biotechnology in agriculture. Topics will include: plant, food and nutrition, animal, and medical aspects of agricultural biotechnology. Three lectures. Prerequisite: Biol 125. (3W)

**208. Beef Production Practices.** Production practices in the handling, selection, and care of beef cattle. Demonstrations of equipment, facilities, and skills relevant to beef cattle production. One lecture, one lab. Prerequisite: ADVS 111 or concurrent enrollment. (3Sp)

**209. Sheep Production Practices.** Production practices in the handling, selection, and care of sheep. Demonstrations of equipment, facilities, and skills relevant to sheep and wool production. One lecture, one lab. Prerequisite: ADVS 111 or concurrent enrollment. (3W,Sp)

**212. Swine Production Practices.** Production practices in the selection, handling, and care of swine. Demonstrations of equipment, facilities, and skills relevant to swine industry. One lecture, one lab. Prerequisite: ADVS 111 or concurrent enrollment. (3W)

**213. Dairy Production Practices.** Production practices in the selection, handling, and care of dairy animals. Demonstrations of equipment, facilities, and skills relevant to the dairy industry. One lecture, one lab. Prerequisite: ADVS 111 or concurrent enrollment. (3F)

**\*\*218. Poultry Production Practices.** Production practices in the selection, handling, and care of poultry. Demonstrations of equipment, facilities, and skills relevant to the poultry industry. One lecture, one lab. Prerequisite: ADVS 111 or concurrent enrollment. (3Sp)

**219. Horse Production Practices.** Production practices in the selection, care, and handling of horses. Demonstrations of equipment, facilities, and skills relevant to horse production. Two lectures, one lab. Prerequisite: ADVS 111 or concurrent enrollment. (3F)©

**225. Cooperative Work Experience.** For students who require animal industry experience to prepare them for advanced curriculum in the Animal, Dairy, or Veterinary Sciences. (1-12F,W,Sp,Su)

**245. Animal Feeds and Feeding Practices.** Feed composition and characteristics which influence animal performance. Digestion of feeds and nutrient utilization by animals. Emphasis on diet formulation and feeding practices. Three lectures, one lab. (4Sp)©

**251. Animal Feeds.** Physical and chemical characteristics of animal feeds and factors which influence animal performance. One lab. (1Sp)

**265. Western Horsemanship II.** Different training techniques for western pleasure and western reining horses, teaching leads, cueing techniques, reining maneuvers, and show-style riding. Three labs. Prerequisite: ADVS 165 or equivalent. Western-type riding boots and health insurance required. Lab fee. (3F,Sp)

**266. Horse Packing.** Practical experience in selecting horses and equipment for pack trips, and in safety principles and in tying hitches. Lab fee. (2W)

**270. Livestock Dressing.** A practical course designed to train students to inspect and dress (slaughter) beef, sheep, and swine. (2F)

**271. Farm Animal Evaluation and Judging.** Evaluation of type and breed characteristics of domestic farm animals utilized for meat production. Judging, grading, and oral reasons will be emphasized. One lecture, two labs. (3F)

**272. Dairy Cattle Evaluation and Judging.** Evaluation of type and breed characteristics of dairy cattle utilized for milk production. Judging, grading, and oral reasons will be emphasized. One lecture, two labs. (3Sp)

**300. Animal Health, Hygiene, and Parasitology.** Introduction to basic principles of disease. The agents, mechanisms, and preventive measures for common diseases and parasites of farm animals will be emphasized. Three lectures, one lab. Prerequisite: ADVS 120. (4F)

**301. Fundamentals of Horse Breaking.** Utilization of current training methods relating to basic Equine behavior, ground breaking skills, and riding and training of the unbroken horse. Three labs. Prerequisite: ADVS 265 or equivalent. Lab fee. (3F,Sp)

**\*\*309. Wool Judging and Evaluation.** Terminology, physical characteristics, and visual grading of wool. Factors associated with the market value of the unprocessed fleece. Judging and oral reasons. One lab. (1F)

**IO 330. Animal Production and Public Policy.** Contemporary forces in society which influence the ability of farmers and ranchers to produce livestock and livestock products. (3W)

**350. Principles of Animal Nutrition.** Biochemistry and utilization of the nutrients for maintenance and productive functions; feedstuff composition and its analysis; major nutritional diseases affecting farm animals. Prerequisites: Chem 141 or concurrent registration. ADVS 120 or equivalent. (5F)

**351. Applied Animal Nutrition.** Principles of animal nutrition applied to ration formulation and feeding strategies; special consideration given to differences in feeds used and feeding practices for each species (beef and dairy cattle, sheep, swine, poultry, and horses). One lecture, one lab. Prerequisites: ADVS 251, 350. (2W)

**365. Live Animal and Carcass Evaluation.** Judging, grading, and pricing of market animals and carcasses, where live vs. carcass evaluation will be stressed. Advanced judging of breeding animals included. (4W)

**\*366. Behavior of Farm Animals.** Applicability of behavioral principles to management of domesticated farm animals of economic importance to man. Two lectures, one lab. (3Sp)

**371. Livestock Judging Contests.** Advanced methods of selection and identification of superior animals for breeding stock; performance records; oral reasons; participation in livestock judging contests. Prerequisite: ADVS 271. (1-2F,Sp)©

**375. Computer Application in Animal Agriculture.** Provides basic computer knowledge to utilize computers for data analysis in animal management decisions, business, record systems, and communication. Two lectures and one lab. Prerequisites: CS 150 or equivalent and a knowledge of statistics or permission of instructor. (3F)

**390. Special Problems and Readings.** Students conduct short-term studies and/or literature review with critical analysis of special topics. Formal written reports required. Prerequisite: approval of instructor. (1-3F,W,Sp,Su)©

**391. Special Topics.** Topics of special interest to those who have needs not satisfied by courses currently offered. (1-5F,W,Sp,Su)

**392. Orientation to Veterinary Medicine.** Provides opportunities for students' orientation to veterinary medicine; to improve their knowledge of and determine their interest in the veterinary profession. Prerequisite: see advisers for qualifications. Limited enrollment. (1-8F,W,Sp,Su)@

**420. Principles of Reproductive Physiology.** An introduction to the principles of physiology as they relate to the reproductive processes in animals. Prerequisites: ADVS 120, or Physl 130, and organic chemistry. (3W)

**421. Applied Reproductive Physiology.** A presentation of factors affecting and methods of measuring reproductive performance in farm animals (beef and dairy cattle, sheep, poultry, swine, and horses) and their application in analysis and evaluation and management of reproduction. One lecture, one lab. Prerequisite: ADVS 420. (2Sp)

**425. Internship in Animal Industry.** A directed and evaluated educational work experience in an animal production unit, related business, or government facility in cooperation with the Livestock Education Foundation. Prerequisite: permission of internship adviser. (1-12F,W,Sp,Su)@

**\*435. Lactation of Farm Animals.** Anatomy and function of mammary glands. Milk as a food for young animals and commercial markets. Factors affecting milk quantity and quality. Milking machine operations. Prerequisite: organic chemistry and ADVS 120. (3W)@

**456. Principles of Animal Breeding.** Genetic influences affecting animal performance and the application of selection principles, breeding systems, and methods for improvement of farm mammals. Prerequisites: Biol 125, 319, or equivalent. Three lectures, one lab. (3F)@

**457. Applied Animal Breeding.** Application of genetics and animal breeding practices to the principal species of farm animals (beef and dairy cattle, sheep, swine, poultry, and horses). One lecture, one lab. Prerequisite: ADVS 456. (2W)

**480. Undergraduate Research or Creative Opportunity.** Research or creative activity pertaining to animals. May include management, production, medical, or basic science; and consider biological, chemical, or physical aspects, or instrument design. Prerequisite: permission of instructor. (1-6F,W,Sp,Su)@

**491. Preprofessional Orientation.** Survey of the professional opportunities in the animal industries, with emphasis on contacts with industry leaders and preparation for employment. Prerequisite: upper division standing. (1W)

**492. Undergraduate Seminar.** Current development in the selected field of the student. Each student is responsible for the research and oral presentation of a topic in the animal industry. Prerequisite: senior standing or permission of instructor. (2F)

**508 (d608)<sup>1</sup>. Beef Cattle Management.** Managing the beef enterprise to yield optimum returns through integrating resource use and applying breeding, nutrition, reproduction, and animal health practices. Three lectures, one lab. Prerequisites: ADVS 208, 351, 421, 457; or instructor's consent. (4F)

**509 (d609). Sheep Management and Wool Technology.** Detailed study of the managerial considerations for range and farm flock operations. Examination of wool and a review of wool clip handling and merchandising. Three lectures, two labs. Prerequisites: ADVS 209, 351, 421, 457; or instructor's consent. (5Sp)

**512 (d612). Swine Management.** Management decisions based on nutrition, breeding, programs, herd health practices, herd records, and marketing opportunities. Three lectures, one lab. Prerequisites: ADVS 212, 351, 421, 457; or instructor's consent. (4Sp)

**513 (d613). Dairy Cattle Management.** Evaluating dairy herds and planning for future improvements, using management records on herd performance, individual student oral and written reports. Two lectures and one lab. Prerequisites: ADVS 213, 351, 421, 457; or instructor's consent. (4W)

**\*518 (d618). Poultry Management.** Management of poultry enterprises with emphasis on nutrition and feeding, health care, facilities, and marketing. Two lectures, one lab. Prerequisites: ADVS 218, 300, 351, 421, 457. (3F)

**519 (d619). Horse Management.** Management decisions in horse enterprises with emphasis on records, nutrition, breeding, health, facilities, and merchandising. Three lectures, one lab. Prerequisites: ADVS 219, 351, 421, 457; agricultural economics; or instructor's consent. (4W)

**\*\*540 (d640). Environmental and Industrial Toxicology.** Study of toxic chemicals present in general or industrial environment. Emphasis on biologic effects, associated problems, and possible solutions. Prerequisite: Chem 370 or instructor's consent. (4Sp)

**\*548 (d648). Veterinary Viral Diseases.** Principles of viral diseases of veterinary animals, characteristics of the viruses, means by which they are transmitted, methods of diagnosis, and control measures. Prerequisites: Biol 125, 127, Micrb 301. (3W)

**549 (d649). Laboratory Animal Management.** Principles of management of laboratory research animals: mouse, rat, guinea pig, rabbit, hamster, dog, cat, monkey, and birds. Covers breeding, feeding, handling, identification, and sanitation. (3Sp)

**\*\*552 (d652). Animal Energetics and Nutrient Metabolism.** Bioenergetics and metabolism of nutrients as they apply to animal production. Three lectures. Prerequisites: ADVS 350, 351, physiology. (3F)

**\*553 (d653). Nutritional Management of Ruminants.** Nutritional management, problem solving, and feeding strategies as they influence animal performance. One lecture, two labs. Prerequisites: ADVS 508, 509, or ADVS 513. (3W)

**\*\*554 (d654). Nutritional Management of Nonruminants.** Nutritional management, problem solving, and feeding strategies as they influence animal performance. One lecture, two labs. Prerequisites: ADVS 512, 518, or 519. (3Sp)

**\*559 (d659). Wool Science.** Biology of fiber growth: Histology, fiber arrangement, morphology, and fleece genetics. Environmental and physiological factors affecting wool growth. Prerequisite: Biol 125. (3F)

**565 (d665). Agricultural Sprays and Dusts.** Preparation, properties, and uses of fungicides, insecticides, herbicides, and growth regulators. Operation and care of application equipment. Four lectures, one lab per week. Prerequisites: Bot 560, Ent 539, or special permission. (5Sp)

**570 (d670). General Pathobiology.** Principles of structural and functional mechanism of abnormal reactive processes in animals. Three lectures, two labs. Prerequisite: Biol 127. (5F)

**571 (d671). Special Pathobiology.** Correlates abnormality with causes; disease processes studied by systems, organs, and cells. Three lectures, two labs. Prerequisite: ADVS 570. (5W)

**\*\*582 (d682). Animal Cytogenetics and Methods in Cell Culture and Chromosome Banding Techniques.** Structure and properties of chromosomes, chromosome behavior during cell division, chromosomal influence on the phenotype, and factors that cause chromosomal change. Emphasis on clinical problems affecting man and livestock. Two lectures, one lab. (3Sp)

**585 (d685). Range Livestock Production and Management.** Principles of production and management of livestock applied to the various range production situations and the correlation of livestock and range management in optimizing production of both. For nonmajors. Prerequisites: RS 300, ADVS 351. (3W)

**\*\*586 (d686). Poisonous Range Plants Affecting Livestock.** Poisonous plants of rangelands and their effects on grazing animals, especially livestock. Management practices to reduce or prevent poisoning. (3W)

## Graduate<sup>2</sup>

**601. Animal Research Orientation.** (1F)

**608 (d508). Beef Cattle Management.** (4F)

**609 (d509). Sheep Management and Wool Technology.** (5Sp)

**612 (d512). Swine Management.** (4Sp)

**613 (d513). Dairy Cattle Management.** (4W)

**\*618 (d518). Poultry Management.** (3F)

**619 (d519). Horse Management.** (4W)

**\*\*620. Physiology of Reproduction.** (4W)

**625. Graduate Internship.** (1-6F,W,Sp,Su)

**\*630. Animal Breeding Theory.** (5W)

**635. General Pharmacology.** (3W)

**\*\*640 (d540). Environmental and Industrial Toxicology.** (4Sp)

**641. Techniques in Toxicology.** (3Sp)

**\*648 (d548). Veterinary Viral Diseases.** (3W)

**649 (d549). Laboratory Animal Management.** (3F)

**\*\*650. Animal Nutrition Laboratory.** (2W)

**\*651. Techniques in Nutrition Research.** (2Sp)

- \*\*652 (d552). Animal Energetics and Nutrient Metabolism. (3F)**
- \*653 (d553). Nutritional Management of Ruminants. (3W)**
- \*\*654 (d554). Nutritional Management of Nonruminants. (3Sp)**
- \*655. Rumen Physiology and Metabolism. (3F)**
- \*\*656. Mineral Metabolism. (3W)**
- \*657. Vitamins in Nutrient Metabolism. (3Sp)**
- \*659 (d559). Wool Science. (3F)**
- \*660. Principles of Toxicology. (4Sp)**
- \*\*662. Molecular and Biochemical Toxicology. (3F)**
- 665 (d565). Agricultural Sprays and Dusts. (5Sp)**
- 670 (d570). General Pathobiology. (5F)**
- 671 (d571). Special Pathobiology. (5W)**
- 680. Animal, Dairy and Veterinary Science Seminar. (1F,W,Sp)®**
- 681. Seminar in Toxicology. (1W,Sp)®**
- \*\*682 (d582). Animal Cytogenetics and Methods in Cell Culture and Chromosome Banding Techniques. (3Sp)**

- 685 (d585). Range Livestock Production and Management. (3W)**
- \*\*686 (d586). Poisonous Range Plants Affecting Livestock. (3W)**
- 690. Special Problems. (1-9F,W,Sp,Su)®**
- 691. Readings and Conference in Pharmacology and Toxicology. (1-5F,W,Sp,Su)®**
- 697. Research and Thesis. (1-12F,W,Sp,Su)®**
- 699. Continuing Graduate Advisement. (1-12F,W,Sp,Su)®**
- 797. Dissertation Research. (1-12F,W,Sp,Su)®**
- 799. Continuing Graduate Advisement. (1-12F,W,Sp,Su)®**

<sup>1</sup>Parentetical numbers preceded by *d* indicate a *dual* listing.

<sup>2</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

©This course is also offered by correspondence through the Life Span Learning Independent Study Division.

\*Taught 1990-91.

\*\*Taught 1991-92.

## Department of

# Art

## College of Humanities, Arts and Social Sciences

**Head:** Associate Professor Marion R. Hyde  
Office in Fine Arts Visual 120

**Professors** Jon I. Anderson, R.T. Clark, Ray W. Hellberg, Moishe Smith, Adrian Van Suchtelen; **Professors Emeritus** Harrison T. Groutage, Jessie Larson, Gaell Lindstrom, Twain C. Tippetts; **Associate Professors** Glen L. Edwards, Craig Law; **Assistant Professors** John Neely, Christopher T. Terry, Thomas E. Toone, Susanne J. Warma; **Temporary Assistant Professors** Alice Brown-Wagner, Alan Hashimoto, John A. Hickman

**Degrees offered:** Bachelor of Arts (BA), Bachelor of Science (BS), Bachelor of Fine Arts (BFA), Master of Arts (MA), and Master of Fine Arts (MFA) in Art

**Areas of specialization:** Advertising Design, Art Education, Art History, Ceramics, Drawing, Graphic Design, Illustration, Painting, Photography, Printmaking, Sculpture

### Objectives

The Department of Art offers a variety of courses carefully selected to prepare art students to become professional in both their thinking and exhibited skills as teachers or as practicing

artists. The department also provides service courses for other students to help them become more creative in their thinking, selective in choice making, and cultured in their attitudes.

### Requirements

#### Departmental Admission Requirements

Students accepted in good standing by the University may apply for admission to the Department of Art. Candidates for the BA and BS degrees must maintain a 2.5 minimum GPA in all art classes. No grade less than a *C* is accepted in any art class. The Bachelor of Fine Arts degree requires a 3.0 overall average in all art classes, including nothing lower than a *B* in emphasis classes, and a group senior show. A description of requirements for the various degrees and art emphasis areas follows.

#### Bachelor of Arts Degree

Art majors should complete the majority of General Education lower division requirements, the modern language requirement of 25 credit hours, and the foundations and basic core curriculum by the end of the sophomore year. This will allow concentration in an area of specialization during the junior and senior years. The foundation curriculum is as follows: Art 101, 102, 120, 160, 275,

276, and 277. Art 102 and 120 are fundamental prerequisites and should be completed before registering for other studio classes.

In addition, art majors must complete requirements for one of the specialties listed as areas of emphases plus courses as outlined by the adviser and/or head of the department. The major professor may also prescribe other courses to serve the particular needs of different students. A minimum of 70 credits in art is necessary for this degree.

### Bachelor of Science Degree

The Bachelor of Science degree has the same requirements as the Bachelor of Arts with the exception that there is no foreign language requirement.

### Bachelor of Fine Arts Degree

The BFA is a professional art degree requiring above-average accomplishment in art. Only students demonstrating considerable promise will be accepted for this more demanding professional degree.

All BFA students must complete the foundation and basic core, as listed in the current requirement sheet, for the BA and BS degrees. Because basic core requirements may vary, according to the particular emphasis area chosen, students should consult an adviser for appropriate course selections.

A minimum 3.0 grade point average in the foundation and basic core and a minimum of 3.0 in each emphasis class is required. Emphasis classes can be retaken for a higher grade. A minimum of 80 credits must be completed for the BFA degree.

The General Education lower division requirements and most of the basic core curriculum, especially Art 102 and 120, should be completed by the end of the sophomore year. This will allow concentration in an area of specialization during the junior and senior years.

### Art Minor Requirements

The requirements for a minor in art are flexible and can be completed in most areas of specialization.

Generally, the minimum requirements include Art 102, 120, plus three credits from the art history group (101, 275, 276, and 277), and 15 credits in a specialization area.

USU does not offer an art teaching minor for secondary teachers. Students choosing to train for teaching art in secondary schools must complete the art education major listed under art specialties and must comply with all requirements listed by the Department of Secondary Education.

### Art History Minor Requirements

A minor in art history requires Art 275, 276, 277, plus 18 credits from the art history group (Art 273, 386, 387, 388, 474, 475, 478, 481, 482, 483, 484, and 589).

### Emphasis Areas

**Art History.** The requirements for a BA in Art History are separate from those of other degrees offered by the Art Department. They are as follows: 52 credits of course work in the major with a 2.5 grade point average required for graduation. Basic course work (21 credits) is to be completed within the first eight quarters and includes Art 101, 102, 120, 275, 276, 277, plus Phil 215. Advanced courses (27 credits) should be selected from Art 386, 387, 388, 474, 475, 478, 481, 482, 483, 484, and 589. Five quarters of one or three quarters each of two foreign languages (French or German preferred) are required. A minor in a related

area or specific courses chosen in consultation with the adviser is also required.

**Ceramics.** Contemporary ceramics represents the extension and synthesis of clay sculpture and vessel traditions. Students are acquainted with the technology of ceramic materials and firing processes while developing sound craftsmanship as a means to personal expression. Enrichment is provided through the ceramics collection of the Nora Eccles Harrison Museum, numerous ceramics exhibitions, and visiting guest artists. Juniors and seniors in the program may compete for one of the Ellen Stoddard Eccles Scholarships, an endowed scholarship fund set aside especially for undergraduate ceramics majors.

**Drawing.** Drawing is the two-dimensional study of form and space, the exploration of drawing media, graphic elements, and visual dynamics. It is an essential discipline for all artists, as it provides the fundamental visual skills needed in their search for a personal idiom. At the same time, drawing itself is also a vehicle of creative expression, visual adventure, and self-discovery.

**Painting.** Painting concerns an analysis and utilization of all historical approaches to painting, and the exploration of new ideas, techniques, and materials to make new personal contributions. Students are not required to follow any one approach to painting but are encouraged to develop and express individuality.

**Photography.** Photography is one of the most recent fine art forms. It is broadly used in contemporary life, and the student will become acquainted with all areas of both applied and aesthetic concerns. The fundamentals of craft are carefully taught, so that the student will be able to contribute positively to the field and have employable skills after graduation.

**Printmaking.** Printmaking is concerned with the process of the artistic creation of the print, the creation of the matrix (wood, copper, stone), and with the printing. Printmaking majors will be introduced to the three major media: intaglio, lithography, and relief printing. Students then spend as much time as possible developing a personal artistic image in a single, chosen medium.

**Sculpture.** Sculpture is the study of three-dimensional form and space and the exploration of various media. Critical to the sculptor is a feel for visual dynamics and its application to personal expression. An understanding of drawing and design is a necessary prerequisite to the development of ideas. The sculptor must also have the technical expertise to fulfill personal expectations.

**Advertising Design.** Advertising Design emphasizes concept and layout, along with proficiency in design, thinking, and production methods. Each student will prepare a portfolio of work to show prospective employers his or her ability to produce tasteful and imaginative solutions to advertising problems. This is one of the most vital areas of art, as it is through the creative work of successful designers that products are advertised and sold.

**Illustration.** Illustration is the art of graphic communication. Students become competent draftsmen and painters and must understand perspective, anatomy, and graphic techniques. The student develops skills to research problems, create compositions that communicate empathy to the viewer, and interpret emotions to provide successful illustrations. A portfolio will be prepared to show to art studios for prospective employment, or the illustrator can work as a free-lance artist.

**Graphic Design.** Students become competent in hand lettering, trademark design, corporate design, package design, editorial layout and design, poster design, and designed illustrations. A



portfolio is prepared to show to design studios for prospective employment in graphic design, such as a package design studio, design studio, art director for a magazine, or free-lance design and illustration. Many students combine this emphasis with Advertising Design or Illustration.

**Art Education.** Students who wish to pursue a teaching credential for art in the secondary schools should make that choice as soon as possible in their college planning. Students must be interviewed by the appropriate faculty member in the Art Department and must be registered with the College of Education for admission to this program.

The Art Education student may pursue a BA, BS, or BFA degree. The BA and BS degrees require 78 credits (the minimum for certification). The BFA requires 82 credits including an additional 6 credits of Art History beyond the core requirement.

A minimum of 24 credits are to be taken as a specialization area in art.

See the Education Major Requirement Sheet, available from the Art Department, for specific course requirements.

### Fine Arts Tour

Art majors and minors should plan to participate in some of the excellent fine arts tours available. Fine arts tours to Europe have been conducted each summer if there is sufficient demand. These tours are planned for a maximum learning experience at minimum cost.

### Art Work

The Art Department faculty reserves the right to retain any student works of their choice for purpose of display, exhibition, and addition to the permanent collection.

### Graduate Study

The Department of Art offers two graduate degrees and cooperates with the College of Education on another degree. The Master of Arts (MA) and the Master of Fine Arts (MFA) are offered by the Art Department. A Master of Education (MEd) with a specialization in art is offered through the College of Education.

See the graduate catalog for prerequisites and further information.

### Art Courses

**HU 101. Exploring Art.** An introduction to the interesting variety of visual art forms which will help students develop an understanding of basic art elements and fundamental art principles. (3F,W,Sp)©

**102. Two-dimensional Design.** Basic art elements with projects in two dimensions. Required of art majors. (3F,W,Sp)©

**120. Drawing.** Introduction to the visual language of drawing, the graphic elements, the various drawing media, and the creative problems involved. Simple to complex subjects. (3F,W,Sp)

**160. Three-dimensional Design.** Study of form and space relationships using clay, plaster, wire, and wood. Emphasis on composition and expression of ideas. Prerequisites: Art 102, 120. (3F,W,Sp)

**210. Presentation Techniques for Art Teachers.** Development of presentation techniques for posters, bulletin boards, and teaching materials, including brush lettering, pen lettering, and layout. (3Sp)

**217. Basic Ceramic Handbuilding.** Introduction to techniques including pinch, coil, slab building, etc., as well as glazing. (3F,W)

**218. Basic Ceramic Wheel Throwing.** Emphasis on throwing and trimming techniques. (3F,W,Sp,Su)

**226. Basic Painting.** Introduction to the visual language of painting with an emphasis upon the expressive aspects of color. A variety of oil painting techniques will be explored. Prerequisites: Art 102, 120. (3F,W,Sp)

**231. Basic Advertising Design.** Introduction to principles and psychology of advertising. Thinking problems in media of newspaper, magazine, television, and posters. Grade is on concepts and thinking only. No art background needed. (3F)©

**235. Basic Illustration.** Drawing, designing, and developing ideas for illustrations, using primarily black and white media. Drawing from the model and homework. (3F)©

**240. Basic Photography.** Operation of camera and related equipment, exposure and developing of black and white film, elementary enlarging and finishing with emphasis on composition and photographic aesthetics. (3F,W,Sp,Su)

**246. Basic Typography Design.** Problems in typography, layout, and design for advertising and graphic design layouts. Learning type faces, printing methods, and ordering type. (3W)©

**255. Basic Printmaking.** An introduction to the theoretical and visual approach of printmaking. Studio work in the media of relief and intaglio. Prerequisites: Art 102, 120. (3F,W,Sp)

**260. Basic Sculpture.** The study of form and space relationships specific to the figure, utilizing clay. Direct modeling and modeling over an armature will be studied. (3F,W,Sp)

**273. East Asian Civilization: Arts and Literature.** A general survey of the arts and literature of China, Japan, and Korea in English translation. (3)

**HU 275. Survey of Western Art.** Prehistoric through Classical. (3F)©

**HU 276. Survey of Western Art.** Medieval through Renaissance. (3W)©

**HU 277. Survey of Western Art.** Baroque through Modern. (3Sp)©

**310. Art Methods for Elementary Grades.** Methods of teaching various art processes, crafts, art history, and art appreciation in the elementary schools. Required preparation for a grade school teacher. (3F,W,Sp)

**311. Art Studio For Elementary School Teachers.** Designed to develop art skills and concepts related to the core curriculum requirements in art in Utah's public schools. (3Sp)

**312. Art Methods for Secondary Teachers.** Methods of teaching art in the secondary schools. How to motivate various art processes, art history and appreciation. Curriculum development. Required for art education majors. (4F)

**317. Intermediate Ceramic Handbuilding.** This course follows Art 217, Basic Ceramic Handbuilding. Focus is on clay as a sculptural medium, applying traditional pottery technology to sculptural concerns. Prerequisites: Art 160 and 217. (3F,Sp)©

**318. Intermediate Ceramic Wheel Throwing.** This class is a continuation of Art 218, Basic Ceramic Wheel Throwing. The student is expected to achieve a consistent level of ability; emphasis is on multiple production. Prerequisites: Art 217 and 218. (3W,Sp)©

**322. Intermediate Drawing.** A continuation of basic drawing emphasizing more complex drawing problems, techniques, and approaches. Prerequisite: Art 120. (3W,Sp)

**323. Anatomy for Artists.** Analysis of the anatomical structure of the human figure through textbook studies, drawing, and three-dimensional clay studies from live models. Prerequisite to life drawing. Prerequisite: Art 120. (3F)

**326. Intermediate Painting.** Application of visual language to specific painting exploration. Color theory, content, and technique emphasized. (3W)

**327. Watercolor and Related Media.** Experimental approaches with transparent watercolor, casein, gouache, and/or acrylics. Part of the quarter spent outdoors working from nature. Prerequisites: Art 120, 226. (3F,Sp)

**334. Intermediate Advertising Design.** Learning the tools and application for advertising design layout and design. Learning the design of the printed page. Dye-marker indication. Prerequisite: Art 231. (3Sp)©

**335. Drawing for Illustration.** To develop the habit of working in sketch books, doing drawings helpful in painting and usable as illustrations. Drawing from the model and homework. (3Sp)©

**337. Intermediate Illustration—Concept.** Students develop ideas for illustrations and carry these ideas through the stages of roughs, comprehensives, and finished artwork. (3F)@

**338. Intermediate Illustration—Technique.** Experience working with a variety of media on a variety of surfaces. Painting from the model and homework. (3W)@

**339. Intermediate Illustration—Storybook.** Creation of illustrations appropriate for children's books. Experimentation encouraged. Some painting from the model and homework. (3Sp)@

**340. Intermediate Photography.** A continuation of Art 240 to further experience the photographer in technical controls, aesthetics, and thoughts with an introduction to experimental laboratory/darkroom techniques. Prerequisite: Art 240. (3F,W)

**344. Zone System.** Based on photographic procedures developed by Ansel Adams. Contrast control in B&W film and paper extensively explored. Prerequisites: Art 240, 340, or equivalent experience. (3Sp)

**360. Figure Sculpture.** Study of the figure and related problems. Use of clay, wax, and plaster modelling techniques, and wood and stone carving. Prerequisite: Art 160. (3F,W,Sp)

**385. Cinema as Art.** Samples the history of motion pictures, in a study of the wide varieties of vision that have graced the silver screen. (3)

**\*386. History of Illustration.** History of illustration in America from Howard Pyle to present; study of illustrators' lives, works, and lectures. (3Sp)

**\*\*387. History of Advertising.** Social trends, consumer needs, and technological advances will be studied to show their effects on the psychology of visual persuasion as used in advertising design. (3Sp)@

**388. History of Photography.** The history of still photography as a medium rather than a technique. Covering a period from 1839 to the present. (3)

**412. Teaching Instruction for Secondary Art Teachers.** Methods of presenting art concepts and techniques for the secondary school teacher. (3W)

**420. Drawing and Composition.** Advanced drawing problems emphasizing various approaches to composition. Prerequisites: Art 120, 322. (3Sp)@

**421. Life Drawing.** Drawing from the live model, studying the design and structure of the human figure, exploring various graphic interpretations. Prerequisites: Art 120, 323. (3W)

**427. Painting: Composition and Color.** Advanced painting problems dealing specifically with applied color and composition. (3W)

**430. Advertising Production.** Learning production and layout of camera-ready art for advertising and graphic design. Ordering type, pasteup mechanicals, and overlays for camera-ready art. (3Sp)@

**436. Fashion Illustration.** Creation of art appropriate for reproduction as fashion illustrations in newspapers, magazines, etc. Drawing from the model and homework. (3Sp)@

**443. Photo Lighting.** Practical projects are assigned emphasizing floodlighting, flash, strobe, and natural lighting. 4x5 camera required. Prerequisites: Art 240, 340, 344. (5F)

**444. Photo Portraiture.** Revealing personality and character. Study of the subject, desirable backgrounds, composition, and types of lighting. Prerequisites: Art 240, 340. (3Sp)

**\*445. Advanced Typography Design.** Finished lettering for magazine and newspaper advertisements, packaging, and symbols. Prerequisite: Art 246. (3W)@

**474 (d674)'. Greek and Roman Art.** Origin and development of the art and architecture of Crete, Mycenae, Greece, and the Roman world. (3W)

**475 (d675). Medieval Art.** Development of art and architecture in the west from the end of the Roman Empire to the Gothic Period. Prerequisite: Art 276 or consent of instructor. (3)

**478 (d678). Renaissance Art.** Development of European art and architecture from the thirteenth to the sixteenth centuries. (3)

**481 (d681). Baroque and Rococo Art.** Development of art and architecture in Europe from the sixteenth to the eighteenth centuries. (3)

**482 (d682). Nineteenth Century Art.** Painting and sculpture from Neoclassicism to Symbolism. Prerequisite: Art 277 or consent of instructor. (3)

**483 (d683). Twentieth Century Art.** History of painting, sculpture, and architecture from the post-impressionists to the present. (3W)

**484 (d684). American Art.** History of painting, sculpture, and architecture in America from colonial times to the present. (3F)

**514. Student Teaching at University Level.** Teaching techniques and procedures for university level. Prerequisite: approval of major professor. (1-9F,W,Sp)@

**515. Ceramic Studio.** Selected topics in contemporary ceramic techniques, including glaze formulation, firing, etc. Prerequisites: Art 217 and 218. (3-9F,W,Sp,Su)@

**521. Advanced Life Drawing.** Drawing from the model with concern for the human figure but with greater emphasis on interpretative approaches and composition. Prerequisites: Art 323, 421. (3Sp)@

**522. Drawing Studio.** Advanced individual drawing projects dealing with a central theme and a specific approach. Prerequisite: approval of major professor. (1-9F,W,Sp,Su)@

**526. Art Studio.** Advanced problems in emphasis, medium, and idiom of student's choice. Student plans project and executes it through individual initiative and scheduled consultation with the instructor. Prerequisite: consent of instructor. (1-9F,W,Sp)@

**527. Painting Studio.** Designed to develop creative problem solving through the process of research and experimentation. Various painting ideas and painting media may be explored. Prerequisites: Art 120, 226. (1-9F,W,Sp,Su)@

**528. Advanced Painting.** Special problems in painting, focusing on the conceptual aspects of painting and the development of each student's individual abilities. (3Sp)

**529. Figure Painting.** Painting from the live model with emphasis on solving problems of the planar structure of the human form. Prerequisites: Art 326 and 421. (3F,Sp)

**531. Advertising Design Studio.** Theory of designing the complete advertising campaign. Training in producing professional advertising for employment in this field. Prerequisites: Art 231, 334. (1-9F,W,Sp)@

**535. Advanced Illustration.** Illustration on a professional level. Experimentation with in-class work encouraged. Most guest artist assignments given in this class. Prerequisite: Art 335. (1-9F,W,Sp)@

**537. Illustration Studio.** Illustrations of a specific nature, determined by the student and instructor, are produced. Concurrent enrollment in Art 535, to work from the model, is required. Prerequisite: approval of major professor. (1-9F,W,Sp)@

**540. Photography Studio.** Student designs own project in conjunction with instructor, then works independently. Especially important for advanced students who have decided on a specialty area. Prerequisite: Art 240. (1-9F,W,Sp)@

**541. Photography Illustration.** Great emphasis placed on the thinking, planning, and interpreting of an idea photographically. Applied or commercial aspects of photographs produced for advertisements and editorial use. Professional portfolio pieces produced for employment in the field. Students required to have 4x5 camera. Prerequisites: Art 240, 340, 344, 443. (5W,Sp)@

Basic Photo Illustration. (5W)

Advanced Photo Illustration. (5Sp)

**542. Color Printing.** Fall—Color theory and production of correctly color balanced print. Winter—Manipulative capabilities and expressive potential of color printing materials. Spring—All areas of color slide production, emphasizing both straight and manipulated images. Prerequisites: Art 240, 340. (3F,W,Sp)@

Basic Color Printing. (3F)

Advanced Color Printing. (3W)

Color Positive—slides. (3Sp)

**545. Advanced Design—Corporate ID.** Trademark design with applications to stationery and business forms. Portfolio perfect. Prerequisite: Art 246. (3F)@

**546. Advanced Design—Editorial.** Layout and design of consecutive pages in magazines and annual reports. Portfolio perfect. Prerequisite: Art 246. (3W)@

**547. Advanced Design—Poster.** Layout and design of posters integrating hand-lettering, typography, illustration, and photography. Portfolio perfect. Prerequisite: Art 246. (3Sp)@

**548. Advanced Design—Package.** Design of commercial packages. Finished artwork in lettering, type, graphics, and photography for portfolio perfect pieces. Prerequisite: Art 246. (3Sp)@

**549. Graphic Design Studio.** Advanced class to prepare the design major for employment in the graphic design field. Finished portfolios of package, trademarks, and editorial design worked on. (1-9F,W,Sp)@

**559. Printmaking Studio.** Individual production of prints using all printmaking media and techniques. Emphasis on woodcuts in fall; lithography in winter; etching in spring. (1-9F,W,Sp,Su)@

**560. Sculpture Studio.** Advanced problems dealing with figurative and nonfigurative expression. Emphasis on clay modeling, fall; plaster and wax modeling, winter; wood and stone carving, spring. Prerequisites: Art 160, 360. (1-9F,W,Sp)®

**589. Art History Seminar and Special Problems.** Prerequisite: consent of instructor. (1-6)®

### *Graduate<sup>2</sup>*

**615. Graduate Ceramic Studio.** (3-9F,W,Sp,Su)®

**620. Graduate Drawing Studio.** (1-9F,W,Sp,Su)®

**625. Graduate Painting Studio.** (1-9F,W,Sp,Su)®

**630. Graduate Advertising Design Studio.** (1-9F,W,Sp)®

**635. Graduate Illustration Studio.** (1-9F,W,Sp)®

**640. Graduate Photography Studio.** (1-9F,W,Sp,Su)®

**645. Graduate Graphic Design Studio.** (1-9F,W,Sp)®

**655. Graduate Printmaking Studio.** (1-9F,W,Sp,Su)®

**660. Graduate Sculpture Studio.** (1-9F,W,Sp,Su)®

**674 (d474). Greek and Roman Art.** (3W)

**675 (d475). Medieval Art.** (3)

**678 (d478). Renaissance Art.** (3)

**680. Seminar.** (1-9F,W,Sp)®

**681 (d481). Baroque and Rococo Art.** (3)

**682 (d482). Nineteenth Century Art.** (3)

**683 (d483). Twentieth Century Art.** (3W)

**684 (d484). American Art.** (3F)

**697. Research and Thesis.** (1-9F,W,Sp)®

**699. Continuing Graduate Advisement.** (1-3F,W,Sp)®

<sup>1</sup>Parenthetical numbers preceded by *d* indicate a *dual listing*.

<sup>2</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

©This course is also offered by correspondence through the Life Span Learning Independent Study Division.

\*Taught 1990-91.

\*\*Taught 1991-92.

## *Department of Biology College of Science*

**Head: Professor John R. Simmons**  
Office in Biology-Natural Resources 119

**Associate Head: Associate Professor David B. Drown**  
Office in Biology-Natural Resources 143

**Professors** Anne J. Anderson, James T. Bowman, Jr., William A. Brindley, LeGrande C. Ellis, James A. Gessaman, Ting H. Hsiao, James A. MacMahon, Ivan G. Palmblad, Jon Y. Takemoto, Sherman V. Thomson, Reed P. Warren, Nabil N. Youssef; **Adjunct Professors** Rex S. Spendlove, Neal K. Van Alfen; **Professors Emeritus** Thomas L. Bahler, George E. Bohart, W. S. Boyle, Donald W. Davis, Keith L. Dixon, B. Austin Haws, Arthur H. Holmgren, Gene W. Miller, Frederick J. Post, Reed S. Roberts, Raymond T. Sanders, Richard J. Shaw, John J. Skujins, Hugh P. Stanley; **Associate Professors** Mary E. Barkworth, James W. Haefner, Wilford J. Hanson, Mark C. Healey, Michael J. Jenkins, Charles M. Lent, Joseph K.K. Li, Raymond I. Lynn, Keith A. Mott, Richard J. Mueller, Steven G. Oberg, Dennis L. Welker, George W. Welkie; **Research Associate Professors** Bill B. Barnett, Vijendra K. Singh; **Adjunct Associate Professors** John C. Bailey, Jay B. Karren, Vincent J. Tepedino, Richard C. Wang; **Assistant Professors** Diane G. Alston, Edward W. Evans, Elizabeth E. Hood, Frank J. Messina, Gregory J. Podgorski, John M. Stark, Kimberly A. Sullivan; **Research Assistant Professors** Jeanne C. Chambers, Joanne E. Hughes, Darwin L. Sorensen; **Clinical Assistant Professor** Daniel A. Boston; **Adjunct Assistant Professors** Leila M. Shultz, John D. Vandenberg; **Senior**

**Lecturer** David M. Anderson; **Research Associate** Catherine T. Hsiao; **Collaborators** Ray W. Brown, William P. Nye, Philip F. Torchio

**Degrees offered:** Bachelor of Arts (BA), Bachelor of Science (BS), Master of Science (MS), and Doctor of Philosophy (PhD) in Biology; BS in Applied Biology, BS in Medical Technology, BS in Public Health, MS and PhD in Ecology (Biology); MS and PhD in Biology (Molecular Biology); MS and PhD degrees in Toxicology, available through the Interdepartmental Toxicology Program

### *Objectives*

**Biology.** The Department of Biology offers programs leading to a Bachelor of Science or Bachelor of Arts degree. Students majoring in Biology will complete courses which provide an in-depth understanding of biological principles. These include ecology, genetics, cell biology, microbiology, and physiology. Upper division courses in developmental and evolutionary biology provide biology majors with an integrated learning experience. Additional course work is designed to develop analytical and applicable skills in such areas as mathematics, chemistry, and physics. Biology degree programs serve as a foundation for graduate work beyond the bachelors level, which is strongly encouraged for those who demonstrate an aptitude as undergraduates. Biology majors can add a minor area of study, such as business, chemistry, or secondary education, to enhance their employment opportunities.

**Applied Biology.** The Bachelor of Science degree in Applied Biology is directed toward students requiring specialized biological training to prepare them for employment at the bachelors level. The Applied Biology degree is offered with emphasis in such areas as microbial biotechnology, environmental biology, and entomology.

The Department of Biology department head, the director of undergraduate studies, and advisers are available to provide all undergraduate majors with additional information regarding specific programs and career opportunities.

**Premedical and Predental Programs.** The Biology Department supervises premedical and predental training. These programs satisfy entrance requirements of medical and dental schools in the United States and Canada and are recognized for the high quality preprofessional preparation they provide. After four years, the student receives a BS degree in Biology or another major. Clinical assistant professor for predental programs is Daniel A. Boston.

**Public Health.** The Department of Biology offers preprofessional training in public health. Individuals completing the BS degree have employment opportunities in such areas as environmental health, industrial hygiene, laboratory microbiology, health education, administration, nursing, nutrition, mental health, and social work. Adjunct Associate Professor for this program is John C. Bailey.

**Medical Technology.** The National Accrediting Agency for Clinical Laboratory Sciences, in cooperation with the Committee on Applied Health Education and Accreditation, establishes the basic educational requirements. The Medical Technology program at Utah State University consists of three years of college preparation with a fourth year spent in clinical training in a hospital laboratory. The affiliated hospitals choose students for the fourth year based on a personal interview, three letters of reference, and academic performance. Upon completion of the fourth year, the student receives a BS degree and becomes eligible to take the national examinations given by the National Certification Agency for Medical Laboratory Personnel and by the Board of Registry of the American Society of Clinical Pathologists.

There is a need for people to prepare for general laboratory work as well as for specialization. Positions are primarily available in hospitals, clinics, reference laboratories, public health agencies, and industry.

The Medical Technology teaching staff includes: *Adjunct Clinical Professors:* Eugene J. Low and Henry A. Totski; *Adjunct Lecturers:* Leilani F. Grange, Nancy L. Groshart, Karelyn Hadley, Cynthia D. Martinez, Gary R. Thorn, Yvette White, and Karen S. Womack.

## General College of Science Requirements

**Written Communications Requirement.** In addition to the University's written communication requirement, the College of Science requires a junior level writing class. This requirement may be filled by completing either English 301 or 305.

**Bachelor of Science Requirements.** Students working toward the Bachelor of Science degree in any major within the College of Science must complete the following courses:

A. Math 220 and 221.

B. Either Stat 201 or CS 171.

C. One of the following sequences: (1) Biol 125 and either Biol 126 or Biol 127; (2) Chem 121, 122, and 124; (3) Geol 111 and 200; (4) Phyx 221 and 222.

Majors in Biology, Chemistry and Biochemistry, Geology, and Physics **cannot** satisfy requirement C by taking a sequence in their own discipline. Higher level courses than the ones listed in the three categories above may be substituted in some instances. Approval for any substitutions must be obtained in advance.

**Note:** The above Bachelor of Science requirements are **not** in effect for the Bachelor of Arts degree.

## Department of Biology Requirements

**Departmental Admission Requirements.** Admission requirements for the Department of Biology are the same as those described for the University on pages 8-11. Students in good standing may apply for admission to the Biology Department.

In order to graduate, a candidate for any bachelors degree offered in the Department of Biology must accumulate a grade point average of 2.25 in all courses specified as requirements in that major. All required courses in mathematics, chemistry, physics, and English (at the 200 and 300 level) are included. The Pass-Fail option is not acceptable for any course required for the BS degree in any biology program, but D grades are permitted within the restrictions of the 2.25 GPA.

**BS Degree in Biology.** The student is required to have a total of 60 credits in biology, including Biol 125, 126, 127, 319, 386, 387, 521, 523, 525; Micrb 301; and one upper division physiology course selected from Bot 440, Ent 532, or Micrb 401; or Physl 505 and one of Physl 401, 501, or 502. No more than one elective course in biology numbered less than 300 can be counted toward the 60 credits. In addition, BS students must complete Math 220 and 221; Chem 121, 122-124, 123-160, 331-334, 332-335; one additional 3-5 credit upper division Chemistry course; and either Phyx 111, 112, and 113 or Phyx 221, 222, and 223.

**BA Degree in Biology.** The student must complete the requirements for the BS in Biology (above) plus two years of a foreign language.

Students majoring in biology may also emphasize an area of interest in a recognized discipline. The courses required for a program in a specific study area are recommended by faculty in that discipline. Students should take all courses required by the BS/BA degree in addition to courses in the area of emphasis.

**BS Degree in Applied Biology.** Students interested in this program must make formal application to the department head. All programs are required to be finalized and approved before the senior year by the department head. Students interested in entomology, microbial biotechnology, environmental biology, or other approved programs are required to have a total of 46 credits in biology, including Biol 125, 126, 127, 319, and 386. It is necessary to have a substantial area of specialization in some applied phase of biology. Applied Biology students are also required to complete 15-30 credits of Chemistry including organic chemistry, and either Phyx 120 or Phyx 111, 112, and 113, as well as previously listed required College of Science courses.

**BS Degree in Public Health.** A four-year program leading to a Bachelor of Science degree in public health is offered by the Department of Biology with options in the following areas: environmental health, industrial hygiene, and public health education. Individuals completing the environmental health option are qualified to take the Registered Sanitarian's Examination. Courses include Biol 125, 126, 127; Pub H 470, 499, 510, 512, 530; Micrb 301; Chem 121, 122-124, 123-160 (Chem 111, 141-144, 142 for education option); Phyx 111, 112, 113 (Phyx 120 for education option).

**BS Degree in Medical Technology.** After satisfactory completion of the curriculum listed below, the student receives a BS degree in Medical Technology and is eligible to participate in national certification examinations.

Requirements include 9 credits of English; Chem 121, 122-124, 123-160, 331, 332, 334, 335, 370, 371; Biol 125, 126, 127, 319; Phys 130; Phyx 120; Micrb 301, 502, 503; Zool 555; and Med T 101, 490, 491, 492, plus required elective credits. See the Medical Technology adviser for a suggested program of study.

**Field Trips.** Many biology courses require field trips. Those enrolled are expected to dress properly for the conditions and observe any safety precautions issued by instructors. Many courses require modest laboratory fees.

**Course Planning and Advising.** Students with majors in the Department of Biology should consult with their advisers as they plan their course of study leading to their degree and career goals. Certain sequences of courses may be more desirable than others. For detailed information, obtain an official Major Requirement Sheet from the department adviser. Requirements may change from time to time.

**Biology Minor.** Students desiring a minor in Biology must complete Biol 125, 126, 127, and a minimum of 18 credits in upper division Department of Biology courses. Specific questions concerning courses to take in the minor should be directed to the regular major adviser, as well as to one of the advisers in the Department of Biology. Contact the Department of Biology Student Assistance Office, BNR 101, or the Undergraduate Director, BNR 143, for assistance.

### ***Undergraduate Research—Bachelors Thesis in Biology***

Students may do undergraduate research work under the supervision of selected faculty members. To participate and receive academic credit, a student must enroll in Biol 480, Undergraduate Research, for up to 6 credits taken during one or more quarters. To complete the research project and write a thesis, a student must be enrolled in Biol 490, Bachelors Thesis, for 3 credits. Thus, a total of 9 credits could be applied toward the 60 credits of upper division courses required by the University for the BS or BA degree.

A thesis supervisory committee must be organized, consisting of an approved biology faculty member and at least one other faculty member. The supervisory committee is subject to the approval of the department head.

### ***Graduate Study***

For those who have demonstrated strong academic capability as well as research interests, the Department of Biology offers the *Master of Science Degree in Biology* with areas of concentration in entomology, genetics, herpetology, mammalogy, microbiology, molecular biology, ornithology, parasitology, physiology, plant pathology, plant physiology, plant taxonomy, and virology. The *MS degree in Ecology (Biology)* is available, as well as the *MS degree in Toxicology* through the Toxicology Interdepartmental Program. The *MS degree in Biology (Molecular Biology)* can also be earned.

Cooperatively with related departments, advanced study and research are offered for the attainment of the *PhD degree in Biology*, with areas of concentration the same as for the MS degree. A *PhD degree in Ecology (Biology)* is available as well as

a *PhD in Toxicology*. Further information may be obtained from the department.

**Herbarium.** Graduate study in plant taxonomy offered in the Department of Biology utilizes the extensive facilities of the Intermountain Herbarium. Most plant species that grow in Utah and the intermountain region are represented in the herbarium.

**Electron Microscopy Laboratory.** An electron microscopy laboratory, located in the Veterinary Science-Biology (VSB) Building and having two transmission electron microscopes, a scanning microscope, a preparation lab, and supplementary equipment, is administered by the Biology Department. Facilities can be used by members of other departments on a rental basis. Processing of samples at a cost is offered by this facility.

**Insect Collection.** Comprising over a million specimens, the insect collection is available to scientists and graduate students involved in taxonomic research and to those requiring identification of insects in various research projects. The collection primarily covers the intermountain region, but it also contains species from nearly all areas of the world. The bee collection is especially outstanding.

**Vertebrate Collection.** Several thousand specimens of terrestrial vertebrates are available for systematic and distributional studies.

### ***Biology Courses***

**LS 101. Biology and the Citizen.** Principles of biology as they relate to the individual's everyday life and environment. Four lectures, one lab. (5F,W,Sp,Su)©

**LS 105, LS 106. Discovering Nature.** Exploration of conspicuous physical and biological features or phenomena in our surroundings. One lecture-demonstration, one field trip or practical exercise per week. (2F) (2Sp)

**LS 125. General Biology I.** Introduction to cell structure and function; gene action; genetics; origin of living systems; and survey of viruses, bacteria, and protists. Four lectures, one lab. (5F)

**126. General Biology II.** Principles of evolution and ecology; structure, function, and diversity of fungi and plants; and introduction to human use of plants. Prerequisite: Biol 125 or permission of instructor. Four lectures, one lab. (5W)

**127. General Biology III.** Diversity, structure, reproduction, development, and homeostasis of animals. Prerequisites: Biol 125 and 126 or permission of instructor. Four lectures, one lab. (5Sp)

**IO 205. Plants and Civilization.** Origin, evolution, and man's dependency upon cultivated plants. Emphasis is given to crop plants, drugs, and narcotics in relation to human history. Anthropology, biology, and early human history are recommended. (3W)

**225. Introductory Internship/Co-op.** An introductory level educational work experience in biology in an internship/cooperative education position approved by the department. (1-6F,W,Sp,Su)

**LS 257. Evolution.** A general consideration of principles of biological evolution as they apply to plants, animals, and man. (3W)

**IO 308. Evolution and Environmental Issues.** Evolutionary mechanisms and ecological principles with emphasis on current socio/environmental problems. Prerequisite: Biol 101 or 125. (4Sp)

**IO 310. Bioethics: Emerging Issues in Biomedicine.** Discussion format. Focuses on current problems arising from technological advances in controlling the life processes, i.e., genetic engineering, human experimentation, behavior control, right to die, right to health care. (3W,Sp)

**319. Principles of Genetics.** An introduction to the classical and molecular aspects of modern genetics. Prerequisites: Biol 125 and College Algebra. (5F,W,Su)

**370. Predental Orientation.** An introduction for the predental student to the dental professional curriculum and to the nature of the dental profession. Prerequisite: permission of instructor. (3F)

**386. General Ecology for Life Science Majors.** Interrelationships among microorganisms, plants and animals, and their environments at the level of individual organisms; species populations and ecosystems with emphasis on the structure and function of the latter two, and human implications. Prerequisites: Biol 125, 126, and 127; or permission of instructor. (4F,W)

**387. Field Ecology.** Sampling theory and methods in ecology; characteristics of aquatic, desert, and montane ecosystems. Prerequisites: Biol 125, 126, and 127 or equivalents and prior or concurrent enrollment in Biol 386. Recommended: Stat 201 or 501. (2F,Sp)

**391. Independent Study.** Directed individual or group study in biology. Prerequisites: Biol 125, 126, 127, and faculty member's consent. May be repeated for credit, but maximum of 3 credits acceptable for meeting biology requirements. (1-6F,W,Sp,Su)

**425. Advanced Internship/Co-op.** An internship/cooperative education work experience in biology at an increased level of complexity where the student should gain a more professional level of experience. (1-9F,W,Sp,Su)

**439. Scientific Illustration.** Principles of and practice in techniques of producing graphs and other illustrations for use in scientific and/or medical publications, using pencil, pen, and ink. One lecture, two 2-hour labs. (2F,W,Sp)

**479. Readings in Biology.** (1-2F,W,Sp,Su)

**480. Undergraduate Research.** Special directed studies on current problems and research in biology utilizing the literature, seminar, or laboratory as determined by discussion with faculty. Prerequisites: Biol 125, 126, 127, and faculty member's consent. May be repeated for credit, but maximum of 3 credits acceptable for meeting biology degree requirements. (1-6F,W,Sp,Su)

**482. Clinical Dental Observation.** The student will observe and work under the direction of a practicing dentist to evaluate the student's interest and commitment to dentistry. Prerequisite: Biol 370. (2W)

**483. Natural History Excursion.** Field trip supervised by accompanying multidisciplinary faculty group. Preparatory study and written reports required. (1-3Sp)®

**485. Teaching Internship.** A program in which advanced undergraduates function as teaching interns under the supervision of a faculty member. Prerequisite: Permission of the department head. A maximum of 2 credits applicable to biology degree requirements. (2F,W,Sp,Su)

**488. Topics in Biology (Topic).** (1-3F,W,Sp)

**490. Bachelors Thesis.** Preparation of a written thesis based upon individual investigation under the supervision of a faculty committee. Prerequisites: 6 credits of Biol 480 and consent of faculty sponsor. (3F,W,Sp,Su)

**501. Microtechnique.** Brightfield, darkfield, phase, Nomarski, and epifluorescence light microscopy. Fixation, plastic embedding, microtomy, staining, histochemistry, and photomicrography of biological specimens. Theory and practice; laboratory skills emphasized. Two 2.5 hour lecture/labs. (3Sp)

**505. Radiological Health and Safety.** Required for authorization to utilize radioactive materials at USU, this course introduces the concepts of fundamental radioactivity, radiation detection, radiology, and practical health physics. Prerequisites: Phys 113 and Biol 125. (3F,Sp)

**517. Introductory Population Genetics.** An introduction to the genetic structure of populations with regard to both quantitative and qualitative traits. Prerequisite: Biol 319. (2Sp)

**519. Molecular Genetics.** Molecular aspects of genetics, including DNA replication, structure, rearrangement, transposition, recombination, repair, genetic engineering, and gene expression. Prerequisites: Biol 319 and a course in biochemistry. (3W)

**521. Cell Biology.** Study of cells: structure, functions, and organization. Deals with microorganisms, plant and animal cells. Prerequisites: Biol 125, Chem 332. (3W)

**523. Developmental Biology.** Study of the subcellular, cellular, and tissue-level phenomena that result in integrated organisms, using plant, animal, and microbial models. Mechanisms, rather than descriptions, will be emphasized. Prerequisites: Biol 319 and 521, or permission of instructor. (3F)

**525. Evolutionary Biology.** Current developments in evolutionary biology. Considers topics from molecular to macroevolutionary scales. Prerequisites: Biol 319 and 386, or permission of instructor. (3W)

**\*\*IO 533. History of Biology.** Historical development of the biological world view from primitive animism to modern reductionism, with emphasis on the origins and impact of major biological theories. (3Sp)

**540. Microcomputers in Biological Research.** Use of microcomputers in biological research as applied to research design; data acquisition; data storage, manipulation,

graphical display; interfacing peripherals. Prerequisite: at least one upper division biology course. Two lectures, one lab. (3W)

**564. Techniques of Electron Microscopy.** Applications of techniques used in preparing samples for electron microscopy and those necessary for examination and photography with the transmission electron microscope. One lecture, two labs. (3F)

**576. Modeling Biological Systems.** Introduction to mathematical and computer modeling of biological systems, emphasizing ecological systems. Prerequisites: Math 216 or 221, at least one upper division course in Natural Resources or Biology, Stat 501, and computer programming or permission of instructor. Three lectures, one recitation. (4F)

**577. Modeling Forest Dynamics.** Theory and methods of forest succession modeling. Analysis and construction of tree and forest ecosystem simulation models. Emphasis on methods and application. Prerequisites: General Ecology, Math 215, Stat 501, CS 241, or permission of instructor. (3Sp)

### Graduate<sup>1</sup>

**\*612. Population Genetics.** (5F)

**621. Advanced Cell Biology.** (4Sp)

**625. Graduate Internship/Co-op.** (1-9F,W,Sp,Su)®

**630. Evolutionary Ecology.** (3F)

**\*\*632. Modeling Ecological Systems.** (4W)

**\*633. Theoretical Animal Community Ecology.** (3W)

**\*\*637. Biogeography.** (3)

**640. Radiotracer Techniques.** (2W)

**642. Behavioral Ecology.** (3W)

**\*\*659. Current Topics in Genetics.** (3)

**662. Scanning Electron Microscopy.** (3Su)

**663. Transmission Electron Microscopy.** (3)

**664. Electron Microscope Histology.** (3)

**665. Current Topics in Electron Microscopy.** (2W)

**672. Principles of Biochemistry.** (3Sp)

**674. Biochemistry Laboratory.** (2Sp)

**675, 676, 677. Topics in Biology (Topic).** (2-3F) (2-3W) (2-3Sp)®

**680. Biology Seminar.** (1)®

**682. Seminar in Genetics.** (1)®

**687. Ecology Seminar.** (1)®

**688. Seminar in Ecology and Systematics.** (1)®

**689. Molecular Biology/Biochemistry Seminar.** (1F,W,Sp,Su)

**691. Special Problems.** (1-6)

**693. Presentation, Publication, and Grantsmanship in the Life Sciences.** (3W)

**697. Thesis Research.** (1-12)®

**699. Continuing Graduate Advisement.** (1-3)®

**797. Dissertation Research.** (1-12)®

**799. Continuing Graduate Advisement.** (1-3)®

<sup>1</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

©This course is also offered by correspondence through the Life Span Learning Independent Study Division.

\*Taught 1990-91.

\*\*Taught 1991-92.

**Botany Courses**

**221. Plants of Utah.** Recognition of Utah's common plants; discussion of factors affecting their distribution and their adaptive characteristics. Recommended: Biol 126. Not available for credit to those previously or concurrently enrolled in Bot 420. (3Sp)

**420. Taxonomy of Vascular Plants.** Principles of vascular plant identification and nomenclature. Identification of common families and use of technical keys. Three lectures, two labs. Prerequisite: Biol 125, 126, or equivalent. (5Sp,Su)

**422. Agrostology.** Identification of grasses using technical keys; current concepts in the taxonomy of grasses. Prerequisite: Biol 126 or equivalent. One lecture, two labs. (3W)

**440. Plant Physiology.** Introduction to plant metabolism, water relations, and growth. Prerequisites: Biol 125, 126; Chem 141 or equivalent. (5W)

**490. Undergraduate Seminar.** (1F)@

**510. Plant Anatomy.** Structure and development as related to function of major cell types and tissues; comparative anatomy of stem, root, leaf, flower, fruit, and seed in angiosperms. Three lectures, two labs. Prerequisites: Biol 125 and 126 or equivalent. (5F)

**\*512. Mycology.** Taxonomy, morphology, genetics, and physiology of the fungi. Special attention to forms important in agriculture, medicine, and industry. Three lectures, two labs. Prerequisites: Biol 125 or 126 or permission of instructor. (5W)

**560. Principles of Plant Pathology.** Fundamental principles underlying disease in plants. Prerequisites: Biol 125, 126, or permission of instructor. (3F)

**561. Diseases of Agronomic Crops.** Identification and control of diseases affecting agronomic crops. Prerequisite: Bot 560 (may be taken concurrently). Two labs. (2F)

**562. Diseases of Fruit Crops and Ornamentals.** Recognition and control of diseases of trees and small fruits, ornamental herbs, shrubs, and trees. Prerequisite: Bot 560 (may be concurrent). Two labs. (2F)

**563. Forest Pathology.** Nature, cause, and control of diseases affecting forest trees. Prerequisite: Bot 560 (may be concurrent). Two lectures, two labs. (4W)

**Graduate<sup>1</sup>**

**\*612. Ecological Plant Morphology and Anatomy.** (3W)

**\*\*621. Principles and Practice of Plant Systematics.** (5F)

**629. Plant Molecular Biology.** (4F)

**641. Plant-water Relationships.** (3W,Sp)

**642. Plant Growth and Development.** (3)

**643. Mineral Nutrition of Plants.** (4)

**\*\*650. Molecular Events in Plant-microbe Interactions.** (3)

**651. Field Plant Pathology.** (3)

**685. Special Problems.** (1-5)@

**690. Plant Biology Seminar.** (1)@

**692. Plant Pathology Seminar.** (1)@

**Entomology Courses**

**191. Biology of Honey Bees.** The elements of biology, behavior, and practical management of beekeeping. Factors in the social development and communications among bees are also considered. (2Sp)@

**LS 229. Insect Biology.** Insects, their impact upon society and the environment, and the biological bases for their importance. Two lectures, one lab. Recommended prerequisite: Biol 101 or equivalent. (3Sp)

**530. Insect Taxonomy.** Classification, identification of insects to family, including basic external morphology. Collection required. Three lectures, one lab. Prerequisite: Biol 127 or consent of instructor. (4F)

**\*\*532. Insect Physiology and Internal Anatomy.** Function and structure of the organ systems of insects, illustrating tissue to subcellular coordination of physiology. Three lectures, two labs. Prerequisite: Biol 127. (5W)

**534. Insect Ecology.** Examines the distribution and abundance of insects in natural and agroecosystems. Topics include population dynamics, life-history adaptations, species interactions, and community structure. Three lectures, one lab. Prerequisites: Insect Biology and Biol 386 or instructor's permission. (4Sp)

**535. Medical and Veterinary Entomology.** Arthropods affecting the health of man and other animals. Includes life history, recognition, disease transmission and control. Two lectures, two labs. Prerequisite: Ent 229 or Biol 127. (4W)

**537. Aquatic Entomology.** Recognition, habitats, adaptations, and life histories of aquatic insects. One lecture, two labs. Prerequisite: basic entomology or instructor's consent. (3Sp)

**539. Economic Entomology.** Insects related to economic pursuits of man. Includes recognition, damage, benefits, and control. Three lectures, two labs. Prerequisite: Ent 229 or Biol 125. (5F)

**540. Forest Entomology.** Life histories, ecological relationships, and recognition of major beneficial and harmful forest insects. Two lectures, two labs. Prerequisite: Ent 229 or Biol 125. (4F)

**541. Pest Management Methods.** Brings the concepts of pest control (insects, diseases, nematodes, and weeds) together within the context of total pest management. Prerequisites: Ent 539, Bot 560, and PISci 555. (4W)

**Graduate<sup>1</sup>**

**630. Advanced Systematics.** (3)

**634. Insect-plant Interactions.** (3)

**\*\*635. Insecticide Toxicology.** (3)

**636. Experimental Entomology.** (3)

**\*637. Theory and Practice of Biological Control.** (3)

**639. Insect Ecophysiology and Behavior.** (3)

**685. Seminar in Entomology.** (1)@

**692. Special Problems.** (1-6)@

<sup>1</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

@Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

©This course is also offered by correspondence through the Life Span Learning Independent Study Division.

\*Taught 1990-91.

\*\*Taught 1991-92.

**Medical Technology Courses**

**101. Introduction to Medical Technology.** An introduction to medical technology as a profession; experience with some fundamental laboratory tests. Two lectures, one lab. (4F)

**490, 491, 492. Applied Medical Technology.** Practical work in hospital laboratories under close supervision: clinical bacteriology and serology, two months; clinical biochemistry, three months; clinical hematology, one month; pathological tissue methods, two months; blood bank procedures, two months; electrocardiograph and basal metabolism procedures. (15F) (15W) (15Sp)

**Microbiology Courses**

**LS 111. Elementary Microbiology.** Biology and role of microorganisms in natural processes. Not intended for biology majors, who should take Micrb 301. May be used as a prerequisite (together with Micrb 112) only for Micrb 510, 530, and 560. (4F,W)@

**LS 112. Elementary Microbiology Laboratory.** Nature of microorganisms, media preparation, and laboratory techniques. Accompanies Micrb 111 which must be taken as a prerequisite or concurrently. (1F,W)



**LS 301. Microbiology I.** Microbes, their ecology, biology, and role in nature. Emphasis on the bacteria. Three lectures, two labs. Prerequisites: Biol 125, 126, 127, and organic chemistry (may be taken concurrently). (4Sp)

**401. Microbiology II.** Physiology, genetics, and structure of selected prokaryotic and eukaryotic microbes, and the viruses. Three lectures, two labs. Prerequisites: Micrb 301 and Biol 319; Chem 333 or 370 recommended. (5W)

**502. Pathogenic Microbiology.** Properties of pathogens and their relationships to infectious diseases. Four lectures, one lab. Prerequisite: Micrb 301 or permission of instructor. (5W)

**503. Immunology.** The immune response in the host animal and immunologic procedures. Prerequisites: organic chemistry, Biol 125, 126, 127, or permission of instructor. (4Sp)

**504. Immunology Laboratory.** Optional laboratory to accompany Micrb 503. (1Sp)

**510. Food Microbiology.** Microorganisms in food production, preservation, spoilage, poisoning, and sanitation. Prerequisite: Micrb 111-112 or 301. (3F)

**511. Food Microbiology Laboratory.** Prerequisite: previous or concurrent enrollment in Micrb 510. Two labs. (2F)

**512. Food Fermentations.** The microbiology and biochemistry of food fermentations. Prerequisite: Micrb 510. (3W)

**513. Food Fermentations Laboratory.** Prerequisites: Micrb 511 and previous or concurrent enrollment in Micrb 512. (1W)

**530. Soil Microbiology.** Activities and ecology of microorganisms related to the soil environment, soil fertility, soil organic matter, rhizosphere, and soil amendments. Prerequisites: general biology, organic chemistry. (3F)

**531. Soil Microbiology Laboratory.** Application of soil microbiological techniques. Two labs. Prerequisite: Micrb/Soils 530 taken concurrently or previously. (2F)

**560. Aquatic Microbiology.** Principles of microbiology relevant to the aquatic environment. Emphasis on fresh water and waste water. Prerequisite: Micrb 111 or 301. (3Sp)

**561. Aquatic Microbiology Laboratory.** Application of aquatic microbial techniques. Two 1.5-hour labs per week. Prerequisite: Micrb 112 or 301 and Micrb 560 concurrent or previously. (1Sp)

**570. Virology.** Structure, replication, genetics, and molecular biology of viruses; virus-host interactions; viral diseases and antiviral agents. Prerequisites: Micrb 301 and Biol 319; Micrb 401 recommended. (4Sp)

**571. Virology Laboratory.** Introduction to laboratory techniques using bacterial and animal viruses. Prerequisite: previous or concurrent enrollment in Micrb 570. (2Sp)

### Graduate<sup>1</sup>

**\*\*603. Advanced Immunology.** (2F)

**\*\*635. Soil and Environmental Biogeochemistry.** (3Sp)

**\*\*670. Advanced Animal Virology.** (3Sp)

**740, 741, 742. Topics in Microbiology (Topic).** (2-3) (2-3) (2-3)Ⓢ

**770. Special Problems in Microbiology.** (1-12)Ⓢ

**780. Seminar.** (1)Ⓢ

<sup>1</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

ⓈRepeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

ⓈThis course is also offered by correspondence through the Life Span Learning Independent Study Division.

\*Taught 1990-91.

\*\*Taught 1991-92.

### Physiology Courses

**LS 103. Human Anatomy.** Structure of the main human body systems with emphasis on the muscular, skeletal, and nervous systems. Four lectures, one lab. (5Sp)

**LS 130. Human Physiology.** Functioning of the human body, with emphasis upon major organ systems. Five lectures, one lab. (5F,W,Sp,Su)Ⓢ

**IO 135. Brain and Behavior.** Introductory survey of brain function. Emphasis will be placed upon neuronal and synaptic interactions, sensory and neurochemical systems, plasticity, and development. Three lectures, two discussions. (5Sp)

**400. Human Dissection.** Skeletal anatomy and prosection of the human body. One lecture, one lab. Prerequisite: permission of instructor. (2W)

**401. Comparative Animal Physiology.** A comparative survey of the physiology of invertebrate and vertebrate excretory, respiratory, circulatory, digestive, endocrine, and nervous systems. Prerequisites: organic chemistry, and Phyx 120 or equivalent. (3Sp)

**501. Mammalian Physiology I.** An intensive and detailed study of electrophysiology, muscle, body fluids, and the cardiovascular and respiratory systems. Prerequisites: Biol 125, 126, 127, Chem 123, 160, and a course in Physics. (4F)

**502. Mammalian Physiology II.** An intensive and detailed study of metabolism, thermoregulation, special senses, and the nervous, excretory, and digestive systems. Prerequisite: Physl 501. (4W)

**503. Endocrinology.** Ductless glands and their secretions. Emphasis is placed on the action of these hormones on growth, metabolism, and adaptation of animals to changes in the internal and external environments. Three lectures, one lab. Prerequisites: Biol 125, 126, 127, Physl 130, and Chem 331, 332. (4Sp)

**505. Animal Physiology Laboratory.** Exercises in respiration, metabolism, water balance, contractility, and excitability. Prerequisites: prior or concurrent enrollment in Physl 401, 501, or 502. (2Sp)

### Graduate<sup>1</sup>

**\*\*601. Cellular and Membrane Physiology.** (3Sp)

**\*603. Comparative Physiology.** (3)

**\*604. Comparative Physiology Laboratory.** (2)

**\*\*605. Ecological Vertebrate Physiology.** (5)

**\*\*620. Physiology of Reproduction.** (4)

**686. Seminar in Physiology.** (1)Ⓢ

**693. Special Problems.** (2-5)Ⓢ

**695. Readings in Physiology.** (1)Ⓢ

ⓈRepeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

<sup>1</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

\*Taught 1990-91.

\*\*Taught 1991-92.

ⓈThis course is also offered by correspondence through the Life Span Learning Independent Study Division.

### Public Health Courses

**115. Personal Health.** Health problems of university students; especially for freshmen and sophomores. (2W)Ⓢ

**302. Family and Community Health.** Focus on health of various population groups within the community. Particular emphasis is placed on guidelines for optimal family health. (3F)

**304. School Health Program for Elementary and Secondary Teachers.** Instruction of elementary and secondary teachers in utilization of available health services, maintenance of a healthful environment, and prevention of health problems in school-age youth. (3Sp)Ⓢ

**349. Introduction to Occupational Health and Safety.** A study of health and safety problems encountered in industry and various occupations. (3F)Ⓢ

**413. Insect and Rodent Vector Control.** (Extension Independent Study only.) (3)Ⓢ

**414. Water-borne Disease Control.** (Extension Independent Study only.) (3)Ⓢ

**470. Public Health Field Experience.** Laboratory and field experience in the practice of public health. (3-18F,W,Sp,Su)Ⓢ

**499. Special Problems in Public Health.** (1-5F,W,Sp,Su)®

**510. Environmental Health.** The effect of environment on man's health together with control measures applied. Includes water, air, refuse, industrial hygiene, radiation, insects, and rodents. Three lectures, one lab. Prerequisites: one year each of biology and chemistry, and Micrb 111-112 or 301. (4Sp)©

**512. Communicable Disease Control.** Mechanisms of transmission, control, and prevention of communicable diseases. Prerequisites: Micrb 111-112 or Micrb 301. (3F)©

**516. Food-borne Disease Control.** Principles of food-borne disease transmission, control, and enforcement. Prerequisites: Micrb 111-112 or Micrb 301. (3Sp)©

**530. Fundamentals of Epidemiology.** Introduction to the study of the distribution and causes of communicable and noncommunicable diseases in man and other animals. Two lectures; one lab. Prerequisites: Stat 201 or equivalent, Micrb 111-112 or 301, and Pub H 512 or permission of instructor. (3W)©

**540. Industrial Hygiene.** Fundamentals of industrial hygiene including recognition, evaluation, and control of chemical, biological, and physical agents affecting the health of workers. Three lectures, one lab. Prerequisites: Biol 125, 126, 127, and Chem 123, 160, 332, or permission of instructor. (4F)

**541. Industrial Hygiene Instrumentation and Sampling.** Practical experience in the application of industrial hygiene field sampling methodologies and utilization of basic sampling instrumentation. Two lectures, one lab. Prerequisite: Pub H 540. (3W)

**542. Industrial Hygiene Laboratory Procedures.** Introduction to industrial hygiene laboratory procedures, instrumentation, and analysis, focusing upon those analytical chemical methods which provide laboratory support to field sampling efforts. Two lectures, one lab. Prerequisites: Pub H 540, 541. (3Sp)

**580. Seminar in Health Problems.** (1F,W,Sp)

*Graduate<sup>1</sup>*

**670. Special Problems in Public Health.** (1-12)®

**Zoology Courses**

**275. Invertebrate Morphology and Evolution.** Introduction to the principles of evolutionary biology and to the morphology and taxonomy of the invertebrates. Three lectures, two labs. (5W)

**350. Vertebrate Biology.** Topics in evolutionary biology and adaptive physiology of the vertebrates. Three lectures, two labs or field trips. Prerequisites: Biol 125, 126, 127, or equivalent. (5F)

**361. Field Ornithology.** Identification, adaptations, and habitat distribution of local birds. Two lectures, one field trip. (3Sp)

**551. Invertebrate Zoology.** The more important phyla of invertebrates, with some consideration of local fauna. Three lectures, two labs. Prerequisites: Biol 125, 126, 127. (5Sp)

**555. Parasitology.** Life cycles, clinical significance and taxonomy of medically important worms, arthropods, and protozoa parasitizing humans and, to a lesser extent, domestic animals. Three lectures, two labs. Prerequisites: Biol 125, 127, or equivalents. (5Sp)

**557. Comparative Embryology.** An introduction to the principles of development of the vertebrates. Three lectures, two labs. Prerequisites: Biol 125 and 127. (5F)

**\*559. Comparative Vertebrate Anatomy.** Structural evolution of vertebrates: fish to philosopher. Three lectures, two labs. Prerequisites: Biol 125, 126, 127, or permission of instructor. (5W)

**561. Avian Biology.** Structure, function, classification, physiology, behavior, and ecology of birds. Two lectures, one lab. Prerequisites: Biol 125, 126, 127, or permission of instructor. (3Sp)

**563. Mammalogy.** Adaptations, classification, distribution of mammals. Three lectures, two labs. Prerequisites: Biol 125, 126, and 127. (5F)

**567. Elements of Histology.** Study of tissues, including characteristics of different kinds of tissues and the main organs. Five lectures, one lab. Prerequisites: Biol 125, 126, 127, or permission of instructor. (5W)

**573. Herpetology.** Classification, distribution, life habitats, and identification of amphibians and reptiles, with emphasis on local forms. Three lectures, one lab. Prerequisites: Biol 125, 126, 127, or permission of instructor. (4Sp)

**580. Animal Communities.** Introduction to the interactions of animals, and of animals with plants. Topics include diversity, stability, evolution, energy flow, competition, resource partitioning, and niche. Three lectures, one lab. Prerequisite: Biol 386. (4Sp)

*Graduate<sup>1</sup>*

**\*669. Protozoology.** (4)

**681. Seminar in Vertebrate Zoology.** (1)®

**691. Special Problems.** (1-6)®

<sup>1</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

©This course is also offered by correspondence through the Life Span Learning Independent Study Division.

\*Taught 1990-91.

\*\*Taught 1991-92.

*Department of*

***Business Administration***

***College of Business***

**Head: Professor Philip R. Swensen**  
Office in Business 811

**Professors** Peter M. Ellis, Allen D. Kartchner, Eugene C. Kartchner, Calvin D. Lowe, J. Robert Malko, C.R. Michael Parent, Paul A. Randle; **Professors Emeritus** Howard M. Carlisle, L. Mark Neuberger; **Associate Professor** Mark Slama; **Assistant Professors** Drew Dahl, Alan A. Stephens; **Instructors** Kenneth R. Bartkus, Sherri M. Stevens

**Degrees offered:** Bachelor of Science (BS) and Bachelor of Arts (BA) in Business Administration, Finance, Marketing, and Production Management

**Objectives**

The business administration program is designed to prepare men and women for administrative positions in business, government, and other institutions. Specialized training is provided within specific functional fields for business, as well as training directed at understanding the broader aspects of business as it

functions within our free enterprise environment. Training is specifically provided in three areas: (1) **Finance**, leading to careers in banking, brokerage activities and investment, and positions as financial analysts in industry; (2) **Marketing**, involving positions in sales, advertising, retailing, traffic and transportation, and other similar activities; (3) **Production Management**, leading to employment as a foreman on a production line or in one of the production activities such as scheduling, procurement, time and motion studies, quality control or inventory control.

## Requirements

**Departmental Admission Requirements.** Students accepted in good standing by the University are eligible for admission to the College of Business. All transfer students, those transferring within USU, and those from other colleges or universities must have an overall GPA of 2.20 to be accepted. Upon admission, all degree-seeking students will be identified with the College of Business Prespecialization Unit for the purpose of qualifying for advanced standing within their chosen major field. Transfer students and others desiring to be admitted to advanced standing in the Department of Business Administration must meet the prespecialization requirements stated below.

**Prespecialization.** For approximately the first two years, a student will be identified with the College of Business Prespecialization Registration Unit. The basic objective of this portion of the student's studies is to provide a broad and sound educational foundation upon which to build a specialized education relating to business.

All students at the University are required to satisfy the General Education requirements of the University as described in the General Education section of this catalog. Additional requirements for Business Administration majors during this period consist of two basic components.

**1. College of Business Prespecialization Core.** The following courses are required: Acctg 201, 202; BIS 140, 255; Econ 200, 201; Math 105; BA 100; MHR 299; CS 150 or 170; Stat 230.

**2. Department of Business Administration Prespecialization Requirement.** The following courses are required for Business Administration majors: Acctg 203; Math 215; Soc 101 or Psy 101; Spch 305 or BIS 340.

Completion of 30 credit hours of university work with a minimum GPA of 2.2 is necessary before a student is allowed to enroll in BIS 255; Acctg 201, 202, 203, 311; and MHR 299.

Access to 300-level Business Administration courses is restricted. Only those students who have completed a minimum of sixty (60) quarter credits with a minimum GPA of 2.50 will be allowed to enroll in 300-level Business Administration courses, with the exception of BA 346.

**Advanced Standing.** The objective of the advanced standing portion of the program is to provide sufficient specialized business training to prepare the student to successfully enter the business world in a chosen field of interest. The program is also directed at providing the type of business education that develops the attitudes, analytical ability, and the social conscience required for future professional advancement.

The requirements for attaining advanced standing in the Department of Business Administration are as follows:

1. Have completed or currently be registered for a minimum of 85 credits and must have earned an overall grade point average (GPA) of 2.50 for all the hours of study taken up to the time the petition for advanced standing is made. This includes all transfer credits.

2. Have completed or currently be registered for the prespecialization requirements for both the College of Business and the Department of Business Administration, as indicated above, and must have earned a GPA of 2.50 or above in these courses. Courses in the prespecialization requirement may be repeated only once to improve a grade.

3. File a request for advanced standing with the College of Business Academic Service Center.

It is strongly recommended that each student make the transition from prespecialization in the college to advanced standing in the Department of Business Administration as soon as possible after having met the 85 credit requirement.

During the initial portion of the Business Administration upper division program, all degree seeking students will be required to take the following core classes, which are designed to provide a broad background in the various areas of business: BA 308, 340, 350, 370; MHR 311, 412, 489<sup>1</sup>; Econ 400 or 500; Econ 401 or 501.

During the latter portion of the program, the student working toward a degree in the Department of Business Administration will be devoting his or her efforts toward fulfilling the requirements in one of the three areas of specialization.

**Finance Major.** Finance deals with means of allocating financial resources efficiently in our economy on both the micro and macro levels. In addition to the basic core requirements, students majoring in finance must take Econ 560; and BA 378, 441, 444, 445, and 446. Also, students must take two courses from BA 321, 443, and 448; and Acctg 331 and 441. In addition to the required courses, it is recommended that the finance major take additional work in mathematics, statistics, computer science, and accounting.

**Marketing Major.** Modern marketing consists of a system of activities designed to understand and influence buyer and seller behavior. Within the socio-economic and political environment, the marketer must plan, price, promote, and distribute want-satisfying goods and services to society. The following courses are designed to prepare students in all areas of marketing and must be taken in addition to the basic core: junior year—BA 451 and 453; senior year—BA 454, 455, and 459.

**Production Management Major.** Production management involves the planning, directing, and controlling of activities related to production. Required courses are junior year—MHR 360, ME 211; senior year—BA 573, Econ 521, BA 472. In addition, two courses must be selected from MHR 364, 414; Acctg 331; BIS 310; ITE 458.

**Business Administration Major.** A degree in business administration is available for those students who have a special career objective that does not fit the other majors. A proposal designed by the student is submitted to the department head for approval.

Those seeking a second bachelors degree or those proposing a unique program of their own must have the approval of the head of the department. Those proposing their own program must provide a written justification and list of courses. Instructions are available in the departmental office.

**Business Administration Minor.** A solid minor in business administration can be extremely valuable when linked with any major. Students who expect to operate their own business or professional office would be well-served to have some business

<sup>1</sup>The MHR 489 Business Policy course is a capstone course and should not be taken until near the end of the senior year.

courses. The Business Administration Department offers minors in Business Administration, Marketing, or Finance.

The business administration minor consists of three required courses (BA 340, 350, and 370) and three additional courses selected from the following list: BA 441, 444, 445, 451, 454, 455, 472, 573, and MHR 435. A grade point average of 2.50 (2.20 for those enrolled at Utah State prior to fall 1988) in the six courses is required. Many of these courses have prerequisites, and it is not assumed that all students will be able to select freely from the list. Most courses require at least Math 105 as a level of math competence.

**Marketing Minor.** BA 340, 350, 370, 451, 453 or 454, 455.

**Finance Minor.** BA 340, 350, 370, 441, 444, 445.

Students with majors from outside the College of Business may elect a college minor consisting of a broader spectrum of courses from all the departments within the College of Business.

**Graduation Requirements.** To be recommended by the department for graduation, business administration majors must have a grade point average of at least 2.50 in their core and specialty courses, as well as an overall GPA of 2.50. This includes transfer credit.

### *Graduate Study*

The college offers the Master of Business Administration degree (MBA). It is designed to give the student training of a general management nature aimed at providing a background for advancement into supervisory positions. The MBA degree does not emphasize narrow specialization in any one of the functional fields of business; rather it is a management degree emphasizing broad training obtainable by qualified students regardless of their undergraduate major. See graduate catalog for more information.

### *Business Administration Courses*

**100. Business Orientation.** Orients freshmen and transfer students to College of Business programs, academic and student services, professional organizations, and career possibilities. (1)

**SS 135. Introduction to Business.** An investigation of the role of business in contemporary society, including an introduction to the general problems of business operation. (3F,W,Su)©

**225. Introductory Internship.** An introductory level experience in a career-related position approved by the cooperative internship office. One credit for every 75 hours of internship experience. Maximum 6 credits. (1-6F,W,Sp,Su)

**308. Operations Research.** Quantitative methods for resource allocation: linear programming, queueing theory, simulation, Markov chains, etc. Prerequisites: Math 105 and Stat 230. (4F,W,Sp,Su)©

**321. Insurance.** Studied from the standpoint of the consumer of insurance services. Topics treated include types of life, property, and casualty insurance contracts; nature and uses of life and property insurance; and the organization, management, and government supervision of insurance companies. (3F)

**323. Real Estate.** Introduction to real estate contracts, forms, principles, and recent federal housing legislation. (3F,W)©

**325. Discussions with Business Leaders.** Examines new methods for improving U.S. competitiveness by attending the Partners Program seminar sessions and hosting visiting executives from top U.S. companies. Repeatable to maximum of 6 credits. (1F,W,Sp,Su)©

**340. Corporation Finance.** How the corporation raises and manages its capital. A study of modern financial principles, methods, policies, and institutions. Corporate organization, creation, and reorganization. Prerequisites: Econ 200, 201, Math 105, Acctg 203, and Stat 230. (4F,W,Sp,Su)©

**346. Fundamentals of Personal Investing.** Examination of investment vehicles available to personal investor. Principal emphasis is on corporate and government securities. Credit cannot be used toward requirements for finance major. (3Sp)

**350. Fundamentals of Marketing.** Overview of the marketing function emphasizing concepts and terminology. Includes the basic marketing activities of product management, pricing, distribution, promotion, marketing research, and consumer behavior. Prerequisites: Math 105, Econ 201, Acctg 203. (4F,W,Sp,Su)©

**370. Production.** Managerial aspects of production planning, procurement, inventory control, production control, quality control, layout, methods improvement, performances, standards, and basic industrial processes. Prerequisites: Math 105, MHR 311, Stat 230. (4F,W,Sp,Su)

**378. Finance Law.** Examines commercial paper, bankruptcy, securities law, secured credit sales, and tax planning for business entities. Prerequisites: MHR 299, BA 340. (2F,W,Sp)

**379. Real Estate Law.** Covers the law of conveyancing, estates in land, forms of ownership, liens and incumbrances, landlord-tenant, escrow, zoning, subdivision, and real estate taxation. (2Sp)

**424. Problems in Real Estate.** Advanced course in financial and management problems, regarding the use and development of real estate. (3Sp)©

**425. Advanced Internship.** An advanced or middle-level experience in a career-related internship position approved by the cooperative internship office. One credit for 75 hours of internship experience. Maximum of 12 credits. (1-12F,W,Sp,Su)

**441. Financial Institutions.** Defines role of major financial institutions in supplying loanable funds to consumers, business, and government. Emphasis on commercial banks as major supplier of short-term credit. Prerequisites: Econ 200, 201, Acctg 201, 202, 203, BA 340. (4F,W,Sp)

**443. Real Estate Finance.** Covers the theory, principles, and techniques of real estate investment, emphasizing present value and cash-flow approaches to real estate investment decisions. Prerequisites: BA 323, 340, 424. (3F)

**444. Financial Administration.** Emphasizes working capital management and other short-term financial decisions. Prerequisite: BA 340. (4F,W,Sp)

**445. Financial Policy.** Emphasizes capital budgeting, capital structure, and other financial decisions having long-range implications for the firm. Prerequisite: BA 340. (4F,W,Sp)

**446. Investments.** Surveys the field of investments, including bonds, warrants, convertibles, options, and futures. Risks, returns, and hedging opportunities are emphasized. Prerequisite: BA 340. (3F,W,Sp)

**448. Securities Analysis and Portfolio Theory.** Study of modern investment analysis and portfolio theory, risk-return analysis, common stock, and bond valuation theories. Prerequisites: Stat 230, BA 340, 446. (3Sp)

**451. Consumer Behavior.** Treats strategic applications of behavioral science concepts to the firm's marketing mix. Builds on concepts from psychology, sociology, anthropology, and economics. Prerequisites: BA 350, Psy 101 or Soc 101. (4F,W,Sp)©

**453. Marketing Research.** The emphasis is on managing the marketing research function. Topics include basic vs. decisional research, survey research, cost vs. value of information, research design, experimentation, and analysis techniques. Prerequisites: Stat 230, BA 350. (4F,W,Sp)

**454. Retailing Management.** Investigations of retailing as one aspect of the channel of distribution. Emphasis on the areas of managerial responsibility including location, layout, buying, control, financial management, and promotion. Prerequisite: BA 350. (4F,W,Sp)©

**455. Promotion Management.** Treats the management of the entire promotion function including advertising, personal selling, publicity, sales promotion, and packaging. Emphasizes integration of the promotional mix with the firm's total marketing mix. Prerequisites: BA 350, 451, 453. (4F,W,Sp)

**459. Marketing Strategy Planning.** The course follows an analytical orientation to the major marketing problems facing the firm. The emphasis is upon strategies involving the marketing mix and their impact upon performance of the firm. Prerequisites: BA 453, 455. (4F,W,Sp)

**472. Procurement and Production Control.** Planning and direct control of materials and production activities. Includes industrial purchasing, planning and control of inventories, and planning and control of production. Prerequisites: BA 308, 370, MHR 311. (5F)

**480. Independent Research and Reading.** (1-5F,W,Sp,Su)©

**573. Management of Quality.** This course develops methods and procedures for design, implementation, and control of TQA (Total Quality Assurance) programs in both product and service organizations. (3)

*Graduate<sup>1</sup>*

- 607. Survey of Corporation Finance. (3)
- 608. Survey of Marketing. (3)
- 635. Managerial Economics. (3)
- 642. Finance Problems. (4)
- 644. Special Topics in Finance. (3)
- 645. Investment Theory. (3)
- 652. Marketing Strategy. (4)
- 654. Special Topics in Marketing. (3)
- 672. Operations Management. (4)
- 674. Special Topics in Operations Management. (3)

- 682. Systems Theory for Administration. (3)
- 690. Independent Research and Reading. (1-5)®
- 695. Business Research Methods. (4)
- 696. Professional Paper. (4)
- 697. Thesis. (1-9)®
- 699. Continuing Graduate Advisement. (1-3)®

<sup>1</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

©This course is also offered by correspondence through the Life Span Learning Independent Study Division.

*Department of*

# *Business Information Systems and Education*

*College of Business*

**Head: Professor Lloyd W. Bartholome**  
Office in Business 711

**Cooperative Education Supervisor: Melissa Huntington**  
Office in Business 707

**Microcomputer Laboratory Supervisor: James N. Elwood**  
Office in Business 103

**Professors** James Calvert Scott, H. Robert Stocker, William A. Stull; **Associate Professor** Charles M. Lutz; **Assistant Professors** Thomas Hilton, Dennis LaBonty, Jack Teh

**Degrees offered:** Bachelor of Science (BS) and Bachelor of Arts (BA) in Business Education; BS and BA in Marketing Education; BS and BA in Business Information Systems; Master of Science (MS) in Business Information Systems and Education with concentrations in Information Systems Management, Business Education/Marketing Education, Training and Development; Master of Education (MEd) in Secondary Education with emphasis in Business Education; Doctor of Philosophy (PhD) and Doctor of Education (EdD) in Business Information Systems and Education with emphases in Business Communications, Business Education, Information Systems Management, Marketing Education, Business Administration, or others as approved by adviser

**Two-year Associate of Applied Science Degree:** Secretarial/Administrative Support

## *Objectives*

The Department of Business Information Systems and Education offers two major educational thrusts in undergraduate as well as graduate programs. The Business Information Systems major is designed to prepare individuals for positions as managers in business information systems including information managers, information supervisors, systems analysts, systems trainers, and office systems managers by pursuing a bachelors degree program in Business Information Systems.

The second major thrust is designed to prepare individuals as teachers and supervisors of business and marketing subjects at the secondary and postsecondary grade levels in the educational system and as teacher-trainers in private industry. Students may earn a bachelors degree in Business Education or Marketing Education.

A comprehensive two-year Associate of Applied Science Degree in secretarial/administrative support subjects is also available. In addition, the department provides service courses for many other groups of students.

The department has a modern microcomputer laboratory in five separate rooms with 140 microcomputers. Students take microcomputer classes as part of their general education and elective programs.

## *Requirements*

### **College and Departmental Admission Requirements**

**Bachelors Degree Programs.** Students accepted in good standing by the University are eligible for admission to the College

of Business. However, transfer students must have an overall minimum GPA of 2.20. Those students with four-year degree goals in Business Information Systems, Business Education, and Marketing Education shall successfully complete prespecialization requirements before being admitted to advanced standing. Criteria for entrance to advanced work in an area of specialization (major) requires (a) completion of the first 30 or more credit hours of university work with a minimum GPA of 2.20 before being allowed to take certain required 200-level courses in the College of Business, (b) completion of at least 85 credits including current quarter registration, (c) minimum of 2.50 overall grade point average for all hours of study taken up to the time the petition for advanced standing is made (including all transfer credits), (d) completion of specified prespecialization courses with a minimum of 2.30 grade point average. Access to 300-level courses in the BISE Department is restricted. Only those students who have completed a minimum of sixty (60) quarter credits with a minimum GPA of 2.20 will be allowed to enroll in 300-level BIS courses. The exceptions to this restriction are BIS 300, 303, 340, and 362. Bachelor degree candidates must have an overall GPA of 2.50 in order to graduate. At least 40 percent of a student's course work should be in the College of Business and at least 40 percent of a student's course work should be outside the College of Business. Advanced standing is also required for students enrolled for their second bachelors degree. See the College of Business section in this catalog for listing of prespecialization requirements for all business majors. In addition, Business Information Systems majors must take BIS 230, and Business Education and Marketing majors must take BIS 300.

Persons planning to teach must also be admitted to the teacher certification program in the College of Education. A cumulative college grade point average of 2.50 is required to student teach. Detailed information may be obtained from the Department of Secondary Education and/or College of Education.

**Two-year Associate of Applied Science Degree.** Students indicating an interest in the Secretarial/Administrative Support Associate of Applied Science Degree can be accepted directly into the program upon admission to the University. Students who desire to transfer to a four-year program offered by the College of Business must meet the requirements specified for advanced standing.

**Competency-based Placement Program.** Students who have acquired knowledge and skills that are not represented on their collegiate transcripts of credit are allowed to demonstrate competency by challenging related courses. Placement in a skills-oriented sequence can be accomplished by discussion with an adviser. Challenge of courses is done by successfully completing an examination similar to a final course test.

Students with potential for demonstrating competence have two options, one of which must be chosen prior to examination. One option is to challenge for credit (*P/D+*, *D*, *F* option) according to University established procedures; results of the test are recorded on the student's transcript. There is a fee for this option. A second option is to waive without credit required classes, assuming competence at the *B* level is demonstrated.

## Program Requirements

**Bachelors Degree in Business Education.** A composite major in Business Education is designed for students desiring to qualify for a certificate to teach business subjects in grades 7-12 or to teach in business and industry. Required courses include: BIS 100, 140, 225 or 425, 240, 255, 310, 340, 440, 520, 561, 572, 573; Stat 230 (or Psy 380), BA 340, 350; MHR 299, 311, 360, 489; Acctg 201, 202, 203; Econ 200, 201; Math 105; CS 150 or 170; and other

general education required by the University. Required English classes are Engl 101 or 111 and Engl 200 or 201. Students must also complete at least one of the following emphases:

**1. Business Data Processing and Information Management Emphasis:** BIS 200, 230, 252, 330, 541.

**2. Basic Business and Accounting Emphasis:** BIS 112, 314; BA 346, 378; MHR 235 or 435 or BA 454; Econ 401 or 510.

If students wish to qualify to teach shorthand, they must also take BIS 123 and 574.

Additional courses for meeting certification and graduation requirements include: SecEd 301, 302, 404, 510; Psy 101 and 366; BIS 300, 303, 362, 450, 460; Sp Ed 301; Ins T 442. Those who do not wish to certify to teach in the public schools may select an emphasis in training and development for business and industry. Current requirements are listed on the major requirement sheets.

**Bachelors Degree in Marketing Education.** A composite major in marketing education is designed for students desiring to qualify for a certificate to teach marketing and distributive education subjects in the public secondary schools or in business and industry. Required courses for students wishing to certify to teach include: Acctg 201 and 202; Stat 230 (or Psy 380); BA 340, 350, 370 (or BIS 541); BIS 100, 112, 140, 225 or 425, 240, 255, and 340; MHR 299, 311, 360, and 489. Students must also take one of the following groups of classes: *Conceptual Orientation:* BIS 355, BA 451, 454, and 455; or *Applied Orientation:* 15 credits of approved marketing courses.

Additional courses for meeting certification and graduation requirements include: BIS 300, 303, 362, 450, 460, 561, 572, 573; SecEd 301, 302, 404, 510; Psy 101, 366; SpEd 301; and Ins T 442. Those who do not wish to certify to teach in the public schools may substitute an option in training and development for business and industry. Current requirements are listed in the major requirement sheets.

Students must also complete Engl 101 or 111 and Engl 200 or 201 as well as Econ 200, 201; Math 105; and CS 150, which may be counted toward their general education requirements.

**Bachelors Degree in Business Information Systems.** The Information Systems program at Utah State University offers a common core of courses through two department majors, Business Information Systems and Education and Computer Science. The curricula of the individual departments differ substantially in emphasis.

The Business Information Systems major, Information Systems Management emphasis, is offered in the Business Information Systems and Education Department, College of Business. The Bachelor of Science or Bachelor of Arts program is designed for students interested in business careers as information specialists, systems analysts, and information systems managers in business and industry. BIS majors take required courses in analysis and design, decision support systems, spreadsheet and database applications, and information systems projects. All graduates are required to complete a common core of business subjects to include a Business Administration minor. The College of Business is accredited by the American Assembly of Collegiate Schools of Business. The department also offers a master of science in Business Information Systems and Education with an area of emphasis in Information Systems Management.

The Computer Science major with an Information Systems option is designed for students interested in a career as a Computer Scientist with a background in Information Sciences and Systems. Majors in this option are trained in all phases of the analysis, design, and implementation of Information Systems. As part of this option, students also receive training in the theory and appli-

cation of information with courses in Telecommunications and Expert Systems. Students select an application area such as Business, Accounting, or Economics. Other application areas can be developed by working closely with an adviser. This program of study, offered within the College of Science, leads to a Bachelor of Science, Bachelor of Arts, or Master of Science degree in Computer Science. See pages 91-92 for additional details.

General requirements for all Business Information Systems majors are: Acctg 201, 202, 203; BIS 100, 140, 230, 255, 310, 330, 340, 410, 425, 440; BA 340, 350, 370; MHR 299, 311, 360, 489; Stat 230; Econ 200\*, 201; and general education requirements required by the University.

Written communications requirements are: Engl 101 or 111 and Engl 200 or 201.

Students must choose either an information systems management emphasis or an office systems management emphasis.

The **information systems management** emphasis provides knowledge and skills for business systems analysts, information managers, and other business information systems positions.

Required classes for the information systems management emphasis are: CS 170\*, 171, 252; BIS 415, 520, or CS 575; BIS 510, 570; Math 215; plus 9 credits related to the major. It is strongly recommended that students take BA 308 and CS 260. See adviser for current checklist of requirements.

The **office systems management** emphasis provides knowledge and skills for office managers, administrative assistants, and other practitioners who process information.

Required classes for the office systems management emphasis are: BIS 200, 240, 252, 541; CS 150\*; Psy 555 or Soc 332; plus 12 credits of approved upper division classes related to the major. BIS 520 is strongly recommended. See adviser for current checklist of requirements.

**Secretarial/Administrative Support Associate of Applied Science Degree.** This program is designed for students desiring two years (a minimum of 96 quarter credit hours) of college in order to prepare for positions as secretaries and other office and information support personnel. Emphasis is placed on job skills. Requirements are: BIS 100, 112, 140, 155, 200, 225, 230, 240, 252; Acctg 201; and Math 101 or 105. In addition, students are required to complete a minimum of 20 credit hours in a business related area as approved by their advisers. Students must also take Engl 101 or 111 and Engl 200 or 201.

A minimum of 20 credits of general education must be taken. Required general education classes are: 5 credits of social science; 5 credits of humanities; 5 credits of life science; and 5 credits of physical science.

Students who initially enroll for the two-year Associate of Applied Science Degree may readily change to a four-year bachelors degree program and complete the requirements for the business information systems major, business education major, or another major in the College of Business.

**Minors.** The Department of Business Information Systems and Education is authorized to award teaching minors in Business Education, Marketing Education, and Business Computers and Information Systems. Requirements for the Business Education minor are BIS 112, 140, 300, 362, 561, 572, 573; and Acctg 201, 202. Business Education minors must also select a minimum of 9 credits from the following courses, with the prior approval of their adviser: BIS 200, 230, 240, 252, 310, 314, 330, 340, 574; MHR 299; and Econ 200.

A minor in Marketing Education consists of the following courses: BA 350; Acctg 201, 202; BIS 112, 140, 300, 362, 561, 572; MHR 311, 360.

Requirements for the Business Computers and Information Systems minor are: BIS 140, 230, 310, 340, 440, 573; and CS 150. BIS 111 or equivalent is a prerequisite to BIS 573. Students must also select at least two courses from the following: BIS 240, 330, 410, 415, 510; CS 170, 251, 260; and Ins T 616.

Students wishing to minor in Business Information Systems must complete the following courses: BIS 230, 240, 310, 330, 340, and CS 251 or 252 or 260. In addition, they must choose two courses from the following: BIS 410, 415, 440, 510, 541, 570 and CS 170. The following courses are also required for nonbusiness majors: Acctg 201, 202, BIS 140, and CS 150.

## Student Organizations

The Department of Business Information Systems and Education sponsors or co-sponsors four student organizations. Each group provides unique experiences that can complement and enrich formal course work. Leadership development and human relations skills are among the personal attributes enhanced by involvement in the various organization activities.

**Data Processing Management Association (DPMA).** DPMA, a professional society for the information systems industry, sponsors a student chapter at USU. The goals of DPMA are to: (1) provide leadership experiences for undergraduate and graduate business information systems majors; (2) help student members plan their careers and find employment by introducing them to practicing systems professionals; and (3) foster a professional attitude among business information systems majors so that they will contribute to their field.

**Phi Beta Lambda.** A cocurricular student organization is Phi Beta Lambda (PBL). The organization's goal is to provide opportunities to develop career competencies and to promote civic and personal responsibility. Membership is open to all students interested in business. Activities are of special interest to business education and secretarial/administrative support students.

**American Marketing Association.** The AMA Chapter is designed for both marketing and marketing education majors.

**Delta Pi Epsilon** is a national honorary fraternity for graduate students in business and marketing education. Purposes of the organization include enhancement of research, scholarship, service, and cooperation in the profession. Election to membership requires review by members and faculty of the Department of Business Information Systems and Education.

## Graduate Study

The Department of Business Information Systems and Education offers courses leading to the Master of Science degree in Business Information Systems and Education with concentrations in business information systems, business education, marketing education, and training and development.

The Department of Business Information Systems and Education cooperates with several other departments in offering the Doctorate of Education and Doctor of Philosophy degrees. Emphases are offered in business education, marketing education, business communications, information systems, and other areas as approved by adviser.

See the graduate catalog or write to the Department of Business Information Systems and Education for further information.

\*These courses are General Education requirements.



## **Business Information Systems and Education Courses**

**100. Business Orientation.** Orients freshmen and transfer students to College of Business programs, academic and student services, professional organizations, and career possibilities. (1)

**111. Beginning Typewriting/Keyboarding.** For students with no previous keyboarding experience. Designed so student can touch type and learn basic concepts related to word processing. (3)

**112. Introduction to Word Processing.** Assumes ability to keyboard by touch at a minimum of 40 words a minute for five minutes. Emphasis on improving keyboarding skill to 60 words a minute and typing letters, tables, manuscripts, and other word processing applications. Prerequisite: BIS 111 or equivalent. (3)

**121. Fundamentals of Shorthand.** Introduction of shorthand theory. Assumes no previous shorthand instruction. (5)

**122. Fundamentals of Shorthand.** Introduction of new matter dictation. Prerequisites: BIS 121 (or 50 wpm dictation speed) and BIS 140. (5)

**123. Fundamentals of Shorthand.** Intensive practice in new matter dictation and transcription. Prerequisites: BIS 122 (or 70 wpm dictation speed) and BIS 140. (5)

**SK 140. Microcomputer Applications in Business.** Instruction in the use of microcomputers in business. Includes word and data processing applications. Prerequisite: ability to keyboard material at 25 wpm required. (3F,W,Sp,Su)

**141. Special Topics.** Selected topics related to using computers in business. (1-3)

**155. Business Correspondence.** Development and application of effective business writing skills. Primary emphasis given to business letters and memoranda as tools for effective written communication. (3)

**200. Office Procedures.** Instruction in and application of administrative activities which are part of the office process. (3)

**225. Introductory Internship.** An introductory level experience in a career-related internship position approved by the cooperative internship office. One credit for every 75 hours of internship experience. Maximum 6 credits. (1-6)

**230. Information and Records Management Principles.** Introduction to information and records management principles designed to provide an overview of the field. (3)

**240. Desktop Publishing of Business Documents.** Design, development, and evaluation of business documents using the technology of desktop publishing. (3)

**252. Managing Word Processing Systems.** Application of word processing concepts and equipment for production of business papers. Emphasizes the design and management of word processing systems. (4)

**255. Business Communication.** The development and application of effective business writing skills. Primary emphasis given to the business report as a tool for effective written communication. Prerequisites: Engl 101 or 111, and Engl 200 or 201. (3)

**300. Principles of Business and Marketing Education.** First course in sequence of professional requirements. Includes basic principles of business and marketing education, including history, curriculum designs, professionalism, and principles of vocational education. (3F)

**303. Field-based Experience.** Exploratory experience generally offered for sophomores; provides for early self-assessment of potential for success in teaching; students spend 40 hours in public schools. (1-2)

**306H. The World of Systems.** An introduction to systems concepts and an understanding of how different types of systems are controlled and interact with their environment. (3)

**310. Business Information Systems.** Introduces business information systems concepts to include: systems' components, systems' life cycle, business information requirements, data base concepts, and information systems' analysis, design, and implementation. (3)

**SS 314. Managing Personal Finances.** The impact of the consumer movement on society and the individual, the use and abuse of money, and the major services available to the consumer. (3)©

**325. Discussions with Business Leaders.** Examines new methods for improving U.S. competitiveness by attending the Partners Program seminar sessions and hosting visiting executives from top U.S. companies. Repeatable to a maximum of 6 credits. (1F,W,Sp,Su)©

**330. Database Management.** Concepts and methods of defining, creating, and managing data base systems. Principles of management of data resources to support effective information systems in organizations. Prerequisite: one programming language (COBOL, BASIC, PASCAL, etc.) (3)

**340. Advanced Microcomputer Applications in Business.** Provides advanced concepts related to integration of microcomputers into a business organization. Course content will consist of the use of microcomputers to perform business functions. Prerequisite: BIS 140 or equivalent. (3)

**355. Principles of Selling.** Focuses on the selling process, including prospective and qualifying customers, planning, and delivering the sales presentation, overcoming objections, and closing the sale. Lecture, discussion, and demonstration. (3F,W,Sp,Su)

**362. Advising Student Organizations.** Includes instruction and experiences on how to be effective as an adviser to either an FBLA or a DECA chapter. (1)

**371. Cooperative Education Programs in Business and Marketing Education.** Includes instruction on how to operate the cooperative phase of the business or marketing education program. Program standards, public relations, and advisory committees are discussed. (2)

**385. Certified Professional Secretary Review.** Prepares nontraditional students to pass the six parts of the Certified Professional Secretary examination. Consists of six separate modules, with one credit given for each module. Students may take selective modules, or all six modules for full credit. (1-6)©

**396. Placement Planning.** Self-assessment; survey and evaluation of job market; matching-skills with the job market; job strategies and contacts; including resumes, letters, interviewing, follow-up, wage negotiation. (1)

**410. Business Systems Analysis and Design.** Introductory business systems analysis and design course stressing design of distributed business information systems. Both traditional forms driven methodology and computer systems design software will be used. Prerequisites: BIS 140 and 310. (5)

**415. Decision Support Systems.** Designed to prepare business information specialists. Role of the microcomputer in information management and developing familiarity with available microcomputer software which supports business decision systems. Prerequisites: BIS 140, 310, 340; Stat 230 or Psy 380; or equivalents. (3)

**425. Advanced Internship.** An advanced or middle-level experience in a career-related internship position approved by the cooperative internship office. One credit for 75 hours of internship experience. Maximum of 12 credits. (1-12F,W,Sp,Su)

**440. Advanced Database Applications in Business.** Instruction employing various software designed to make the use of database programs easier and more effective. Prerequisite: BIS 140 or equivalent and programming course. (3)

**450. Secondary Curriculum Seminar.** Discusses planning, teaching procedures, adapting classroom practices to individual differences, testing, and evaluation during student teaching. To be taken concurrently with BIS 460. Prerequisite: admission to teacher education. (3)

**460. Student Teaching in Secondary Schools.** Prerequisites: admission to teacher education, Psy 366, SecEd 301, and Special Methods in major and/or minor subjects. (12)

**510. Business Information Systems Projects.** Design and development of a complete, integrated microcomputer applications system to meet the information needs of a specific business situation. Prerequisites: BIS 340, 410, and 440 or permission of instructor. (3)

**520. Local Area Network Management for Business.** Application of networking concepts related to the management of local area networks. Includes topics related to repair, setup, management, and maintenance of local area networks. (3)

**530. Information and Records Management Systems.** Provides a knowledge of the management of controlling the quality, quantity, and cost of records in the modern business office. (3F,W,Sp,Su)

**540. Training Program Management.** The study of training management in private and public organizations. Includes ideas on how to work with top management in meeting training needs, how to develop a training program budget, how to evaluate the effectiveness of training programs, and other topics of importance in this area. (3)

**541. Office Systems Management.** Management of contemporary office information systems, including the production and management of information and methods of control. (3)©

**560. Designing Business Training Programs.** How to design training programs based on a needs analysis. Approximately one-half of this course spent on how to effectively deliver training. (3)

**561. Business and Marketing Education Curriculum.** Study of business and marketing education curriculum. Examines how to develop curricula, use the cooperative education method, and complete other supervisory and administrative tasks. (3)

**570. Management of Information Systems.** Management issues inherent in the existence of the management information systems function. Emphasis on elements that make information systems management different from other organizational functions. (3)

**572. Methods of Teaching Business and Marketing Education.** Methods of teaching as applied to business and marketing education courses such as general business, business law, business principles, accounting, marketing, and merchandising. Prerequisites: Acctg 201, 202, BA 350, and admission to teacher education. (3)

**573. Methods of Teaching Keyboarding and Microcomputing.** Psychological principles and methodology for teaching keyboarding, microcomputing, and computerized accounting. Includes microcomputer equipment, teaching laboratory needs, classroom management, and lesson planning. Prerequisites: BIS 112, 140, and admission to teacher education. (3)

**574. Methods of Teaching Shorthand and Transcription.** Includes methodology of teaching theory, dictation, speed building, standards, and grading in shorthand and transcription. Prerequisites: BIS 123 and admission to teacher education. (3)

**595. Independent Readings.** (1-5)®

### Graduate<sup>1</sup>

**610. Business Information Systems Analysis.** (3)

**611. Workshop.** (1-3)®

**612. Business Information Systems Design.** (3)

**615. Communications for Business.** Prerequisite: BIS 255 or equivalent. (3)

**620. Business Data Communication Systems.** (3)

**621. Office Technology.** (3)

**625. Graduate Internship.** (1-12)®

**630. Database Management Systems.** (3)

**640. Microcomputer Applications in Business.** Prerequisite: BIS 140 or equivalent. (3)

**650. Microcomputer Business Systems.** Prerequisite: BIS 140 or equivalent and programming course. (3)

**660. Business Teaching Internship.** (1-12)®

**661. Issues and Trends.** (3)

**662. The Business Curriculum.** (3)

**665. Adult Programs in Business Education.** (3)

**670. Information Systems Resource Management.** (3)

**672. Improvement of Instruction in Business and Marketing Education.** (3)

**673. Improvement of Instruction in Typewriting and Business Microcomputing.** (3)

**675. Improvement of Instruction in Accounting.** (3)

**676. Cooperative Programs in Business and Marketing Education.** (3)

**677. Criterion Referenced Instruction.** (3)

**681. Research and Proposal Writing.** (3)

**682. Systems Theory for Administration.** (3)

**695. Independent Readings.** (1-5)®

**697. Masters Paper.** (1-9)®

**699. Continuing Graduate Advisement.** (1-3)®

**733. Supervision Internship.** (3-12)

**766. Postsecondary/Adult Business Programs.** (3)

**781. Research Seminar.** (1-6)®

**795. Independent Readings.** (1-5)®

**797. Doctoral Dissertation.** (1-18)®

**799. Continuing Graduate Advisement.** (1-3)®

<sup>1</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

©This course is also offered by correspondence through the Life Span Learning Independent Study Division.

## Department of

# Chemistry and Biochemistry

## College of Science

**Head: Professor Vernon D. Parker**  
Office in Maeser Laboratory 106

**Associate Head: Professor Richard K. Olsen**  
Office in Maeser Laboratory 211

**Professors** Steven D. Aust, Thomas F. Emery, Wilford N. Hansen, Edward A. McCullough, Jr., William M. Moore, Karen W. Morse, Lawrence H. Piette, Linda S. Powers; **Distinguished Professor Emeritus** R. Gaurth Hansen; **Professors Emeritus** Grant Gill Smith, Jack T. Spence; **Associate Professors** Stephen E. Bi-

alkowski, Jack R. Lancaster, Jr., Joseph G. Morse; **Assistant Professors** Bruce R. Copeland, Eric D. Edstrom, John L. Hubbard, Gayle Knapp, David B. Marshall, Cindra A. Widrig, Michael E. Wright; **Research Assistant Professor** Ann E. Aust

**Degrees offered:** Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), and Doctor of Philosophy (PhD) in Chemistry; MS and PhD in Biochemistry

**Areas of specialization:** Analytical Chemistry; Biochemistry; Inorganic Chemistry; Organic Chemistry; Physical Chemistry

## Objectives

The Department of Chemistry and Biochemistry offers a variety of courses designed to prepare students for careers which utilize the sciences of chemistry and biochemistry, including teaching at all levels, positions of chemists in industry or government and, with further training in other disciplines, in law, medicine, and business. The program offered for the BS degree (professional chemistry option) is fully approved by the American Chemical Society. The department's courses also serve students from many other disciplines, both in strengthening their technical backgrounds and in building a base for life in a technological society.

## General College of Science Requirements

**Written Communications Requirement.** All students who gain a degree in any department in the College of Science must have 9 credits in English, including Engl 101 or 111; 200 or 201; and 301 or 305.

**Bachelor of Science Requirements.** Students working toward the Bachelor of Science degree must complete the following course work or its equivalent:

A. Math 220 and 221.

B. Either Stat 201 or CS 171.

C. One of the following sequences: (1) Biol 125 and either Biol 126 or Biol 127; (2) Chem 121, 122, and 124; (3) Geol 111 and 200; (4) Phyx 221 and 222.

Majors in Biology, Chemistry and Biochemistry, Geology, and Physics **cannot** satisfy requirement C by taking a sequence in their own discipline. Higher level courses than the ones listed in the three categories above may be substituted in some instances. Approval for any substitutions must be obtained in advance.

**Note:** The above Bachelor of Science requirements are **not** in effect for the Bachelor of Arts degree.

## Department of Chemistry and Biochemistry Requirements

**Departmental Admission Requirements.** Admission requirements for the Department of Chemistry and Biochemistry are the same as those described for the University on pages 8-11. Students in good standing may apply for admission to the department.

No Chem prefix course may be applied toward graduation with any major in chemistry with an earned grade of less than C-. No Chem prefix course may be repeated more than one time to improve the grade to a C- or better. A student dropped from the chemistry program for failure to meet this standard may be readmitted only upon appeal to the Undergraduate Studies Committee.

Students majoring in chemistry may pursue either a **Bachelor of Science Degree**, which entails considerable specialization in chemistry or science, or a **Bachelor of Arts Degree** for those who desire a broader education in the liberal arts and sciences. There are five options for the BS degree, all requiring a common core of courses but allowing for differing emphasis in advanced work according to the interests and career objectives of the student. Three of the options will meet the requirements for certification as chemical professionals by the American Chemical Society. These emphases include **chemistry**, **biochemistry**, or **chemistry education**. Other options include a **life science** emphasis, and an **alternate chemistry teaching** major.

The following core courses are required for all bachelors degrees<sup>1</sup>: general chemistry (either Chem 121, 122, 123, or Chem 221H and 222H; Chem 124 and 160), physical chemistry (Chem 306, 307, 309, 310), organic chemistry (Chem 331, 332, 333, 334, 335, 336), inorganic chemistry (Chem 351, 352), biochemistry (Chem 370), analytical chemistry (Chem 360, 361), and seminar (Chem 499). Included as prerequisites for some of the courses are Phyx 221, 222, and Math 220, 221, 222, 320, and 321 or 322.

Additional requirements for the **professional chemistry BS option** are Chem 308, 311, 533, 552, 564, and 565, plus 6 additional credits in appropriate advanced courses such as Chemistry courses numbered 600 and above; Phyx 341, 342, 411, 412, 413, 461, 462, 463, 500; Math 541, 542, 543, 561, 562, 563; Stat 501, 502, 505, 510; or other courses approved by the department. For students planning advanced study in analytical or physical chemistry, Phyx 412 is highly recommended.

The **BS degree with Biochemistry Emphasis** requires the following additional courses: Chem 308, 371, 564, 565, 670, 671, 672, and Biol 125.

For the **Chemistry Education Emphasis** the following courses should be added to the core: Chem 308 or 564; one of Chem 311, 371, 533, 565; and two of Biol 125, Geol 111, and Phyx 200. These students must also complete teacher certification requirements (see detailed major requirement sheet or Secondary Education listing).

For the **BS life science option**, additional courses required beyond the core are: Biol 125; Biol 127 or Phyx 130; Biol 126 or 319 or Micrb 301; Chem 308, 311, 370, and 371; and 5 additional credits in approved courses numbered 300 or above in chemistry, biology, mathematics, or physics.

Those pursuing the BA degree must complete two years of courses in a foreign language in addition to the core courses.

For suggested quarterly schedule for BS and BA degrees, see requirement sheet available from the department.

**Chemistry Minor.** Students must complete at least 15 credits of upper division chemistry course work (chemistry courses numbered 300 or above) in addition to Chem 121, 122, and 123 (or Chem 221H and 222H), 124, and 160, or their equivalent, in order to qualify for an approved minor in chemistry. The following courses are recommended: Chem 301, 331, 332, 333, 334, 335, 336, 351, 352, 360, 361, 370, and 371.

**Teaching Major and Minor.** A teaching major or minor in chemistry is available through the Department of Chemistry and Biochemistry and the Department of Secondary Education. Students seeking this degree should see the detailed requirement sheet available from these departments.

An application for admission to teacher education should ordinarily be completed before the junior year (see College of Education for requirements). Approval is a prerequisite to teacher certification candidacy and to enrollment in education and psychology courses.

**Honors.** There is also an Honors Plan for students desiring a BS degree "with Honors" in Chemistry. For details, students should contact their academic adviser.

## Graduate Study

**Combined BS-MS Degree (Five-year Program).** A good student with a minimum GPA of 3.0 at the third year, who is

<sup>1</sup>Some exceptions apply to the Chemistry Teaching major. See detailed major requirement sheet.

interested in the five-year BS-MS degree in chemistry or biochemistry, should consult with the Department of Chemistry and Biochemistry.

For further information regarding admission standards, entrance requirements, and graduation requirements for MS and PhD degrees in chemistry or biochemistry, see the graduate catalog.

## Chemistry Courses

**PS 101. Introduction to Chemistry.** A lecture-demonstration course designed primarily for students of nursing, liberal arts, and others whose major field does not require further chemistry. (5F,W,Sp,Su)

**PS 111. General Chemistry.** For nonscience majors. Prerequisite: one unit of high school or college algebra. Four lectures and one recitation. (5F,W,Su)

**PS 121. Principles of Chemistry.** For science and engineering majors and others who will take additional chemistry courses. Prerequisite: completion of or concurrent enrollment in Math 105 or high school equivalent. Some previous chemistry in high school or college is highly recommended. Four lectures and one recitation. (5F,W)

**PS 122. Principles of Chemistry.** Continuation of 121. Three lectures, one recitation. Must be taken concurrently with Chem 124 unless permission is received from instructor. (4W,Sp)

**123. Principles of Chemistry.** Continuation of 122. (3F,Sp)

**PS 124. Chemical Principles Laboratory.** Must be taken concurrently with Chem 122. One three-hour laboratory per week. Prerequisite: Chem 121. (1W,Sp)

**PS 141. Elementary Organic Chemistry.** An introduction to organic chemistry. Prerequisite: Chem 111. (4W,Sp,Su)

**PS 142. Elementary Biochemistry.** A brief introduction to selected topics in biochemistry. Prerequisite: Chem 141. (4Sp)

**PS 144. General Chemistry Laboratory.** A one-quarter laboratory course including basic as well as sophisticated chemical principles, techniques, and instrumentation. Prerequisite: previous or concurrent registration in Chem 141. (2Sp)

**160. Quantitative Analysis I.** Normally taken concurrently with Chem 123. Introduction to principles and practice of quantitative laboratory measurements. Two three-hour lecture/laboratories per week. Prerequisite: Chem 124. (2F,Sp)

**195. Glass Blowing.** (1)

**PS 221H, PS 222H. Chemical Principles—Honors.** For students who will take additional chemistry courses and who have had strong high school preparation in chemistry. Series may be taken in lieu of Chem 121-123. Prerequisites: Concurrent enrollment in or completion of Math 220 or equivalent and strong high school preparation in chemistry or permission of instructor. (3F) (3W)

**225. Cooperative Experience.** Planned work experience outside the University. Specific experience must receive prior approval for credit to be earned. Consult adviser or department head for details. (1-3F,W,Sp,Su)

**\*\*301. Fundamentals of Physical Chemistry.** A lecture survey of basic quantitative laws governing chemical processes. Prerequisites: Chem 141 or 332, Math 105 or equivalent. (4F)

**306, 307, 308. Physical Chemistry.** Quantitative methods for solving problems in chemical thermodynamics, phase change, electrochemistry, reaction kinetics, quantum theory, and molecular structure. Prerequisites: Chem 123, 160, Phys 222, Math 322. (3F) (3W) (3Sp)

**309, 310, 311. Experimental Physical Chemistry.** Work correlated with Chem 306, 307, 308. (2F) (2W) (2Sp)

**331, 332, 333. Organic Chemistry.** A survey of the physical properties, stereochemistry, and reactions of organic molecules. Chem 333 also will include treatment of biologically important molecules. (3F) (3W) (3Sp)

**334. Organic Chemistry Laboratory.** Laboratory in general techniques and methods of organic chemistry. Normally to be taken concurrently with Chem 331. Prerequisites: Chem 123, 160. (1W,Su)

**335. Organic Chemistry Laboratory.** Laboratory in general techniques and methods of organic chemistry. Normally to be taken concurrently with Chem 332. Prerequisite: Chem 334. (1Sp,Su)

**336. Organic Qualitative Analysis Laboratory.** Normally to be taken concurrently with Chem 333. Two labs. Prerequisites: Chem 332 and 335. (1-2F)

**351. Intermediate Inorganic Chemistry.** Explores the various classes of inorganic compounds, emphasizing descriptive aspects, synthesis, reactions, identification, and physical properties. Prerequisite: Chem 123. (3Sp)

**352. Inorganic Chemistry Laboratory.** Utilizes qualitative inorganic analysis, synthesis, and the use of spectroscopic tools to explore the descriptive chemistry of inorganic materials (1Sp)

**360. Quantitative Analysis II.** Continuation of Chem 160. Basic theory and laboratory practice in analytical chemistry, including introduction to multiple equilibria and chemical separation methods. Prerequisites: Chem 123, 160, Math 105. (3F)

**361. Quantitative Analysis II Laboratory.** Designed to accompany Chem 360. Two three-hour laboratories per week. Must be taken concurrently with Chem 360. Prerequisites: Chem 123, 160, and Math 105. (2F)

**370. Intermediate Biochemistry.** A brief survey of the chemistry of biologically important compounds and their role in animal and plant metabolism. Prerequisites: Chem 123 and either Chem 141 or 332. (4Sp)

**371. Biochemistry Laboratory.** A laboratory course designed to be taken concurrently with Chem 370. One three-hour lab per week. (1Sp)

**425. Cooperative Experience.** Planned work experience outside the University. Specific experience must receive prior approval for credit to be earned. Consult adviser or department head for details. (1-3F,W,Sp,Su)

**480. Research Problems.** (1-3F,W,Sp,Su)®

**499. Seminar.** (1Sp)®

**533. Advanced Synthesis Laboratory.** A laboratory course in practical synthetic methods requiring advanced technique; inert atmosphere, vacuum line, tube furnace, etc. Prerequisites: Chem 335, 352, Chem 311 concurrently. (2Sp)

**552. Advanced Inorganic Chemistry.** Study of the elements and their compounds. Structure/bonding/properties relationships and stereochemistry of inorganic compounds. Prerequisites: Chem 306 and 351. (3Sp)

**564. Instrumental Analysis.** Theory and application of physicochemical methods of analysis. Selected electrochemical and optical methods. Prerequisites: Chem 308, 360, 361. (3W)

**565. Instrumental Analysis Laboratory.** Laboratory course to accompany Chem 564. Two four-hour labs per week. Prerequisites: Chem 308, 361. (2W)

## Graduate<sup>1</sup>

**600. Chemical Kinetics.** (3F)

**601. Quantum Chemistry.** (3W)

**602. Molecular Spectroscopy and Structure.** (3Sp)

**625, 626, 627. Advanced Organic Chemistry.** (3F) (3W) (3Sp)

**629 (f529)<sup>2</sup>. Plant Molecular Biology.** (4F)

**649. Group Theory Preparation for Inorganic Chemistry.** (1F)

**\*\*650. Inorganic Chemistry of the S and P Block Elements.** (3F)

**\*651. Coordination Chemistry.** (3F)

**662. Analytical Chemistry.** (3Sp)

**670, 671, 672. Principles of Biochemistry.** (5F) (4W) (3Sp)

**673, 674. Biochemistry Laboratory.** (2W) (2Sp)

**\*676. Physical Biochemistry.** (3W)

**689. Molecular Biology/Biochemistry Seminar.** (1F,W,Sp,Su)

**691. Special Problems in Chemistry and Biochemistry.** (1-6F,W,Sp,Su)

**699. Continuing Graduate Advisement.** (1-3)®

**\*701. Chemical Thermodynamics.** (3F)

- \*\*702. Statistical Mechanics. (3Sp)
- \*\*705. Atmospheric Chemistry and Photochemistry. (3W)
- 709. Special Topics in Physical Chemistry. (3)®
- \*728. Theoretical Organic Chemistry. (3)
- \*\*729. Advanced Physical Organic Chemistry. (3Sp)
- \*\*730. Chemistry of Natural Products. (3)
- \*\*731. Heterocyclic Compounds. (3)
- 733. Special Topics in Organic Chemistry. (3)®
- 753. Special Topics in Inorganic Chemistry. (2-3)
- \*760. Analytical Spectroscopy. (3Sp)
- \*761. Analytical Separations. (3W)

- \*\*762. Electrochemistry. (3W)
- 764. Special Topics in Analytical Chemistry. (3)®
- 777. Special Topics Biochemistry (Topic). (2F)®
- 778. Special Topics Biochemistry (Topic). (2Sp)®
- 780. Seminar. (1)®
- 797. Research. (1-15)®
- 799. Continuing Graduate Advisement. (1-3)®

<sup>1</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

<sup>2</sup>Parenthetical numbers preceded by an *f* are the *former* course numbers.

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

\*Taught 1990-91.

\*\*Taught 1991-92.

## *Department of*

# *Civil and Environmental Engineering*

## *College of Engineering*

**Head:** Professor William J. Grenney  
Office in Engineering Laboratory 211

**Professors** Loren R. Anderson (Assoc. Dean, College of Engr.), Jay M. Bagley, A. Bruce Bishop (Dean, College of Engr.), David S. Bowles, Vance T. Christiansen, Daniel H. Hoggan, Trevor C. Hughes, C. Earl Israelsen, L. Douglas James (Director, Utah Water Research Laboratory), Roland W. Jeppson, Fred W. Kiefer, Jr., J. Paul Riley, Ronald C. Sims; **Professors Emeritus** Winfred O. Carter, Calvin G. Clyde, William A. Cordon, Irving S. Dunn, Gordon H. Flammer, Joel E. Fletcher, Norman B. Jones, Elliot Rich, Reynold K. Watkins; **Adjunct Professors** Ellis L. Armstrong, James P. Heaney, Norman E. Stauffer, Jr., Gerald Williams; **Associate Professors** R. Ryan Dupont, Marian W. Kembrowski, Upmanu Lal, William J. Rahmeyer, J. Derle Thorpe, Muzaffer Yener; **Adjunct Associate Professors** Lloyd H. Austin, Conly L. Hansen, Jeffrey R. Keaton, Rangesan Narayanan; **Adjunct Research Associate Professor** Witold F. Krajewski; **Assistant Professors** William J. Doucette, Michael J. McFarland, David K. Stevens, David G. Tarboton, Gilberto Urroz-Aquire, Kevin C. Wornack; **Research Assistant Professors** Thomas B. Hardy, MarDell C. Parrish, Darwin L. Sorensen; **Adjunct Assistant Professor** Edwin L. Smith; **Research Scientist-Chemist** Joan E. McLean; **Research Engineers** Steve Barfuss, Brent A. Bartz; **Lecturer** Judith L. Sims; **Affiliate Faculty** Ronald V. Canfield, Craig B. Forster, Robert W. Gunderson, Richard C. Peralta

**Degrees offered:** Bachelor of Science (BS) in Civil Engineering; Master of Science (MS), Master of Engineering (ME), and Doctor of Philosophy (PhD) in Civil and Environmental Engineering; Civil Engineer (CE)

## *Objectives*

The Department of Civil and Environmental Engineering (CEE) at USU is ranked among the top engineering programs in the nation. The department offers outstanding opportunities for young men and women to enter this exciting and rewarding profession. The department provides the widest selection of technical electives of any university in the Intermountain West.

Civil engineers have been the master builders of earlier centuries, and today are engaged in providing the infrastructure which supports the highest quality of life in the history of the world. CEE is a broad and diversified profession, offering a variety of career opportunities in small towns and giant metropolises. Civil and environmental engineers may be involved in office jobs dealing with clients or engaged in planning, design, or project management. They may also be involved in field work, gathering information at project sites or managing construction.

Civil and environmental engineers work in a variety of areas of specialization. **Environmental engineers** protect the environment for the long-term quality of life for future generations. **Geotechnical engineers** design and build foundations, tunnels, retaining walls, and dams to resist the shocks from earthquakes. **Structural engineers** design and build conventional structures, such as bridges, buildings, and dams, as well as specialized space stations. **Transportation engineers** plan, design, and construct the federal highway system, as well as all airports and harbors. Engineers in the area of **water resources and hydraulics** gather the flows from watersheds and groundwater aquifers to provide society with water for drinking, irrigation, recreation, industry, and hydropower.

## Requirements

**Admission Requirements.** Admission requirements for the Department of Civil and Environmental Engineering are the same as those described for the University on pages 8-11. Students in good standing may apply for admission to the department. In addition, students must maintain the academic requirements outlined for the College of Engineering on pages 40-41.

**Bachelor of Science Degree.** The four-year program listed here leads to the Bachelor of Science degree in Civil Engineering. The first two years consist of a preengineering program. Students must successfully complete this program or, in the case of transfer students, substantially equivalent course work at another institution before they will be permitted to enroll in the professional program. Transfer students may apply for professional acceptance in cases where postponement of upper division courses will prolong the student's time to graduate.

The student who is majoring in or planning to major in Civil and Environmental Engineering needs to be aware of the College of Engineering requirements concerning admission to the college, preengineering, admission to professional engineering programs, general education, and other academic requirements. Additional information concerning these items is given in the College of Engineering write-up on pages 39-42. It is the responsibility of the student to be aware of these rules and regulations. **Passing the Fundamentals of Engineering exam is required for graduation.**

Also, beginning fall quarter of 1990, all undergraduate CEE students will be required to own an HP-28SX calculator.

## Undergraduate Study

**Preengineering Program (freshman and sophomore years):** Engr 103, 200, 202, 204, 270; Chem 121, 122, 124; CEE 187, 205, 224, 227, 287; Econ 200; Engl 101, 200; Geol 111 or Micrb 111, 112; Math 220, 221, 222, 320, 321, 322; Phyx 221, 222, 223; General Education courses.

**Professional Engineering Program (junior and senior years):** Engr 330; CEE 303, 305, 306, 308, 309, 328, 343, 350, 351, 363, 364, 387, 420, 425, 430, 487, 512, 522; General Education courses. Technical electives (27 credits) chosen from: CEE 431, 504, 505, 507, 508, 513, 518, 521, 532, 543, 551, 552, 561, 565, 566, 588; AE 543.

For more information about Bachelor of Science requirements and the sequence in which courses should be taken, see major requirement sheet, available from the Civil and Environmental Engineering Department.

## Graduate Study

This department offers the Master of Engineering, Master of Science, Civil Engineer, and Doctor of Philosophy degrees. See graduate catalog for specialty programs.

Excellent interdepartmental cooperation and the large, outstanding staff of the department, most of whom have PhD degrees from prominent universities and are registered professional engineers, make for an extensive and varied graduate program. Research conducted through the Advanced Transportation Center, Utah Water Research Laboratory, and the Engineering Experiment Station enhances these programs and provides financial assistance to outstanding graduate students. Graduate specialties include environmental engineering, fluid mechanics, geotechnical engineering, hydraulics, hydrology, structural mechanics, transportation, water quality, and water resources.

## Civil and Environmental Engineering Courses

**187. Civil and Environmental Engineering Freshman Seminar.** To provide orientation and the heritage of the CEE profession. To help develop computer skills, other basic skills, and engineering perspectives needed for the first year. (1F,W)@

**205. Dynamics Laboratory.** Planar kinetics, supervised problem-solving, and demonstrations. To be taken concurrently with Engr 202. Two-hour period. (1F,W)

**221. Plane Surveying.** For nonengineering students. Use of tape, hand level, level, transit, compass, and plane table. Differential and profile leveling, traversing, plotting, mapping, and care of engineering instruments. One lecture, two labs. Prerequisites: algebra and trigonometry. (3)

**224. Engineering Surveying.** Principles and methods of engineering surveying including terminology, computations, areas, volumes, field astronomy, computer analysis, and the use of surveying instruments. Two lectures, two labs, one recitation. Prerequisite: trigonometry. (4Sp)

**227. Computer Aided Drafting and Design.** Utilization of computer work stations to prepare engineering drawings and to develop engineering designs. (3W,Sp)

**287. Sophomore Seminar.** Supervised discussion and review of problems encountered by professional engineers. (1W,Sp)@

**303. Professional Computer Applications in Engineering.** Use of professional computers for solving engineering analysis problems and for applications in project management. Prerequisite: Engr 103. (4F)

**305. Mechanics of Solids.** Stress, strain, and deflection due to flexure and shear. Combined stresses, instability, effect of repeated and dynamic loadings. Prerequisite: Engr 204. (3F,W)

**306. Structural Mechanics.** Analysis of statically determinate and indeterminate structures. Prerequisites: CEE 303 and 305, or instructor's consent. (3W)

**307. Structural Steel Design.** Fundamental principles and practice of the design of steel and timber structural elements. Prerequisite: CEE 306. (3Sp)

**308. Structural Concrete Design.** Fundamental principles and practice of the design of concrete and masonry structural elements. Prerequisite: CEE 306. (3Sp)

**309. Structural Testing Laboratory.** Laboratory testing and analysis of steel, concrete, timber, and masonry structural elements. Concurrently with CEE 307. (1Sp)

**328. Engineering Materials.** Influence of atomic arrangement, bonding, and crystalline structure on the properties of construction materials. The properties, requirements, and uses of engineering materials in modern construction. Two lectures, lab arranged. (3Sp)

**343. Hydrology for Engineers.** The hydrologic cycle, including weather elements and climate, precipitation, evaporation, transpiration, infiltration, groundwater, runoff, and methods of collection of hydrologic data. Three lectures, one lab. Prerequisites: CEE 350 and scientific computer programming capability or instructor's consent. (4W)

**344. Engineering Hydrology.** Engineering hydrology for nonengineering students with previous hydrology related courses. Three lectures, one lab. Prerequisites: Soils 358, Engr 103, and WS 375 or 420. (4W)

**350, 351. Engineering Fluid Mechanics.** Fluid properties, hydrostatics, fluid dynamics similitude, energy and momentum principles, and flow measurements. Prerequisites: Math 322, Engr 103 and 202. (3F,W)@ (3W,Sp)

**352. Applied Fluid Mechanics.** Uniform and nonuniform open channel flow; pipe network analyses, pumps and pumping systems; design considerations. Three lectures, one lab. Prerequisite: CEE 350. (3)@

**353. Fluid Mechanics Laboratory.** Laboratory experiments observing and reasoning fluid flows. (1)

**363. Introduction to Environmental Engineering.** Concepts and principles of natural science applied to engineering solutions of environmental problems. Applications in the aquatic, atmospheric, and terrestrial environments are explored. Prerequisite: Chem 122. (3F)

**364. Water Supply and Treatment.** Application of physical, chemical, biological, and hydraulic principles to water supply and treatment for municipal and industrial uses. Prerequisites: CEE 351 concurrent, CEE 363. (3W)

**365. Wastewater Treatment Processes.** Application of physical, chemical, biological, and hydraulic principles to the collection of municipal and industrial wastewater. Prerequisites: CEE 352 and 363. (3)

**387. Technical Writing in Civil Engineering.** Supervised discussion and review of problems encountered by professional engineers. Emphasis on communication skills. (1F,W,Sp)@

**420. Engineering Economics.** Applications of the mathematics of finance to engineering decision making. Prerequisite: Econ 200 or instructor's consent. (3F)

**425. Legal Aspects of Engineering.** Synopsis of the law of contracts. Writing of engineering specifications. Engineering ethics. (3Sp)

**430. Soil Mechanics.** Elementary physics of soil as applied to engineering problems. Moisture, plasticity, and capillary relationships. Percolation and the design of earth structures and foundations. Two lectures, one lab. Prerequisites: CEE 305, 350. (3F)

**431. Soil Engineering.** Application of engineering soil mechanics and structural theory to the design of foundations, dams, highways, and other engineering problems. Prerequisite: CEE 430. (3W)

**487. Senior Seminar.** Supervised discussion and review of problems encountered by professional engineers. (1F,W)@

**493. Independent Study.** A laboratory design or a research project on a problem selected by the student. It requires a review of literature, preparation of a proposal which describes the project, and the completion of a design or research and the preparation of a report. (1-3)@

**497. Honors Studies.** Advanced work for qualified students. Initiated by the student and may consist of a special individual project under the direction of a faculty member, or of advanced study in connection with an established departmental course. Prerequisite: a satisfactory grade point average, recommendation of instructor, and approval of the College of Engineering Honors Committee. (1-3)

**500. Construction Cost Estimating.** Introduction to construction contracting and methods of preparing cost estimates, including an introduction to the critical path method of planning and scheduling construction projects. Prerequisite: instructor's consent. (3)

**501 (d612).<sup>1</sup> Prestressed Concrete Design.** Prerequisite: CEE 305. (3)

**504. Structural Matrix Analysis.** Matrix procedures for statically determinate and indeterminate trusses, beams, and frames; energy theorems; stiffness and flexibility methods; computer applications. Prerequisite: CEE 306. (4F)

**505. Design of Concrete Structures.** Reinforced and prestressed concrete structures, analysis and design; building bridges. Prerequisites: CEE 307, 308. (3F)

**507. Design of Steel Structures.** Buildings, bridges, framework design. Design project. Prerequisite: CEE 505. (3W)

**508 (d610). Numerical Methods in Elasticity.** Elasticity theory; stress and strain analysis; failure theories; yield criteria; flex and torsion theories for solids and thin-walled members; energy methods; introduction to numerical methods; computer implementations. Prerequisite: CEE 305. (3F)

**512. Finite Element Methods in Civil Engineering.** Introduction to finite element analysis covering applications in solid and fluid mechanics. Slope functions, element matrices and vectors, assembling global systems of finite element equations. Prerequisite: CEE 305. (3W)

**513 (d613). Structural Dynamics (Earthquake).** Analytical and engineering methods of evaluating the response of structural systems to earthquake-induced motion. Current and anticipated building code requirements. Prerequisite: CEE 306. (3W)

**518 (d618). Composite Structures.** Behavior of composite structures including: structural applications, manufacturing methods, joining and fastening, macro mechanical behavior, and analysis using computer techniques. Prerequisite: CEE 305. (3W)

**521. Highway Engineering.** Highway drainage, subgrade structure base courses, bituminous and Portland cement concrete pavements, planning, and regulation. Prerequisite: CEE 430. (3Sp)

**522. Traffic Engineering.** Volume, speed time, demand, and capacity of transportation systems; geometric design; vehicle and user characteristics; traffic control. (3Sp)

**530. Soils Engineering.** Classification, moisture movement, soil stresses, consolidation, shear strength, stability, lateral pressures, bearing capacity. Not intended for majors in the structures and soil mechanics track. Prerequisite: instructor's consent. (3)

**532. Foundations Analysis and Design.** Engineering properties of soil and their effect on the design of footings, pile foundations, cofferdams, caissons, mat foundations, and retaining walls. (3Sp)

**543 (d643). Groundwater Engineering.** Analytical techniques for evaluating groundwater flow, quality, and yield. Aquifer properties, storage, movement recharge, and withdrawal. Prerequisite: CEE 343. (3F)

**550. Applied Hydraulics.** Course primarily for nonengineering students. Fluid statics and dynamics, flow in pipes and open channels, flow measurement, pumps. Three lectures, one lab. Prerequisites: five credits of college physics, Math 221. (4)@

**551 (d651). Hydraulic Transients.** Unsteady flow in closed conduits, transient analysis of water hammer caused by operating pipelines, valves, pumps, and turbines. Prerequisites: CEE 352 and FORTRAN programming. (3Sp)

**552 (d652). Hydraulic Design.** Design and operation of pipelines, economic analysis, pipe material and pipe pressure class, pump hydraulics and selection, flow control valves, cavitation analysis and design, and transient analysis. (3F)

**553. Engineering Hydraulics.** For graduate students needing an engineering hydraulics course. Hydrostatics, continuity, work-energy, impulse-momentum, pipe and open channel flow. Not accepted for graduate credit in engineering. Prerequisites: calculus, physics; engineering mechanics preferred. (5)@

**561 (d660). Water Quality Analysis.** Methods of physical, chemical, and biological analysis of water and wastewater; underlying principles and limitations of test methods; statistical significance of data. Two lectures, two labs. Prerequisites: Chem 122, 124. (4F)

**\*562 (d672). Chemistry of Aquatic Systems.** Emphasis on the chemical processes occurring in natural environments. Principles of physical chemistry applied to problems involving the composition of natural waters and man's influence on these systems. Prerequisite: Chem 301. (3)

**565. Design of Municipal Water and Wastewater Systems.** Design of municipal water and wastewater treatment plants. Emphasis on plant configurations, sizing, and design of various unit operations and processes. One lecture, two laboratories. Prerequisite: CEE 365 or instructor's consent. (3W)

**566 (d669). Introduction to Water Resource Systems Analysis and Microeconomics.** System analysis and basic microeconomic concepts, including applications of linear programming and simulation models to water planning and operation problems. Prerequisites: CEE 420 and FORTRAN or BASIC language. (3Sp)

**567. Design of Hydraulic Structures.** Structural design of conveyance structures, power structures, pipe bridges, connections, and other structures. Prerequisites: CEE 307, 552. (3)

**588. Civil and Environmental Engineering Design Project.** Major design experience that builds upon the fundamental concepts of basic sciences, engineering sciences, engineering design, and communication skills. (3W)

**590. Cooperative Practice.** A planned work experience in industry. Detailed program must have prior approval. Written report is required. (3-9)

## *Graduate<sup>2</sup>*

**601. Finite Element Methods in Structural Mechanics.** (3)

**603. Finite Element Methods in Fluid Mechanics.** (3)

**606. Limit Analysis of Structures.** (3)

**608. Structural Stability.** (3)

**609. Similitude.** (3)

**610 (d508). Numerical Methods in Elasticity.** (3)

**612 (d501). Prestressed Concrete Design.** (3)

**613 (d513). Structural Dynamics (Earthquake).** (3)

**614. Structural Optimization.** (3)



- 615. Structural Reliability. (3)
- 616. Experimental Methods in Structural Engineering. (3)
- 618 (d518). Composite Structures. (3)
- 628. Concrete Engineering. (3)
- 630. Earth and Rock Fill Dams. (3)
- 633. Soil Mechanics. (3)
- 634. Soil Mechanics Laboratory. (3)
- 635, 636. Soil Mechanics. (3) (3)
- 637. Buried Structures. (3)
- 638. Earthquake Engineering--Geotechnical. (3)
- 639. Hydrologic Instrumentation. (1)
- 640. Engineering Hydrology. (4)
- 641. Surface Runoff Hydrology. (3)
- 642. Statistical Hydrology. (3)
- 643 (d543). Groundwater Engineering. (3)
- 644. Advanced Groundwater Hydrology. (3)
- 645. Parametric Hydrology. (3)
- 646. Stochastic Methods in Hydrology. (3)
- 647. Groundwater Modeling. (3)
- 648. Groundwater Quality Modeling. (3)
- 649 (f541). Small Watershed Hydrology. (4)
- 650. Numerical Methods in Engineering. (3)
- 651 (d551). Hydraulic Transients. (3)
- 652 (d552). Hydraulic Design. (3)
- 653. Hydraulic Modeling and Experimental Methods. (3)
- 655. Open Channel Flow. (4)
- 656. Sedimentation Engineering. (3Sp)
- 657. Potential Fluid Flow. (3)
- 658. Fluid Mechanics. (4)
- 660 (d561). Water Quality Analysis. (4)
- 661. Water Quality Management. (3)
- 662. Air Quality Management. (3)
- 663. Waste Management. (3)

- 664, 665, 666. Water and Wastewater Treatment. (4) (4) (4)
- 667. Industrial Wastewaters. (3)
- 668. Unit Processes in Hazardous Wastes. (3)
- 669 (d566). Introduction to Water Resource Systems Analysis and Microeconomics. (3)
- 670 (f570). Watershed Hydrologic Modeling. (3)
- \*672 (d562). Chemistry of Aquatic Systems. (3Sp)
- 673 (f563). Analysis and Behavior of Environmental Contaminants. (3)
- 680. Graduate Seminar. (1)®
- 690. Directed Reading. (1-3)®
- 693. Special Problems. (1-4)®
- 695. Design Project. (3)
- 697. Thesis Research. (1-9)®
- 699. Continuing Graduate Advisement. (1-12F,W,Sp,Su)®
- 708. Plate and Shell Theory. (3)
- 709. Shell Theory. (3)
- 710. Plasticity in Structural Engineering. (3)
- 711. Material and Structural Modeling. (3)
- 712. Advanced Topics in Civil Engineering. (3)
- 742, 743. Water Resources Engineering Systems Analysis. (3) (3)
- 744. Water Resources Planning and Institution. (3)
- 745. Water Systems Evaluation. (3)
- 752. Porous Media Flow. (3)
- 758. Advanced Finite Element Analysis. (3)
- 759. Boundary Layers and Turbulence Theory. (3)
- 768. Water Quality Modeling for Environmental Management. (3)
- 797. Dissertation Research. (1-15)®
- 799. Continuing Graduate Advisement. (1-12F,W,Sp,Su)®

\*Taught 1990-91.

<sup>1</sup>Parentetical numbers preceded by *d* indicate a *dual* listing; parentetical numbers preceded by an *f* are the *former* course numbers.

<sup>2</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

©This course is also offered by correspondence through the Life Span Learning Independent Study Division.

## Department of **Communication** College of Humanities, Arts and Social Sciences

**Head:** Associate Professor Scott A. Chisholm  
Office in Animal Science 310

**Professor** Nelson B. Wadsworth; **Professor Emeritus** Burrell F. Hansen; **Associate Professors** Gerald L. Allen, Penny M. Byrne, Donald T. Cundy, James O. Derry; **Adjunct Associate Professor** Robb Russon; **Assistant Professors** Andrew Giarelli, Nancy M. Williams; **Adjunct Assistant Professors** Kenneth E. Boutwell, Roger McEvoy

**Degrees offered:** Bachelor of Science (BS) and Bachelor of Arts (BA) in Journalism; Master of Arts (MA) and Master of Science (MS) in Communication

**Areas of specialization:** Broadcast-News, Print-News, Media-Management, Public Relations, and Journalism Education

### Objectives

The Department of Communication is a professionally-oriented department offering hands-on instruction in journalism, broadcasting, and media management. The department publishes a weekly community newspaper, the *Cache Citizen*, and produces a weekly cable TV newscast, the *Cache Valley Report*. Using an integrated curriculum following a specific sequence of courses, students are trained for entry-level positions in mass media.

### Requirements

**Departmental Admission Requirements.** Admission requirements for first quarter freshmen into the Department of Communication are the same as those described for the University on pages 8-11.

**Journalism requirements:** There is a mandatory sequence of courses which must be completed. Upon completion of the freshman course requirements, each student must have an overall 2.33 grade point average (GPA). Should the overall GPA fall below 2.33, the student will be placed on departmental probation for one quarter. If the GPA is not raised to 2.33, the student will then be dropped as a major from the journalism program. Any student transferring into the department is required to have a 2.33 overall GPA.

**Graduation Requirements.** Journalism majors must have a C or better in all communication courses taken after Comm 121 and 130, which require a C+, and maintain an overall university grade point average (GPA) of 2.33 (C+) to fulfill the departmental requirement for graduation. A journalism major requires a minimum of 47 credits and a maximum of 54 credits in communication. See departmental adviser for current course requirements and sequence of courses.

### Journalism Undergraduate Curriculum

**Freshman Year:** Students majoring in journalism must complete the following courses before entering any sophomore courses: Engl 101 or 105 or 111; Ins T 100; Art 240; PolSc 110 or Hist 170 or Econ 200; Comm 121, 130.

**Sophomore Year:** Comm 206 (Prerequisite: Art 240 or permission of instructor); Comm 210, 232, 283.

Upon completion of the freshman and sophomore core courses, all students majoring in journalism will have the opportunity to con-

centrate in one of the areas of concentration. Students should be aware that the department has a specified sequence of courses. Majors must consult the department before enrolling in any communication course. Students interested in public relations or media management are required to build an individualized program of study in consultation with a departmental adviser.

**Junior Year:** Comm 302 (take 1 credit per quarter for 3 quarters). Select 8 credits of laboratory courses from: Comm 310, 321, 370, 375, 383, 385, 387, 390, 484 (2 credits each).

**Senior Year:** All students are required to take Comm 502 and 513; choose one of the following two courses: Comm 503 and 565; and choose one of the following four courses: Comm 530, 531, 580, and 583.

Majors are to select 6-9 credits from the following courses, as suggested by their advisers. Senior skills courses are open to majors who have completed their junior-level lab requirements. Theory courses are open to majors and nonmajors.

**Skills Courses:** Comm 330, 384, 420, 425, 432, 451, 480, 500, 504, 506, 530, 531, 583.

**Theory Courses:** Comm 452, 499, 502, 560, 580, 582, 587.

For detailed course requirements, obtain an official major requirement sheet from the Department of Communication. Requirements may change from time to time.

### Nonteaching Journalism Minor

Contact a departmental adviser to develop an 18-credit minor. At least 9 credits must be in upper division courses. Graduation requirements are the same as those for majors.

### Journalism Education Option

Students in this program must register with the College of Education and be enrolled in teacher education. Education majors must maintain a minimum grade point average (GPA) of 2.5.

### Financial Support

In addition to University and College of Humanities, Arts and Social Sciences scholarships, grants, and loans, the Department of Communication offers several scholarships for undergraduate and/or graduate students. Most of these are limited to juniors and seniors. See department for details and deadlines. There are also part-time employment opportunities for students working on the department's media outlets. Applications are available in the department office.

### Graduate Study

The Master of Arts (MA) and the Master of Science (MS) in Communication with emphases in print, photo, and broadcast journalism; and media-management are offered. See current Graduate Catalog for program description. Application for admission to a graduate program is made through the School of Graduate Studies.

## Communication Courses

**SS 121. Introduction to Mass Communications.** Structures, functions, political, social, and economic impacts of mass media: newspapers, books, magazines, radio, television, film, public relations, and advertising. (3F,W)

**130. Writing for the Mass Media.** The mechanics and techniques of reportorial writing. Prerequisites: typing ability; Engl 101, 111, or equivalent. (3F,W,Sp)

**206. Photo and Electronic Journalism.** Emphasis on functions of pictures in newspapers, magazines, television, and advertising. Practice in picture taking and darkroom procedures. Students furnish cameras and some materials. Prerequisite: Art 240 or permission. (3F,Sp)

**210. News Gathering and Writing.** Skills and techniques of interviewing, researching public records, and reporting for media of mass communication. Prerequisite: C+ or better in Comm 121 and 130. (3F,W,Sp)

**217. Public Opinion, Persuasion, and Propaganda.** Impact of media on the formation of public opinion through persuasion and propaganda. Techniques of media influence on thought and behavior. (3Sp)

**225. Introductory Communication Internship.** Lower division, on-campus internship. Students work with media-related campus units. Approval of instructor required; may not be repeated. (1-2F,W,Sp,Su)

**232. Introduction to Research Methods.** Proceeds from an examination of the rationale underlying the scientific method to a consideration of experiments, quasi-experiments, and surveys as tools of social science/communication research. (3W)

**283. Broadcast Production.** Introduction to the types and uses of broadcast equipment. Prepares student for advanced production opportunities. Prerequisite: For Communication majors only. (3F,W,Sp)

**302. Community Journalism.** A pro-seminar which explores the processes and problems of news gathering and reporting in local communities. Repeatable to a total of 3 credits. (1F,W,Sp,Su)®

**310. Reporting Practicum.** Lab work in reporting news for print and broadcast media. Must be taken concurrently with Comm 302. (2F,W,Sp,Su)

**321. Editing and Copy Reading.** Laboratory work in editing news copy for style, usage, and presentation. Must be taken concurrently with Comm 302. (2F,W,Sp)

**330. Reporting Public Affairs.** Coverage of local, state, federal courts; municipal, state, and federal government administration in the local community. Prerequisite: PolSc 111 (American State and Local Government and Politics). (3F)

**370. Television Production.** Lab work in studio production; use of studio and control room equipment. Must be taken concurrently with Comm 302. (2F,W,Sp)

**375. Television Control Room Operations.** Lab work in use of control room equipment; includes switching and video taping for operation of cable channel. Must be taken concurrently with Comm 302. (2F,W,Sp)

**383. Newspaper Production Laboratory.** Lab course in design, layout, and pasteup of newspapers. To be taken concurrently with Comm 302. (2F,W,Sp)

**384. News and Documentary Writing.** Newsroom organization and operations; selection of news stories; the newscast; the TV documentary; special events; features, commentary, and analysis. (3F)

**385. Radio and TV Performance.** Lab work in radio and TV announcing and improvement in voice articulation. Must be taken concurrently with Comm 302. (2F,W,Sp)

**387. Radio Production.** Laboratory work in use of voice, music, and sound to create radio programs. Must be taken concurrently with Comm 302. (2F,W,Sp)

**390. Media Advertising Sales.** Instruction in the planning and preparation of media advertising sales presentations. Lab experience in the selling and servicing of actual accounts. To be taken concurrently with Comm 302. (2F,W,Sp)

**420. Feature Writing.** Instruction and practice in writing the newspaper feature story and short magazine article. Prerequisite: Comm 210 or consent of instructor. (3W)

**425. Communication Internship.** Supervised in-service training for print or broadcast students. By permission only. Repeatable to a total of 6 credits. (1-3F,W,Sp,Su)®

**432. Editorial Writing.** Study of the editorial and opinion functions of mass media. Planning, researching, and writing editorials. Prerequisite: C or better in Comm 210. (2F)

**451. Advertising.** An overview of advertising, including purposes and structure of advertising appeals and copy writing for both print and broadcast journalism. (3F)

**452. Public Relations.** Media and methods used in public relations work as required by corporations, public institutions, service organizations, and governmental agencies. Prerequisite: Comm 210 or instructor's consent. (3F)

**480. Commercial and Continuity Writing.** Creative aspects of commercial copy and dramatic scripts; writing, evaluating, and revising scripts; analysis and critique of local and national material. (3W)

**484. Electronic News.** Practice in use of electronic news gathering equipment and production of visual news materials. Must be taken concurrently with Comm 302. (2F,W,Sp)

**497H. Senior Thesis.** An in-depth paper or project culminating in a formal presentation. Required of all students for graduation from the Honors Program in communication. Students must also complete HASS 480H. (1-5F,W,Sp,Su)

**499. Special Topics.** Study of special topics in print, broadcast, photojournalism, or media management. (1-3F,W,Sp,Su)®

**500. Projects in Communication.** Individualized readings and projects. Prerequisite: consent of student's adviser. Maximum of 6 credits may be counted toward a degree. (1-5F,W,Sp,Su)®

**502. Communication Ethics.** Ethical theory and practice in interpersonal, group, organizational, and mass communication. (3Sp)

**503. Mass Media and Society.** Study of the criticisms, challenges, impact, and responsibilities of mass communications in modern society. Emphasis on performance and ethics of practitioners. (3W)

**504. School Publications.** Problems of advising staffs of school newspapers, yearbooks, and magazines. (3Su)

**506. Advanced Photojournalism.** Laboratory work in use of cameras to communicate news and to make social statements. Prerequisites: Comm 130 and 206. (3W)

**513. Mass Media Law.** Principles of the law of libel, privacy, copyright, press freedom, and responsibility as they apply to the news media. (3F)

**\*530. Magazine Article Writing.** Lectures and practice in preparing feature articles for magazines. Analysis of periodical markets. (3F)

**531. In-depth Reporting.** Researching and reporting public affairs in depth. (2Sp)

**560. History and Literature of Mass Communication.** Readings and discussion of history, biography, social impacts, and philosophy of journalism, public relations, advertising, and broadcast. (3W)

**565. Communication Theory.** Intensive study of major theories and issues using models and research techniques. Application of these theories to significant societal problems. (3Sp)

**580. Mass Media Management.** Examines the methods, techniques, and principles of managing the media organization, including newspapers and broadcast stations. (3F)

**\*\*582. International Communications.** Study of mass communications within and between countries. Systems and techniques of mass communication. Possibilities of bringing about better understanding between countries and cultures. (3W)

**583. Advanced Television Production.** Projects to develop the imagination, creativity, and aesthetic judgment for different types of television programs, and to develop and perfect skill in television production. Prerequisite: Comm 370. (3Sp)

**587. Educational Television and Radio.** Production of radio and television materials for education uses; methods for effective classroom utilization of audio and visual materials and programs. (3W,Su)

## Graduate<sup>1</sup>

**601. Introduction to Mass Communication Graduate Study.** (2F,W,Sp,Su)

**602. Seminar in Community Journalism.** Repeatable to a total of 3 credits. (1F,W,Sp,Su)®

**610. Communication Theory and Technology for International Agricultural Extension.** (3Sp)

**611 (f590).<sup>2</sup> Internship.** (1-6F,W,Sp,Su)®

- 617 (F517). Persuasion. (3Sp)
- 620. Feature Article. (3W)
- 625. History of Communication. (3F)
- 630. Reporting on Arts and Culture. (3W)
- 635. News Analysis, Commentary, and Editorials. (3F)
- 640. Seminar in Mass Media Issues. Repeatable to 6 credits. (1-3W)®
- 650. Regional Issues. (3F)
- 670. Introduction to Research. (4F)
- 680. Research Seminar. (3Sp)®
- 683. Television Direction. (3Sp)

- 685. Problems in Media Practice. Repeatable to 6 credits. (3F,W,Sp,Su)®
- 687. Legal Issues in Mass Media. (3W)
- 690. Research Studies. (1-5)®
- 697. Thesis. (1-9)®
- 699. Continuing Graduate Advisement. (1-3)®

<sup>1</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

<sup>2</sup>Parenthetical numbers preceded by an *f* are the *former* course numbers.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

\*Taught 1990-91.

\*\*Taught 1991-92.

## *Department of* **Communicative Disorders** *College of Education*

**Head:** Professor Thomas S. Johnson  
Office in USAC 102A

**Professors** Frederick S. Berg, James C. Blair, Thomas C. Clark, Jay R. Jensen, Steven H. Viehweg; **Assistant Professors** Jaclyn Little-dike, Sonia S. Manuel-Dupont, Carol J. Strong; **Clinical Assistant Professor** Susan Watkins; **Clinical Instructors** Dee R. Child, Yvonne Lee Clark, Douglas Hart, Ann B. McKeehan; **Research Instructor** Dorothy Jensen

**Degrees offered:** Bachelor of Science (BS) in Communicative Disorders; Master of Science (MS), Master of Education (MEd), and Master of Arts (MA) in Communicative Disorders with emphasis in Educational Audiology or Speech Pathology; MEd in Education of Hearing Impaired; Educational Specialist (EdS) in Educational Audiology

### *Objectives*

Three major objectives of the Department of Communicative Disorders are (1) to train competent speech-language pathologists, educators of the hearing impaired, and educational audiologists capable of state and national certification; (2) to provide clinical services to speech-language or hearing impaired individuals in the University population or in the community; (3) to provide a research opportunity for those students relating to communicative problems of individuals. The programs in both Speech-Language Pathology and Educational Audiology are fully accredited by the Education and Training Board of the American Board of Examiners in Speech-Language Pathology and Audiology of the American Speech-Language-Hearing Association, the Utah State Office of Education, and NCATE.

### *Requirements*

**Departmental Admissions Requirements.** Admission requirements for the Department of Communicative Disorders are the same

as those described for the University on pages 8-11. Students in good standing may apply for admission to the department.

**Admission into the Professional Program.** Students must apply to the Department of Communicative Disorders for admission into the professional program. The professional program is a professional education program culminating in the masters degree. A 3.0 GPA overall is required for admission into the professional program. Transfer students or students applying for admission into the program subsequent to the fall quarter of their junior year must receive approval of the department head before beginning their matriculation in major classes.

An application for admission to teacher education should be completed by all majors before the junior year (see College of Education requirements). This approval is necessary for the student to take those courses taught in the Departments of Elementary Education, Special Education, and Secondary Education, which are supportive of his or her major, as well as to take the Communicative Disorders clinical practicum course work.

**Bachelors degree in Communicative Disorders.** Though the BS or BA degree is available, the student should be aware that there is **no** professional employment certification possible at the bachelors level. All majors must complete a core curriculum consisting of Com D 240, 270, 310, 312, 322, 365, 375, 381, 398, 510, 549, 551, 560, and 583. The undergraduate major for communicative disorders consists of 65 quarter credits of courses specified by the department plus 6-10 quarter credits of extra departmental course work. Current certification requirements demand more course work than the minimum numbers required for University graduation.

Students wishing to obtain certification to teach the hearing impaired (Education of the Hearing Impaired) will need to complete the requirements for a teaching certificate in early childhood education, elementary education, or secondary education. In conjunction

with meeting the requirements for certification, the student should also complete course work in Communicative Disorders, as directed by the department.

There is no teaching minor offered in communicative disorders. Students desiring supportive courses for majors in special education, elementary or secondary education, family life, psychology, or other related departments, are advised to seek counsel from the department head in determining an effective minor core.

## Graduate Study

The masters degree is *required* for the student to obtain recommendation for either state or national professional certification. Either the MS, MEd, or MA is offered with specialization in education-clinical audiology, speech-language pathology, or education of the hearing impaired. Additionally, the Educational Specialist degree (EdS) is offered for those who have completed the masters degree and who are working in educational settings with the hearing impaired. See the graduate catalog and the current department major requirement sheet for prerequisites and further information.

## Communicative Disorders Courses

**010. Communication Training.** For students with communicative problems for which speech and/or hearing therapy is needed. (1-2F,W,Sp,Su)

**240. Orientation and Observation in Communicative Disorders.** Introduces students to the professional responsibilities required of communicative disorders specialists in a variety of employment settings. Observation in different settings will be provided. (2F,W,Sp)

**HU 270. Language, Hearing, and Speech Development.** A consideration of the development of phonology, morphology, syntax, and pragmatic skills in the language of children birth through eight years. A cross-cultural consideration of the development of phonologic, morphologic syntactic, and pragmatic skills in the language of children and throughout the lifespan. (5F,W,Sp,Su)

**290. Independent Study.** Selected work individually assigned, handled, and directed. Issues of mutual interest to students and the instructor are investigated and reported. (Not used for degree credit.) (1-5F,W,Sp,Su)

**310. Fundamentals of Anatomy for Speech and Hearing.** Basic study of the structures associated with the subprocesses of speech and hearing, including respiration, phonation, resonance, articulation, hearing, and fundamental neurology. Prerequisite: Physl 130 or consent of instructor. (5F)

**312. Disorders of Articulation.** Introduction to articulation disorders and related problems. Emphasis is directed at evaluation, management, and measurement of success. Principles of programming are presented. Prerequisites: Com D 270, 375. (5Sp)

**322. Professional Writing in Communicative Disorders.** Writing opportunities related to clinical management practices and professional report and paper writing for future professionals in communicative disorders. (1-3F,W,Sp)@

**SK 338. American Sign Language for the Deaf, an Introduction.** Introduction to American Sign Language and Total Communication. Basic receptive and expressive use of sign language as used in the American Sign Language system. (3F,W,Sp)

**365. Clinical Processes and Behavior.** A consideration of clinical management as an interactive process. Interpersonal sensitivity, technical knowledge and skills, and behavior modification are discussed and presented as core considerations. Prerequisites: Com D 270, Psy 101. (3Sp)

**375. Developmental Phonology.** Basic study of the sounds of English speech and the phonological subsystem of spoken language; developmental, descriptive, prescriptive, physiological, and acoustic features; applications in several disciplines. (5W)

**381. Hearing Science.** Study of the physics of sound and its interaction with people. Basic concepts of wave forms, decibels, room acoustics, aural harmonics, adaptation, and masking. (5W)

**398. Basic Audiometry.** Pure tone, speech audiometric, tuning fork, air-conduction and bone-conduction, and speech sensitivity and acuity tests. Prerequisites: Com D 270, 310, 381. (5Sp)

**408 (d604).<sup>1</sup> Listening Problems in the Classroom.** Hearing, speech, and listening considerations; room acoustics, hearing aids, FM equipment. For elementary, secondary, and special education educators. (1-4F,W,Sp)

**430. Practica in Sign Language.** Provides opportunities for graduate and undergraduate students to improve their sign language skills. Each student will supervise and train others in use of sign language. Prerequisite: Com D 338 or equivalent. (2F,W,Sp)@

**437. Intermediate Sign Language.** Development of conversational and educational signing abilities for people who have developed a basic signing vocabulary. Enhancement of both receptive and expressive abilities. Prerequisite: Com D 338. (3Sp)

**497. Senior Thesis.** Student-initiated research project under faculty supervision. Prerequisites: satisfactory grade point average, instructor recommendation, and approval of Honors Committee. (1-9F,W,Sp,Su)@

**500. Institute in Communicative Disorders.** Special colloquial offerings in communicative disorders. (1-5F,W,Sp,Su)

**507. Speech Science.** Contemporary theory, research findings, clinical applications, and laboratory experiences in speech production. (3Sp)

**510 (d609). Grammatical Analysis of Language Disability.** This course provides basic information in the clinical analysis of syntactic and morphological properties of productive language disorders. (5F)

**528 (d628). Educational Audiology.** Management of the hearing impaired child in the regular schools; population and individual profiles; evaluation and staffing; models of delivery; integration considerations; remedial and facilitative programming. (3W)

**540 (f440). Clinical Practicum in Communicative Disorders.** Supervised diagnostic and remedial casework in communicative disorders. Prerequisite: admission to teacher education. (1-4F,W,Sp,Su)@

**542. Internship in Audiology.** Supervised diagnostic and remedial practicum with auditorially impaired individuals. Prerequisite: consent of instructor. (1-5F,W,Sp,Su)@

**549 (d649). Evaluation of Language Disorders.** Evaluation of receptive and expressive language disorders using normative-based evaluation instruments and language sampling procedures. Semantic, syntactic, and pragmatic aspects of evaluation included. Prerequisites: Com D 270, 510, or equivalents. (5F)

**551 (d652). Remediation of Language Disorders.** Language therapy for semantic, syntactic, and pragmatic aspects of language in infants and preschool children. Includes theoretical approaches, as well as published materials, and emphasizes parental role in intervention. Prerequisite: Com D 549. (3W)

**553 (d653). Practicum in Education of the Hearing Impaired.** Supervised diagnostic and remedial casework in education of the hearing impaired. (1-4F,W,Sp,Su)@

**560. Aural Rehabilitation for Children.** Introduction to the principles and techniques of aural rehabilitation, specifically related to intervention with preschool and school-aged hearing-impaired children. (3W)

**575 (d675). Introduction to Research in Communicative Disorders.** An introduction to research methodology, experimental design, issues, and interpretation. Thesis prospectus development is guided. Statistical inference and single-subject designs are also considered. Prerequisite: (prior to/or concurrent) Psy 380. (3Sp)

**580 (d680). Structure, Function, and Diseases of the Ear.** A study of the structure, function, and diseases of the ear. Students will learn anatomy and gain knowledge of various diseases and disorders of ear. (5F)

**583. Introduction to Immittance Audiometry.** Provides understanding of theory and application of immittance audiometry and develops skill in administration and interpretation of results. (1F)

**590. Independent Study.** Selected work individually assigned, handled, and directed. Problems of mutual interest to students and the instructor are investigated and reported. (1-8F,W,Sp,Su)@

## Graduate<sup>2</sup>

**600. Introduction to Education of the Hearing Impaired.** (3)

**601. Audiology and Teachers of the Hearing Impaired.** (5)

602. Socio-Clinical Implications of Hearing Impairment. (3)
603. Speech and Language for the Young Hearing Impaired Child. (3)
- 604 (d408). Listening Problems in the Classroom. (1-4F,W,Sp)
605. Listening Problems in the Classroom. (3)
- 608 (f508). Internship in Audiology. (1-4F,W,Sp,Su)®
- 609 (d510). Grammatical Analysis of Language Disability. (5F)
611. Neuropathologies of Speech. (5F)
612. Language and Speech Management of the Hard of Hearing. (3F)
613. Speech for the Hearing Impaired. (3)
620. Rehabilitative Audiology. (3F)
621. Communicative Disorders of Cleft Palate. (4W)
- 622 (f521). Communicative Disorders Management in the Public Schools. (3F)
624. Special Auditory Tests. (3W)
626. Teaching Language to the Hearing Impaired. (3F)
- 628 (d528). Educational Audiology. (3W)
631. Disorders of Fluency—Stuttering. (5F)
638. Programming for the Young Hearing Impaired Child. (3W)
639. Educational Audiological Evaluation and Referral. (3Sp)
- 640 (f541). Internship in Speech Pathology. (1-5F,W,Sp,Su)®
641. Public School Internship in Speech Pathology. (1-4F,W,Sp,Su)
644. Public School Internship in Audiology. (1-12)®
- 648 (f548). Teaching Reading to the Hearing Impaired. (3W)
- 649 (d549). Evaluation of Language Disorders. (5F)
651. Externship in Speech Pathology. (1-12)®
- 652 (d551). Remediation of Language Disorders. (3W)
- 653 (d553). Practicum in Education of the Hearing Impaired. (1-4F,W,Sp,Su)®
654. Multi-handicapped Hearing Impaired Children. (3F)
655. Adaptation of Curriculum to the Hearing Impaired. (3Su)
656. Total Communication in the Classroom. (3Su)
657. Mainstreaming the Hearing Impaired. (3Sp)
658. Educational Audiological Management of the Hearing Impaired. (3F)
668. Industrial Audiology. (3W)
672. Internship in Education of the Hearing Impaired. (3-9F,W)
673. Student Teaching in Hearing Impairment. (3-9W)
674. Associate Teaching in Hearing Impairment. (3-9Sp)
- 675 (d575). Introduction to Research in Communicative Disorders. (3Sp)
678. Professional Practice. (3Su)
679. Pediatric Audiology. (3)
- 680 (d580). Structure, Function, and Diseases of the Ear. (5F)
681. Management of Voice Problems. (4)
684. Motor Disorders of Speech and Swallowing. (4Sp)
685. Seminar in Communicative Disorders. (2F,W,Sp)
686. Immittance Audiometry. (3W)
687. Hearing Aids. (5F)
688. Electrophysiological Auditory Tests. (5Sp)
689. Assessment and Educational Services for the Bicultural/Bilingual/Bidialectal Child. (3W)
690. Independent Study. (1-12F,W,Sp,Su)®
691. Independent Research. (1-12F,W,Sp,Su)®
696. Masters Project. (2-6F,W,Sp,Su)®
697. Thesis. (1-9F,W,Sp,Su)
- 698 (f598). Externship in Audiology. (1-12F,W,Sp,Su)
699. Continuing Graduate Advisement. (1-12F,W,Sp,Su)®
733. Supervision Internship. (1-10)
751. Supervision in Communicative Disorders. (3F)
781. Research Seminar in Educational Audiology. (1-6)
790. Independent Study. (1-3F,W,Sp,Su)
791. Independent Research. (1-3F,W,Sp,Su)
797. Dissertation. (1-12F,W,Sp,Su)
799. Continuing Graduate Advisement. (1-12F,W,Sp,Su)®

<sup>1</sup>Parentetical numbers preceded by *d* indicate a *dual* listing; parentetical numbers preceded by an *f* are the *former* course numbers.

<sup>2</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

## Department of

# Computer Science

## College of Science

**Head:** Associate Professor Donald H. Cooley  
Office in University Reserve Building

**Associate Head:** Associate Professor Gregory W. Jones  
Office in University Reserve Building

**Professors Emeritus** Rex L. Hurst, Wendell L. Pope; **Adjunct Professor** Ronald L. Thurgood; **Associate Professors** Stephen J. Allan, Scott R. Cannon, Nelson T. Dinerstein, Del Dyreson, Larre N. Egbert; **Assistant Professors** Vicki H. Allan, Jie Wu, Jianping Zhang

**Degrees offered:** Bachelor of Science (BS), Bachelor of Arts (BA) (students can earn a BA degree by completing two years of a foreign language), and Master of Science (MS) in Computer Science

### Objectives

The course of study offered by the Department of Computer Science is directed primarily toward developing the problem solving skills of its students. This, in conjunction with the understanding of computers and computer systems provided by course work, will enable a graduate of the program to apply his or her knowledge to finding solutions to problems that arise in the sciences, in business, industry, government, and education.

Students who have the ability to think analytically and creatively will find a challenging and exciting future in computer science.

Opportunities for practical applications of computer science skills are available with members of the computer science faculty who are engaged in research and consultation work both on and off campus.

### Computer Science

Computer Science deals with information structures and processes as they are represented and implemented in modern high-speed digital computers, and with information processing systems designed to implement useful applications of computing.

The program in computer science attempts to provide a solid foundation of knowledge about computers and to teach a mode of thinking which will permit continuing growth on the part of graduates. Prospective students should have an aptitude for mathematics and logic and an interest in analysis and deduction.

Computer science is one of the fastest growing fields of study in our society. Excellent employment opportunities are available to computer science graduates.

### Information Systems Option

The Information Systems program at Utah State University offers a common core of courses through two department majors, Business Information Systems and Education and Computer Science. The curricula of the individual departments differ substantially in emphasis.

The Computer Science major with an Information Systems option is designed for students interested in a career as a Computer Scientist with a background in Information Sciences and Systems. Majors in this option are trained in all phases of the analysis, design, and implementation of Information Systems. As part of this option, students also receive training in the theory and application of information with courses in Telecommunications and Expert Systems. Students select an application area such as Business, Accounting, or Economics. Other application areas can be developed by working closely with an adviser. This program of study, offered within the College of Science, leads to a Bachelor of Science, Bachelor of Arts, or Master of Science degree in Computer Science.

The Business Information Systems major, Information Systems Management emphasis, is offered in the Business Information Systems and Education Department, College of Business. The Bachelor of Science or Bachelor of Arts program is designed for students interested in business careers as information specialists, systems analysts, and information systems managers in business and industry. BIS majors take required courses in analysis and design, decision support systems, spreadsheet and database applications, and information systems projects. All graduates are required to complete a common core of business subjects to include a Business Administration minor. The College of Business is accredited by the American Assembly of Collegiate Schools of Business. The department also offers a Master of Science in Business Information Systems and Education with an area of emphasis in Information Systems Management. See pages 76-77 for additional details.

### Requirements

#### Summary of Departmental Admission and Retention Requirements

Admission requirements of the Department of Computer Science for freshmen are the same as those described for the University on pages 8-10. Transfer students with a 2.5 GPA may apply for admission to the department.

To remain in good standing, students pursuing a major in the department must maintain a GPA of 2.5 or better. In addition, before a student can register in a CS course, he or she must earn a grade of C- or better in all prerequisite courses. All required computer science classes must be completed with a grade of C- or better. Required courses may not be taken pass-fail, and a Computer Science major must have advanced standing to register for a course at the 400-level or above.

For a more complete statement of requirements, please contact the department directly. Requirements may change from time to time.

### Bachelor of Science Degree

The department offers a degree program with emphasis in science, digital systems, or information systems. The objectives are to train computer scientists who can relate to science, computer design, or business disciplines. Other areas of emphasis will be considered on an individual basis.



**COMPUTER SCIENCE REQUIRED COURSES<sup>1</sup>****Science Option**

CS 170, 171, 172, 242, 355, 356, 357, 455, 456, 457, 525, 530, 531, 540, 541, 542, 570; Stat 501; Math 220, 221, 222, 320, 321, 322, 331, 461; 18 upper division credits in science or engineering

**Digital Systems Option**

CS 170, 171, 172, 242, 455, 456, 457, 530, 531, 540, 575; EE 120, 211, 212, 251, 252, 352, 358, 487, 550, 588; Math 220, 221, 222, 320, 321, 322, 331, 461; Stat 501

**Information Systems Option**

CS 170, 171, 172, 252, 355, 356, 357, 455, 456, 457, 517, 518, 519, 530, 531, 540, 549, 575, 576; Acctg 201, 202, 203; Stat 501; BA 308; MHR 311; Econ 200 or 201; Math 220, 221, 222, 331; BIS 310, 570; 14 upper division credits in business, economics, accounting, or computer science

**Minors**

Minors are offered with emphasis in four areas as follows: (Also, minors may be tailored to meet a student's needs by consultation with a departmental adviser.)

**Computer Science**

CS 170, 171, 172, 455, 456, 457

**Information Systems  
(for the business major)**

CS 170, 171, 172, 252, 517, 518, 519

**Scientific Computing**

CS 170, 171, 172, 242; and any 2 of: CS 357, 455, 525, 541

**Teaching Minor**

Students working toward a degree in secondary education can get a computer science teaching minor, which will qualify them to teach the full range of computer science courses offered in junior and senior high schools.

**Required courses (24 credits):**

CS 150, 170, 171, 172, 455; Ins T 522, 616

**Elective courses (3 credits minimum):**

CS 241, 251, 260, 355, 356, 357, 456, 457, 541; Ins T 527; Sp Ed 656

**Graduate Study**

The department offers the Master of Science degree in Computer Science. See the graduate catalog for further information.

**Computer Science Courses**

**PS 101. Using Computers.** This course introduces the student to the use, nature, history, and impact of computers in modern life. It has no prerequisites. (4F,W,Sp,Su)

**SK 150. BASIC Programming.** Use of the language BASIC to teach problem solving skills on a computer. BASIC is the language most commonly supported on small computers, including home computers. Three lectures, one recitation. (4F,W,Sp,Su)

**SK 170. Computer Science Fundamentals.** Introduction to computer science for CS majors or minors who don't have adequate math or computer background: history, computing concepts, computer usage. May be waived by examination or instructor's consent. Prerequisite: Math 105 prior to or concurrent with CS 170. (4F,Sp)

**SK 171, 172. Computer Programming and Problem Solving Techniques.** Introduction to computer science for majors and minors. General computing concepts, problem analysis, algorithm development, and programming in a modern high-level language. Prerequisites: CS 170 or consent of instructor; Math 215 or 220 prior to or concurrent with CS 171; CS 171 is a prerequisite to CS 172. (3F,W,Sp,Su) (3F,W,Sp,Su)

**210. Computer Programming, BASIC.** The use of the BASIC programming language in solving problems in business and scientific areas. Taught off campus only. Prerequisite: CS 150. (3F,W,Sp,Su)

**225. Cooperative Work Experience.** This course provides credit for students who work at a participating firm under faculty supervision. (1-9F,W,Sp,Su)®

**SK 241. FORTRAN Programming.** Use of a problem-oriented language in solving problems by means of a computer. FORTRAN is principally used for scientific programming. (3F,W,Sp,Su)

**242. Advanced FORTRAN.** Programming of scientific applications in FORTRAN for students knowledgeable about programming. Students will learn advanced FORTRAN and its scientific and data handling applications. Prerequisite: CS 172 or 241. (3W,Sp)

**SK 251. COBOL Programming.** Students are expected to learn the fundamentals of COBOL and gain experience in writing COBOL programs. COBOL is principally used for programming in business. Prerequisite: prior programming experience or permission of instructor. (3F,W,Sp,Su)

**252. Advanced COBOL.** Brief introduction to elementary topics followed by a more intense study of advanced topics: report writer, sorting, merging, file handling, string processing. Intended for CS majors who have completed CS 172, and for nonmajors who have completed CS 251. Prerequisites: CS 172 or 251. (3F,W)

**260. Programming in C.** Introduction to software development using the C programming language and environment. Prerequisite: Prior programming experience. (3F,W,Sp,Su)

**265. Computer Science: An Intensive Introduction.** Computer organization, structuring problems for computer solution, use of a high level computer language, interactive development of computer programs. Prerequisite: prior programming experience or permission of instructor. (6Su)

**355, 356, 357. Introduction to Computer Architecture.** Discussion of the structure of various computer systems. Computer information storage and representation, input-output, and trends in computer architecture. Symbolic coding at the assembly level. Prerequisites: CS 171, 241, or 251; CS 355 or EE 251 is required for 356 and CS 356 for 357. (4F) (4W) (4Sp)

**425. Cooperative Work Experience.** This course provides credit for students who work at a particular firm under faculty supervision. (1-9F,W,Sp,Su)®

**455. Computer Software Methods.** A study of the specification, design, development, and implementation of computer software, including designing and programming methods, information and file structures, and programming languages. Prerequisites: junior standing, Math 331 and CS 172 or permission of instructor. (3F,W)

**456, 457. Computer Software Methodology.** A study of the specification, design, development, and implementation of computer software, including designing and programming methods, information and file structures, and programming languages. Prerequisites: calculus, junior standing, Math 331, and CS 171 or permission of instructor. (3W,Sp) (3F,Sp)

**495. Undergraduate Research.** The student will participate in research projects and study developments and material in computer science not available in current course work. Prerequisite: permission of instructor. (1-5F,W,Sp,Su)®

**517. Theory of Database Management Systems.** Relational, hierarchical, and network systems. Schemas, constraints, properties, and languages. Comparison of systems. Prerequisite: CS 455. (4F)

**518. Information Systems Development.** Life cycles, politics, technology. Techniques of analysis and design. Files, interface, testing. Inputs, reports, processes. Database applications. Prerequisite: CS 517. (3W)

**519. Construction of an Information System.** Analysis, design, and implementation of a commercial quality system. Prerequisite: CS 518. (3Sp)

**525. Computer Modeling and Simulation.** Introduction to simulation and comparison with other techniques. Discrete simulation models and discrete change simulation.

<sup>1</sup>Changes or additions to these requirements may occur from time to time. Please contact the department office for current requirements.

Analysis of data generated by simulation experiments and validation of simulation models and results. Prerequisites: statistical methods and computer programming. (3F,W)

**530, 531. Compiler Construction.** Review of program language structures, translation, loading, execution, and storage allocation. Compilation of simple expressions, statements, and declarations. Organization and design of a compiler. Prerequisite: CS 455. (3W,Sp) (3F,Sp)

**540. Finite Automata Computability and Complexity.** A treatment of formal grammars, finite and push down automata, Turing machines, and the theory of computability, decidability, and complexity. Prerequisite: CS 455. (3Sp)

**541, 542. Computer Graphics.** A two-quarter sequence introducing the concepts of graphics techniques and digital representation of information. Prerequisites: CS 172 or 260 or consent of instructor; CS 541 must be taken prior to 542. (3F) (3W)

**549. Expert Systems—Theory and Practice.** Inference mechanism concepts, automated reasoning, and hands-on experience in expert system construction and evaluation are included in this stand-alone course. Prerequisite: familiarity with a high-level programming language and the use of microcomputers, or permission of instructor. (3F)

**560. Artificial Intelligence Languages.** An introduction to artificial intelligence languages. Prerequisite: CS 455 or consent of instructor. (3F,Sp)

**570. Programming Languages: Analysis and Comparison.** An analysis and comparison of major families of programming languages including features available, areas of use, implementation considerations, and support of data abstraction. Prerequisite: CS 455. (3F)

**575. Telecommunications.** An introduction to data communications concepts and terminology, distributed computer systems, public and private communications services, and local area networks. Prerequisite: junior standing. (3W)

**576. Data Communications.** Representations of data, network architectures and protocols, standards, applications, and performance measures. Prerequisites: CS 357 and 575, Math 222. (3Sp)

**595. Independent Study.** Provides for independent study of selected topics. Prerequisite: permission of instructor. For use in the Ogden area only. (3-6F,W,Sp,Su)

### Graduate<sup>1,2</sup>

**605. Highly Parallel Programming and Computing.** (3W)

**610. Operating Systems.** (3F)

**611. Operating System Implementation.** (3W)

**615. Theory of Relational Database Systems.** (3W)

**616. Structured Systems Analysis and Design.** Prerequisites: CS 517 and 518. (3Sp)

**620. Management Information Systems.** (3Sp)

**625. Cooperative Work Experience, Graduate.** (1-9F,W,Sp,Su)@

**627, 628, 629. Software Engineering.** (3W) (3Sp) (3Sp)

**\*\*630. Automatic Software Generation.** Prerequisite: CS 531. (3F)

**632. Advanced Compilers.** Prerequisite: CS 531. (3F)

**641. Advanced Computer Graphics.** Prerequisite: CS 542 or permission of instructor. (3Sp)

**650. Artificial Intelligence in Machine Learning and Natural Language Processing.** (3W)

**651. Artificial Intelligence in Knowledge Representation and Expert Systems.** (3W)

**652. Artificial Intelligence in Machine Cognition and Action.** (3Sp)

**671. Topics in Computer Science (Topic).** Prerequisite: CS 455 or permission of instructor. (1-3F,W,Sp,Su)@

**690. Seminar.** (1-5)@

**695. Reading and Reports.** (3-6)@

**697. Thesis and Research.** (1-9)@

**699. Continuing Graduate Advisement.** (1-3)@

<sup>1</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

<sup>2</sup>Not all graduate courses are taught each year. Please see the department for current course offerings.

@Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

\*Taught 1990-91.

\*\*Taught 1991-92.

## Department of *Economics* College of Agriculture and College of Business\*

**Head: Professor Donald L. Snyder**  
Office in Business 615

**Professors** Jay C. Andersen, Basudeb Biswas, Rondo A. Christensen, Reed R. Durtschi, Herbert H. Fullerton, Terrence F. Glover, Gary B. Hansen, Bartell C. Jensen, W. Cris Lewis, Kenneth S. Lyon, Darwin B. Nielsen, H. Craig Petersen, E. Boyd Wennergren, Morris D. Whitaker; **Professors Emeritus** Roice H. Anderson, Lynn H. Davis, Allen D. LeBaron, Evan B. Murray, N. Keith Roberts, Morris H. Taylor; **Associate Professors** DeeVon Bailey, Larry K. Bond, E. Bruce Godfrey, L. Dwight Israelsen, John E. Keith, Glenn F. Marston; **Assistant Professor** Christopher Fawson; **Human Resources Specialist** Marion T. Bentley

\*The Department of Economics is in the College of Agriculture and the College of Business. Programs in both Agricultural Economics and Economics are offered.

**Degrees offered:** Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), and Master of Arts (MA) in Economics; BS and MS in Agricultural Economics; BS in Agribusiness; Master of Agricultural Industries (MAI); Master of Social Science (MSS); Doctor of Philosophy (PhD) in Economics (may have emphasis in Agricultural Economics)

### Objectives

The Department of Economics offers programs in both the College of Business and the College of Agriculture. Students majoring in this field receive preparation for employment in business, government, agriculture, and a variety of other professions. The requirements of the department are intended to allow students the flexibility to combine training in other fields with a degree in economics. Indeed, specifically-designed programs are available for

students who are interested in careers in business, agribusiness, and law, and also for those who intend to pursue graduate education in agricultural economics or economics.

### **Economics Requirements**

**Admission.** Admission requirements for undergraduate study of Economics are the same as those for the University, as listed on pages 8-10. Students who plan to earn a BS or BA in an area of economics in the College of Business may apply for admission to the College of Business or directly with the department head or academic adviser in the Department of Economics. Students who plan to earn a BS degree in agricultural economics or agribusiness economics in the College of Agriculture may apply for admission to the College of Agriculture or directly with the department head or academic adviser in the Department of Economics.

**Prespecialization.** All majors must complete 40 credits of general education courses and 6 credits of written communication courses as listed on pages 21-25. In addition, the following prespecialization courses are required for the BS degree in economics: Math 105, 215; Acctg 201, 202; BIS 140, 255; Stat 230 or Stat 501 and 502; Econ 200, 201.<sup>1</sup>

**Bachelor of Science in Economics.** On completion of the prespecialization courses, the student selects one of three options:

(1) **General Economics.** This option is designed for students who are planning to go on to graduate study in economics and also for those who want maximum flexibility to combine study in economics with courses in other disciplines. Requirements for this option are Econ 500, 501<sup>2</sup>, 543, 575, 576, 595, and 18 additional credits in economics courses numbered 300 and above.<sup>3</sup>

(2) **Prelaw.** This option is for those students planning to attend law school who want to obtain a strong foundation in economics. The requirements for this option are Econ 400 or 500, 401 or 501<sup>2</sup>, 530; PolSc 101, 110, 120; 15 additional credits of economics courses numbered 300 or above<sup>3</sup>; and 8 additional credits of political science courses numbered 300 and above.

(3) **Managerial Economics.** The managerial economics option is for students who are planning for careers in business. The option can serve as a terminal program for those planning to enter the job market on graduation or as excellent preparation for students who intend to pursue an MBA. The requirements are Econ 400 or 500, 401 or 501<sup>2</sup>, 543, 575, 576, 595, and an additional 12 credit hours of Economics courses numbered 300 or above<sup>3</sup>; BA 308, and 12 additional credits from accounting or business administration courses numbered 300 or above.

To graduate with a BS degree in Economics, the student must first be admitted to advanced standing in the College of Business. This requires completion or current registration for a minimum of 85

credits and a GPA of at least 2.2 for all credits (including transfer credits) taken to the time of the petition for advanced standing. The prespecialization courses must be included in the 85 credits and must be completed with a GPA of at least 2.5. In addition, the student must have a 2.2 GPA for all economics courses taken.

**Minor in Economics.** To obtain a minor in Economics, a student must complete at least 23 credits of Economics courses, and must earn a GPA of at least 2.2 in these courses. Required courses include Econ 200, 201, 400 or 500, and 401 or 501.<sup>2</sup> The balance of the 23 credits should be taken from other Economics courses numbered 300 or above. Econ 325 may not be used for credit towards a minor. Students may not obtain more than one minor in the Department of Economics.

### **Agribusiness Management and Agricultural Economics Requirements**

Two BS degrees are offered within the department in connection with the College of Agriculture. They include the Bachelor of Science in Agribusiness Management, and the Bachelor of Science in Agricultural Economics.

**Admission.** Admission requirements for undergraduate study toward these degrees are the same as those for the University as listed on pages 8-11. Students may apply to the College of Agriculture or directly to the Department of Economics.

**Prespecialization.** All majors must complete 40 credit hours of general education courses and 9 credits of written communication courses as described on pages 21-25. In addition, the following prespecialization courses are required for a degree: Acctg 201 and 202; Ag Ec 310; BIS 140, or CS 150, or CS 170; Econ 200 and 201; and Math 105.

**Bachelor of Science in Agribusiness Management.** Students may choose one of two options within this degree, based on their career interests:

(1) **Agribusiness—Food Marketing.** This option is designed to prepare students for employment with food marketing firms and businesses and institutions that serve them. The requirements for this option include Acctg 203 and 331; Ag Ec 401, 411, 535, 560, and 575; BA 308; Econ 400 or 500,<sup>2</sup> plus 15 additional credit hours of economics courses numbered 300 or above; Stat 230 or Stat 501 and 502; a minor in Business Administration with emphasis in operations management;<sup>4</sup> and a minor in either Nutrition and Food Sciences or Computer Science. See department requirement sheet for additional information.

(2) **Agribusiness—Food Production.** This option is designed to prepare students for work in food production as farmers and ranchers, and for work with farm supply firms. The requirements for this option include Ag Ec 331, 401, 410, 411, 510, 520, and 560; BA 308; Econ 400 or 500,<sup>2</sup> plus 12 additional credit hours of economics courses numbered 300 or above; Stat 230 or Stat 501 and 502; a minor in Business Administration;<sup>4</sup> and a minor in either an agricultural science or Computer Science. See department requirement sheet for additional information.

**Minor in Agribusiness Management.** The requirements for a minor in Agribusiness are Acctg 201 and 202; Ag Ec 535, 560, and 575; and Econ 200 and 201. Econ 325 may not be used for credit towards a minor. Students may not obtain more than one minor in the Department of Economics.

<sup>1</sup>Econ 200 and 201 or their equivalent, are prerequisites for upper division Ag Ec and Econ courses.

<sup>2</sup>Economics 400, 401, 500, and 501 may not be used to satisfy the requirement for upper division electives credit in any undergraduate program in the department.

<sup>3</sup>Students may use only 3 credits total from the following courses to satisfy the 21 credit upper division requirement: Econ/Ag Ec 390, Econ/Ag Ec 425, and Econ/Ag Ec 595.

<sup>4</sup>Certain restrictions apply to the number of College of Business courses that may be used to meet the requirements of this degree. See the departmental adviser for additional information.

**Bachelor of Science in Agricultural Economics.** This degree is designed for students who plan to attend graduate school or law school, or enter a specialized career field requiring skills in quantitative analysis. The requirements for this degree include Ag Ec 331, 410, 411, 510, 520, 560, and 575; MHR 311, plus one of BA 340, 346, 350, 370, 451, 454, MHR 299;<sup>4</sup> Econ 500, 501,<sup>2</sup> 543, 575, and 576, plus 9 additional credits of economics courses numbered 300 or above; Math 215; Stat 501 and 502; and a minor in either an agricultural science or Computer Science. See department requirement sheet for additional information.

**Minor in Agricultural Economics.** The requirements for a minor in Agricultural Economics are Acctg 201 and 202; Ag Ec 410, 520, and 560; and Econ 200 and 201. Econ 325 may not be used for credit towards a minor. Students may not obtain more than one minor in the Department of Economics.

## Graduate Study

The department offers the PhD and Masters degrees in economics and agricultural economics. These are open to students with or without undergraduate majors in economics or agricultural economics. The programs are designed to prepare the student in economic theory and provide depth in an area of specific interest.

See the graduate catalog for additional information on graduate programs.

**Center for Economic Education.** The Center for Economic Education has the responsibility for strengthening economic offerings and teaching effectiveness at the elementary, secondary, and college levels. It is involved in training teachers, consultation, and research in economic education. The center works closely with the College of Education, the Extension Services, other state centers, and the Joint Council on Economic Education—the national organization.

**Economics Research Institute.** The Economics Research Center sponsors economic research and assists in the preparation of applications for research funds from outside agencies. It also acts as a clearinghouse for research materials and counsels researchers on techniques. In addition, the institute sponsors seminars on economic topics and finances the visits of off-campus economic authorities.

## Agricultural Economics Courses

**210. Farm Business Decision Making.** Introduction to the problems and alternative solutions associated with the acquisition and management of modern day farms and ranches. (3F)©

**SS 218. Economics of Consumer Choices.** Basic economic principles and concepts applied to consumer related problems, such as dealing with inflation, unemployment, investments, purchases, and retirement. (3F,Su)

**225. Introductory Internship.** Introductory level experience in internship position approved by the department. One credit for 75 hours of experience. Maximum of 6 credits. Sophomore standing. (1-6F,W,Sp,Su)

**260. Marketing of Farm Products.** Consumer demand, pricing, and markets for farm products. (3W)

**310. Computer Systems and Their Application in Agriculture.** Use of programmable calculators, microcomputers, and other computer systems in solving problems common to agriculture. (3F,Sp)

**317. Livestock Economics.** Application of farm and ranch management principles to production and marketing of livestock and livestock products. (3W)

**320. Economics of World Food Problems.** Reviews unique economic factors associated with food and agricultural problems in developed versus developing countries, and emphasizes policies needed to balance food supplies with food needs. (3Sp)

**324. Agricultural Cooperatives.** History, organization, management, financing, and marketing for and by agricultural cooperatives. Current activities and problems together with discussion of future direction. (3F)

**331. Farm Accounting and Business Analysis.** Students set up a farm accounting system on a microcomputer, enter transactions, prepare financial statements and budgets, and make cash flow and enterprise analyses. (3W)

**390. Independent Research and Reading.** (1-5F,W,Sp,Su)@

**401. Managerial Economics.** Microeconomic principles applied to economic decision-making and policy formulation with emphasis at the level of business firm and the individual consumer. Designed for undergraduate business and accounting majors. Prerequisite: Econ 201 or consent of instructor. (3F,W,Sp,Su)

**410. Farm and Ranch Management.** Principles and practices associated with the successful operation of farms and ranches. Prerequisites: Econ 201 or Ag Ec 210; Ag Ec 331 or Acctg 201; or consent of instructor. (3F)©

**411. Farm and Ranch Finance.** Financial considerations in organizing and operating farms and ranches. Transfer of property and estate planning are analyzed. Prerequisite: Ag Ec 410 or consent of instructor. (3W)

**425. Advanced Internship.** Midmanagement level experience in position approved by department. One credit for each 75 hours of experience. Maximum of 6 credits applicable to graduation requirements. Junior standing required. (1-12F,W,Sp,Su)@

**505. Current Economic Problems.** Discussion and analysis of current economic problems. May be repeated once for credit. Prerequisites: Econ 200 and 201 or consent of instructor. (1F)@

**510. Farm and Ranch Management Analysis.** Problem solutions and practices associated with organizing and operating farms and ranches, utilizing economic and management principles, budgets, linear programming, and other methods. Prerequisite: Ag Ec 410 or consent of instructor. (3Sp)

**520. Public Policy for Agriculture.** A study of agricultural policies and their impacts on product and factor markets, with major focus on an economic analysis of public policy actions. (3Sp)

**524. Economics of the Cooperative and Worker-Owned Enterprise.** Provides the student with an understanding of the structure and functioning of industrial cooperatives and other types of worker-owned enterprises in the U.S. and abroad. (3Sp)

**534. Farm and Ranch Real Estate and Appraisal.** An integrated presentation of the factors, principles, and techniques used in determining the money value of farm and ranch properties. Two lectures, one laboratory each week. (3Sp)

**535. Agribusiness Management.** Application of economic and management principles to farm marketing and supply firms. Management teams operate computer simulated farm supply firms in competition with each other. Prerequisite: Econ 201 or Ag Ec 210; Ag Ec 331 or Acctg 201; or consent of instructor. (3W)

**554. Guide to Benefit Cost Analysis and Interpretation.** Terminology, data arrangement, economic and financial considerations required in preparation of project feasibility and funding documents. Lecture plus workshop format. (3Sp)

**556. Natural Resource Economics.** Economics of developing, managing, and conserving natural resources. Topics include resource use and conservation, environmental quality, public and private resource management, and valuation of nonmarket goods. Prerequisite: Econ 401 or 501. (3F)

**560. Agricultural Marketing.** Principles and functions of marketing as applied to agriculture. Prerequisite: Ag Ec 260 or Econ 201. (3F)

**575. Applied Agricultural Price Analysis.** Analysis and movement of agricultural prices, conceptual and statistical analysis of Ag supply and demand relationships, application of price analysis, price forecasting, outlook. Prerequisites: intermediate microeconomics and statistics or econometrics. (3W)

**580. Economics of Less Developed Countries.** Theories of economic development, characteristics, and problems of less developed and developing countries, alternative techniques, and policies for the promotion of growth and development. (3F)

**585. Regional and Urban Economics.** Building on microeconomic theory, models for regional and urban structure and change are explored. Policy decision models are also developed. (3F)

**595 (d695).<sup>1</sup> Applied Economic Analysis.** Application of economic theory and tools to real-world problems. Topics will be selected from areas of current interest by Economics Department faculty members. (3Sp)

### **Graduate<sup>2</sup>**

**606. Research Methods I.** (3W)

**607. Research Methods II.** (2Sp)

**610. Agricultural Production Economics.** Prerequisite: Econ 501 or consent of instructor. (3W)

**611. Agricultural Production Decision Theory.** (3Sp)

**620. Agricultural Policy.** (3F)

**625. Graduate Internship.** (1-6F,W,Sp,Su)®

**635. Advanced Agribusiness Management.** (3Sp)

**647. Business Forecasting Methods.** (3Sp)

**656 (f555). Resource Economics.** (3F)

**660. Agricultural Marketing.** (3Sp)

**675, 676, 677. Mathematical Economics.** Prerequisites: Math 105, Econ 501. (3F) (3W) (3Sp)

**690. Readings and Conferences.** (1-5F,W,Sp,Su)®

**695 (d595). Applied Economic Analysis.** (3Sp)

**697. Thesis.** (1-12F,W,Sp,Su)®

**699. Continuing Graduate Advisement.** (1-12F,W,Sp,Su)®

**710. Advanced Production Economics.** (3W)

**720. Agricultural and Marketing Policy Analysis.** (3Sp)

**754 (f654). Welfare and Benefit Cost Analysis.** Prerequisites: Ag Ec/Econ 656, Econ 601. (3Sp)

**755 (f655). Economics of Resource Use.** Prerequisites: Basic calculus, Ag Ec/Econ 656, Econ 601. (3W)

**797. Dissertation Research.** (1-12F,W,Sp,Su)®

**799. Continuing Graduate Advisement.** (1-12F,W,Sp,Su)®

### **Economics Courses**

**100. Business Orientation.** Orients freshmen and transfer students to College of Business programs, academic and student services, professional organizations, and career possibilities. (1)

**SS 200. Economics I.** Designed for any student. Principles and institutions underlying operation of the economic system. Emphasis on government policy for reducing unemployment and inflation. (5F,W,Sp,Su)®

**SS 201. Economics II.** Designed for any student. Economics of the marketplace, analysis of issues surrounding our business and consumer institutions. (5F,W,Sp,Su)®

**SS 218. Economics of Consumer Choices.** Basic economic principles and concepts applied to consumer related problems, such as dealing with inflation, unemployment, investments, purchases, and retirement. (3F)

<sup>1</sup>Parenthetical numbers preceded by *d* indicate a dual listing; parenthetical numbers preceded by an *f* are the former course numbers.

<sup>2</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through the Life Span Learning Independent Study Division.

**225. Introductory Internship.** Introductory level experience in internship position approved by the department. One credit for 75 hours of experience. Maximum of 6 credits. Sophomore standing. (1-6F,W,Sp,Su)

**302. Economics for Teachers.** A combination principles and methods course for secondary and lower division college teachers and prospective teachers of economic subjects. Econ 200 and 201 are recommended prerequisites. (3Su)

**320. Economics of World Food Problems.** Reviews unique economic factors associated with food and agricultural problems in developed versus developing countries, and emphasizes policies needed to balance food supplies with food needs. (3Sp)

**324. Agricultural Cooperatives.** History, organization, management, financing, and marketing for and by agricultural cooperatives. Current activities and problems together with discussion of future direction. (3F)

**325. Discussions with Business Leaders.** Examines new methods for improving U.S. competitiveness by attending the Partners Program seminar sessions and hosting visiting executives from top U.S. companies. Repeatable to a maximum of 6 credits. May not be used towards an Economics Minor. (1F,W,Sp,Su)®

**390. Independent Research and Reading.** (1-5F,W,Sp,Su)®

**400. Business Fluctuations and Forecasting.** Macroeconomic analysis applied to forecasting and understanding fluctuations in the levels of income, employment, and production. Designed for undergraduate business and accounting majors. Prerequisite: Econ 200 or consent of instructor. (3F,W,Sp,Su)

**401. Managerial Economics.** Microeconomic principles applied to economic decision-making and policy formulation with emphasis at the level of business firm and the individual consumer. Designed for undergraduate business and accounting majors. Prerequisite: Econ 201 or consent of instructor. (3F,W,Sp,Su)

**425. Advanced Internship.** Midmanagement level experience in position approved by department. One credit for each 75 hours of experience. Maximum of 6 credits applicable to graduation requirements. Junior standing required. (1-12F,W,Sp,Su)®

**500. Macroeconomics.** Analysis of the underlying causes of unemployment, economic instability, inflation, and economic growth. Prerequisite: Econ 200 or consent of instructor. (4F,W,Sp,Su)

**501. Microeconomics.** Analysis of the behavior of consumers and business firms. Application of theory to the solution of real world problems. Prerequisite: Econ 201 or consent of instructor. (4F,W,Sp,Su)®

**505. Current Economic Problems.** Discussion and analysis of current economic problems. May be repeated once for credit. Prerequisites: Econ 200 and 201 or consent of instructor. (1F)®

**510. History of Economic Thought.** Origin and development of economic theories of leading thinkers in western civilization from 1750. (3W)

**511. Economic History of the United States.** Development of agriculture, industry, transportation, and finance from colonial times. (5W)

**\*512. Economic History of the Far West.** Development of agriculture, industry, transportation, and finance of the Far West with special attention to the economic development of Utah. (3W)

**\*513. Economic History of Russia.** Development of the Russian economy from earliest times to 1930, emphasizing the interaction between economic forces and policies of the state. (3Sp)

**515. Comparative Economic Systems.** History, economic theories, and comparative policies of communist, socialist, and capitalistic economies. (3Sp)

**\*\*516. Political Economy of the USSR and Eastern Europe.** Description and analysis of the contemporary economic systems of the USSR and Eastern Europe with emphasis on problems of economic policy and central planning. (3Sp)

**520. Introduction to Labor.** A review of the development of labor-management relationships and the growth of trade unionism in the United States. (3F)

**521. Industrial Relations and Collective Bargaining.** A comprehensive study of the bargaining process and scope of labor-management contracts, the day-to-day administration of agreements, and the major substantive issues in negotiations. (3W,Su)

**522. Labor Force Analysis and Manpower Economics.** Labor force development and behavior, occupational choice and mobility, human capital formation, labor market information and institutions, and manpower policies. (3W)

**523. Trade Unionism and the Law.** A survey of the law governing labor relations. The legal framework in which the collective bargaining relationship is established and in which negotiations take place is analyzed. (3Sp)

**524. Economics of the Cooperative and Worker-Owned Enterprise.** Provides the student with an understanding of the structure and functioning of industrial cooperatives and other types of worker-owned enterprises in the U.S. and abroad. (3Sp)

**529. Economic Power and American Industry.** Description and analysis of economic power in American industry. Pricing, advertising, and innovation policies of firms with market power. Case studies of selected industries. Prerequisite: Econ 401 or 501 or consent of instructor. (3W)

**530. Business and Government.** Description and analysis of government-business interaction: antitrust, price and entry regulation, consumer protection, government enterprise, patents, price controls. (3Sp)

**540. International Economics.** Primary issues in international economics including comparative advantage, trade restrictions, balance of payments, and alternative international monetary mechanisms. Prerequisite: Econ 401 or 501. (4W)

**543 (d643).<sup>1</sup> Applied Econometrics I.** An analysis of the commonly used and practiced techniques for estimating and testing linear econometric models. For first year graduate students. Prerequisites: calculus and statistics, or consent of instructor. (3F)

**544 (d644). Applied Econometrics II.** Empirical estimation and testing of linear simultaneous equation models. Prerequisite: Econ 543 or consent of instructor. (3W)

**550. Public Finance.** Government fiscal institutions-expenditure programs, budget procedures, tax systems, debt issues, levels of government, and the issues surrounding their operations. Prerequisite: Econ 401 or 501. (3F)

**551. State and Local Finance.** Unique financial problems of state and local governments. (2F)

**554. Guide to Benefit Cost Analysis and Interpretation.** Terminology, data arrangement, economic and financial considerations required in preparation of project feasibility and funding documents. Lecture plus workshop format. (3Sp)

**556. Natural Resource Economics.** Economics of developing, managing, and conserving natural resources. Topics include resource use and conservation, environmental quality, public and private resource management, and valuation of nonmarket goods. Prerequisite: Econ 401 or 501. (3F)

**560. Money and Banking.** Development of our present monetary and banking system; a critical analysis of central banking. Prerequisite: Econ 400 or 500 or consent of instructor. (4F,Sp)

**566 (d666). Training and Organizational Development.** Theoretical basis for training and development in organizations; practical experience in the design and development of training and other educational programs in an organizational setting. For graduate students. (3Sp)

**575, 576, 577. Introductory Mathematical Economics.** Survey of the principal mathematical formulations used in economic analysis. Prerequisite: Math 105. (3F) (3W) (3Sp)

**580. Economics of Less Developed Countries.** Theories of economic development, characteristics, and problems of less developed countries, alternative techniques, and policies for the promotion of growth and development. (3F)

**585. Regional and Urban Economics.** Building on microeconomic theory, models for regional and urban structure and change are explored. Policy decision models are also developed. (3F)

**586. Urban Economics.** Economics of urban structure and growth. Analysis of urban economic problems including transportation, housing, and public finance. (3W)

**595 (d695). Applied Economic Analysis.** Application of economic theory and tools to real-world problems. Topics will be selected from areas of current interest by Economics Department faculty members. (3Sp)

**610. History of Economic Thought.** (3W)

**620. Labor Economics: Contemporary Problems in Human Resources.** Prerequisite: Econ 522 or consent of instructor. (3Sp)

**622. Manpower Planning and Evaluation.** Prerequisite: Econ 522 or consent of instructor. (3Sp)

**624. Collective Bargaining in Public Employment.** (3F)

**625. Graduate Internship.** (1-6F,W,Sp,Su)®

**626. Economics of New Work Systems.** (3F)

**640. International Economics.** Prerequisite: Econ 540 or consent of instructor. (3Sp)

**643 (d543). Applied Econometrics I.** Prerequisites: calculus and statistics, or consent of instructor. (3F)

**644 (d544). Applied Econometrics II.** Prerequisite: Econ 643 or consent of instructor. (3W)

**\*\*645, 646. Operations Research.** Prerequisites: calculus and statistics, or consent of instructor. (3Sp) (3Su)

**647. Business Forecasting Methods.** (3Sp)

**650. Public Finance.** Prerequisite: Econ 550 or consent of instructor. (3W)

**656 (f555). Resource Economics.** (3F)

**666 (d566). Training and Organizational Development.** (3Sp)

**670. Econometrics.** Prerequisite: calculus and statistics or consent of instructor. (3F)

**671, 672. Theory of Econometrics.** Prerequisite: Econ 670 or consent of instructor. (3W) (3Sp)

**675, 676, 677. Mathematical Economics.** Prerequisites: Math 105, Econ 501. (3F) (3W) (3Sp)

**680. Economic Development.** Prerequisite: Econ 580 or consent of instructor. (3Sp)

**690. Readings and Conference.** (1-5F,W,Sp,Su)®

**691. Independent Research.** (1-5F,W,Sp,Su)®

**695 (d595). Applied Economic Analysis.** (3Sp)

**697. Thesis.** (1-12F,W,Sp,Su)®

**699. Continuing Graduate Advisement.** (1-3F,W,Sp,Su)®

**701. Price Theory I.** Prerequisite: Econ 601 or consent of instructor. (3Sp)

**702 (f660). Monetary Economics I.** Prerequisite: Econ 560 or consent of instructor. (3W)

**703. Price Theory II.** Prerequisite: Econ 701 or consent of instructor. (3F)

**704. Income Theory.** Prerequisites: Econ 600 and 702 or consent of instructor. (3Sp)

**754 (f654). Welfare and Benefit Cost Analysis.** Prerequisites: Ag Ec/Econ 656, Econ 601. (3Sp)

**755 (f655). Economics of Resource Use.** Prerequisites: Ag Ec/Econ 656, Econ 601. (3W)

**797. Dissertation Research.** (1-12F,W,Sp,Su)®

**799. Continuing Graduate Advisement.** (1-3F,W,Sp,Su)®

<sup>1</sup>Parentetical numbers preceded by *d* indicate a *dual* listing; parentetical numbers preceded by an *f* are the *former* course numbers.

<sup>2</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through the Life Span Learning Independent Study Division.

\*Taught 1990-91.

\*\*Taught 1991-92.

## Graduate<sup>2</sup>

**600. Income Theory.** Prerequisite: Econ 500 or consent of instructor. (4W)

**601. Price Theory.** Prerequisite: Econ 501 or consent of instructor. (4F)

**606. Research Methods I.** (3W)

**607. Research Methods II.** (2Sp)

# Department of *Electrical Engineering* College of Engineering

**Head: Professor Richard W. Harris**  
Office in Engineering Laboratory 149

**Professors** Doran J. Baker, Kay D. Baker, Joe R. Doupnik, Robert W. Gunderson, Ronney D. Harris, Alan W. Shaw, Allan J. Steed, Ronald L. Thurgood (Assoc. Dean, College of Engineering), Clair L. Wyatt; **Research Professors** Gene W. Adams, David A. Burt, Frank J. Redd, James C. Ulwick; **Adjunct Professors** Boyd P. Israelson, Linda S. Powers; **Professors Emeritus** Clayton Clark, Larry S. Cole, Bertis L. Embry, William L. Jones, L. Rex Megill, Bruce O. Watkins; **Associate Professors** John C. Kemp, Gardiner S. Stiles, Paul A. Wheeler; **Research Associate Professors** Ronald J. Huppi, Bruce R. Peterson; **Associate Professor Emeritus** Duane G. Chadwick; **Research Associate Professor Emeritus** Earl F. Pound; **Adjunct Associate Professors** Stephen E. Bialkowski, Gene A. Wäre; **Research Assistant Professors** L. Carl Howlett, Larry L. Jensen; **Adjunct Assistant Professor** Richard W. Strong; **Engineers/Lecturers** Paul D. Israelson, Jody A. Swenson

**Degrees offered:** Bachelor of Science (BS), Master of Engineering (ME), Master of Engineering Science (MES), Master of Science (MS), and Doctor of Philosophy (PhD) in Electrical Engineering

## **Objectives**

The Department of Electrical Engineering offers a balanced curriculum of class work, laboratory work, and design experiences to prepare students for careers as practicing engineers. The Bachelor of Science program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC/ABET) to assure professional status to the graduates of this department. The research program of the department, which includes undergraduates as well as graduate students, is internationally acclaimed in the field of aerospace instrumentation and measurements.

A goal of the electrical engineering program is to give each student a solid foundation in electricity, electronics, computers, communications, energy, and systems, with individual practical experience on up-to-date equipment in modern laboratories. Upon this basic foundation the student then builds expertise in advanced areas, stressing actual design practice to prepare him or her for a productive engineering career. The advanced program can be categorized into three basic areas: (1) electronics and instrumentation systems, semiconductors, integrated micro-circuits, analog and digital electronics, computers, electrooptics, electromechanics, and cryogenics; (2) information, communication, and control systems, information transmission and signal processing systems, automated systems, spectral analysis, computer-aided modeling, simulation, and optimization techniques; and (3) electrical energy, electromagnetic radiation, propagation and reception, optical/infrared engineering, particle and photon emission and detection, energy conversion, machines, and power distribution systems.

Digital and computer engineering is a rapidly expanding application area involving logic circuits, computer architecture and design, microcomputer systems, data communication networks, digital control systems, robotics, design automation, and software engineering. The Electrical Engineering Department offers an excellent program

option in digital and computer engineering which includes minors in computer science and mathematics.

In cooperation with other departments, all EE students are encouraged to complete one or more minors in computer science, mathematics, physics, or other appropriate fields of interest to the student. Dual degrees are also available with many of these departments.

## **Requirements**

Prior to entry into the upper division classes, the student must meet the standards for entry into the Professional Engineering Program. Additional information concerning these items is given in the College of Engineering write-up. It is the responsibility of the student to be aware of these rules and procedures; however, adviser assistance is available.

**Bachelor of Science.** The program leading to a *Bachelor of Science in electrical engineering* is nominally a four-year program. The required program consists of a basic foundation of mathematics, science, computer science, engineering fundamentals, and laboratory and design experiences. Advanced elective courses that provide for one or more areas of specialization, technical communication skills, and general education complete the program and prepare the student for a productive and rewarding career in the electrical engineering profession.

**Required courses** are shown in the accompanying paragraphs; however, because of differences in high school or transfer student preparation, it is strongly recommended that students meet with the college academic adviser to plan a detailed quarter by quarter schedule for completing the preprofessional requirements. Particular attention must be paid to course prerequisites, requiring some students to take longer than six quarters to complete the preprofessional program. Students transferring into the department should consult with the college academic adviser for transfer credit evaluation and proper placement in the curriculum.

AP and CLEP credit can be used to meet some of the required technical and General Education courses.

Some of the junior classes can be delayed until the senior year, but this will limit a student's choice of electives during his or her senior year. Details concerning courses acceptable as EE and technical electives are available from the Electrical Engineering Department.

## **Preprofessional Program**

**Freshman Year:** Math 220, 221, 222; CS 170, 171, 172; Chem 121; Phyx 221; EE 120; Engl 101; and 8-11 credits of General Education electives.

**Sophomore Year:** Math 320, 321, 322; Phyx 222, 223; EE 211, 212, 251, 252; Engl 200 or 201; and 13 credits of General Education or technical electives.

## **Professional Program**

**Junior Year:** EE 303, 308, 311, 312, 313, 314, 315, 346, 347, 352, 358, 375, 391, 392; and Econ 200.



**Senior Year:** EE 480, 487, 491, 492; 12-24 credits EE electives; 8-18 credits engineering electives; 0-12 credits computer science electives; 5-15 credits of math and science electives; and 0-6 credits of EE practicum, teaching, and communication electives, for a total of 41 credits of technical electives.

### Student Research Opportunities

The academic disciplines are given meaningful application as part of the University's commitment to human, atmospheric, water, energy, and ecological resources, and to the exploration of space. Numerous motivated students, undergraduate as well as graduate, are given exciting hands-on experience on projects, such as working with instruments being flown on the Space Shuttle. USU's world famous space program was spawned by the Electrical Engineering Department. Programs are also active in digital systems, robotics, artificial intelligence, computer and communication networks, optics, large-scale integrated circuits, and computer-aided teaching and design.

Several research units are associated with the Electrical Engineering Department. The Center for Space Engineering conducts research primarily in infrared energy measurements and advanced instrumentation development and performs rocket and satellite measurements of upper atmospheric and space phenomena. The Center for Atmospheric and Space Sciences performs theoretical analyses and carries out experiments in the study of the physics and chemistry of the terrestrial atmosphere and magnetosphere and of the solar system. Image compression is currently a major focus in the department. Graduate students have opportunities in developing algorithms, VLSI chips, and printed circuit subsystems for use in image compression systems. The Digital Systems Laboratory conducts undergraduate and graduate research in the development of digital systems with emphasis upon microprocessor applications. The Utah Water Research Laboratory, the Agricultural and Irrigation Engineering Department, and the Electrical Engineering Department are active in high-tech water resource management.

### Graduate Study

The Department of Electrical Engineering offers the following degrees: Master of Engineering (ME), Master of Engineering Science (MES), Master of Science (MS), and Doctor of Philosophy (PhD) in Electrical Engineering. See the graduate catalog for information on these programs.

### Electrical Engineering Courses

**120. Basic Computer Skills.** Develops competence in using a computer for electrical engineering. (2F,W,Sp,Su)

**211, 212. Electrical Circuits.** Basic electrical quantities and components, Ohm's Law, Kirchhoff's Laws, network theorems, loop and nodal methods, DC, AC, and transient analysis. Develops skills in laboratory measurements and instruments. Three lectures, one lab. Prerequisite: Phyx 222. Math 322 must be taken concurrent with EE 212. (4W,Sp,Su) (4F,W)

**225. Introductory Internship/Co-op.** An introductory-level planned work experience in industry. Detailed program; must have prior approval. Written report required. (3F,W,Sp,Su)

**251, 252. Digital Circuits.** Digital and microcomputer fundamentals, discrete signals, number systems, codes and arithmetic logic operations, analysis and design of combinational and sequential logic circuits. Three lectures, one lab. (3F,Sp) (4F,W)

**303. Electrical Networks and Circuits.** Network analysis including passive and active elements, energy, transients, resonance, differential equations, and Laplace transform techniques. Prerequisite: EE 212. (3F,W)

**308. Electrical Energy Systems.** Multiphase AC systems, fundamentals of electromagnetic energy generation, control, and conversion. Introduction to machinery, power transducers, and transformers. Prerequisite: EE 211. (3F,W,Sp)

**311, 312. Signal Analysis.** Analysis of signals in linear systems, including discrete and continuous Fourier analysis, sampling, spectral density, noise, and communications. Prerequisites: EE 212 for 311; EE 311 for 312. (3F,W) (3W,Sp)

**313. Systems.** System models, block diagrams, signal flow graphs, and feedback concepts. Time domain and transform domain methods of system analysis. Three lectures, one lab. Prerequisite: EE 303. (4W,Sp)

**314, 315. Electromagnetics.** Electromagnetic forces and fields, charge and current distributions, Maxwell's equations, electromagnetic energy and power, electromagnetic waves, radiation, propagating waves, transmission lines, waveguides, and antennas. Three lectures, one lab. EE 314 must be taken before EE 315. (3F) (3W)

**346, 347. Electronic Analysis and Design.** Introduction to semiconductors, diodes, transistors, amplifier circuits, operational amplifiers, and integrated circuits. Three lectures, one lab. Prerequisite: EE 212. (4F,W) (4W,Sp)

**352. Microcomputers.** Microprocessor architectures, instruction sets, and assembly language programming with emphasis on software design techniques. Three lectures, one lab. Prerequisites: EE 252, CS 171. (4F,Sp)

**358. Microcomputer Systems.** Synthesis of microcomputer systems, and analysis of microcomputer system components and interfacing to peripherals, including signal requirements such as loading, timing, and interrupts. Three lectures, one lab. Prerequisite: EE 352. (4F,W)

**375. Seminar.** Weekly meeting of undergraduate students with faculty and representatives from industry to promote professionalism and prepare students for an engineering career. Repeatable with 2 credits required for graduation. P/D+, D, F grading. (1F,Sp)@

**391. Introduction to Design.** Preparation for senior design projects and writing and oral presentation of an individual project proposal. Prerequisite: Upper division standing. (2F,W,Sp,Su)

**392. Design I.** Individual or team engineering project, including design, development, and testing. Written reports required. Prerequisite: EE 391 and senior standing. (2F,W,Sp,Su)

**425. Advanced Internship/Co-op.** A planned work experience in industry. Detailed program; must have prior approval. Written report required. (3F,W,Sp,Su)

**463. Electricity and Magnetism.** Electromagnetic phenomena as it applies to statics, dynamics, and circuits. (3Sp)

**480. Applied Electronics.** Electronic devices and circuits for instrumentation, communication, control and power applications. Three lectures, one lab. Prerequisite: EE 347. (4F,Sp)

**487. Digital System Design.** Hardware and software engineering of digital systems. Topics basic to the interfacing of microprocessors in control applications and to the design of digital computers. Three lectures, one lab. Prerequisite: EE 358. (4W,Sp)

**491. Design II.** Individual or team engineering project, including design, development, and testing. Written reports required. Prerequisite: EE 392 and senior standing. (2F,W,Sp,Su)

**492. Technical Reporting.** Written and oral reports describing technical details of design project. Prerequisite: EE 491. (2F,W,Sp,Su)

**493. Special Studies for Undergraduates.** Independent or group study of engineering problems not covered in regular course offerings. (1-5F,W,Sp,Su)@

**500. Introduction to Aeronomy.** A survey of the properties and processes in the upper atmosphere. Atmospheric structure, magnetospheric phenomena, the ionosphere, solar terrestrial relationships, aurora and airglow, and atmospheric reactions. (3Sp)

**506. VLSI Design Techniques.** Basic course in microcircuit design, modeling, and simulation. Computer-aided analysis for VLSI design and verification. Study of NMOS and CMOS processes. (3F)

**507. Very Large Scale Integrated Circuit Design.** Procedures for the design of VLSI circuits. Emphasis on top-down design. Structured, interactive computer-based layout and design verification techniques. A full circuit design is completed in EE 507. Exposure to GaAs technology in EE 608. (3W)

**509. Electrical Energy Devices.** Electrical energy devices such as machines, transducers, and transformers. Introduction to power generation, distribution, and control. Two lectures, one lab. Prerequisite: EE 308. (3)

**510, 511. Control Systems.** Analysis and design of control systems. Transfer function and state space techniques in the engineering of continuous and discrete control systems. Three lectures, one lab. Prerequisite: EE 313. (4F) (4W)

**515. Automated Systems.** Sensors, electromechanical components, and microprocessor controllers in engineering of robotic and other automatic systems; electrical transducers for position, velocity, pressure, light, heat, sound; servomotors, actuators, manipulators, encoders. Three lectures, one lab. Prerequisites: EE 313, 358. (4Sp)

**540, 541. Microwave Electronics.** Circuit parameters and design techniques for distributed circuits, active and passive microwave devices. Three lectures, one lab. Prerequisites: EE 315 and 347. (4F) (3W)

**550. Digital Signal Processing.** Theory and principles of digital signal processing, including discrete-time signals and systems, Z-transforms, Fourier analysis, FIR digital filters, and discrete Fourier transforms. (4F)

**554. Communication Systems.** Engineering of analog and digital communication systems. Signal analysis, modulation-demodulation, channel properties, and introduction to communication standards and protocols. Prerequisite: EE 312. Three lectures, one lab. (4W)

**564. Solid-state Materials-devices.** Modeling of electrical and electromagnetic characteristics of solid-state semiconductor materials. Operating principles of semiconductor and optical solid-state devices used in electrical engineering. Prerequisites: EE 314 or Phyx 461, Math 322. (3)

**581. Applied Electronics.** Electronic circuits and systems analysis and design of integrated circuit devices. Three lectures, one lab. Prerequisite: EE 480. (4W)

**586. Computer Structure.** Theory and organization of computer structures: number representations, computer arithmetic, processors, control units, memories, interconnection networks, parallel architectures, and performance trade-offs. (3F)

**588. Digital System Design.** Hardware and software engineering of digital systems. Topics basic to the interfacing of microprocessors in control applications and to the design of digital computers. Three lectures, one lab. Prerequisite: EE 358. (4Sp)

**591, 592. Teaching Engineering.** Teaching principles, techniques, and laboratory experience in engineering. Instruction and experience in teaching engineering lectures, recitation, and laboratory sections. One scheduled session per week with other sessions arranged. Prerequisite: department head approval. (3F,W,Sp,Su) (1-3F,W,Sp,Su)

**593. Special Topics in Electrical Engineering.** Independent or group study of engineering problems not covered in regular course offerings. (1-5F,W,Sp,Su)

### Graduate<sup>1</sup>

**601. Stochastic Processes in Electronic Systems.** (3F)

**608. Very Large Scale Integrated Circuit Design.** (3Sp)

**\*611 (f570), \*612 (f571).<sup>2</sup> Optical Engineering.** (3F) (3W)

**\*631, \*632. Space Science and Engineering.** (3W) (3Sp)

**640, 641. Computer Networking.** (3W) (3Sp)

**642. Analog VLSI Design.** (3Sp)

**643. Monolithic Microwave Integrated Circuit Design.** (3Sp)

**650, 651. Digital Image Processing.** (3W) (3Sp)

**652, 653. Control Theory.** (3F) (3W)

**\*\*657, \*\*658, \*\*659. Applied Plasmadynamics.** See Phyx 657, 658, 659. (3F) (3W) (3Sp)

**661, 662. Electromagnetics and Plasmas.** (3F) (3W)

**680. Electrical Engineering Colloquium.** (1F,W,Sp,Su)®

**687, 688. Computer Structure.** (3W) (3Sp)

**693. Special Topics in Electrical Engineering.** (1-5F,W,Sp,Su)®

**695. Design Project.** (3F,W,Sp,Su)

**697. Thesis Research.** (1-9F,W,Sp,Su)®

**699. Continuing Graduate Advisement.** (1-12F,W,Sp,Su)®

**701, 702, 703. Aeronomy.** See Phyx 701, 702, 703. (3) (3) (3)<sup>3</sup>

**704. Ionospheric Physics.** See Phyx 704. (3)<sup>3</sup>

**706. Circulation of High Atmosphere.** See Phyx 706. (3)<sup>3</sup>

**\*711, 712. Electro-optics.** (3) (3)<sup>3</sup>

**742, 743. Design and Analysis of Advanced Integrated Circuits.** (3) (3)<sup>3</sup>

**752, 753. Advanced Control Theory.** (3) (3)<sup>3</sup>

**764, 765. Digital Computer Architecture.** (3) (3)<sup>3</sup>

**770, 771. Communications and Signal Processing Theory.** (3) (3)<sup>3</sup>

**781. Seminar.** (1F,W,Sp,Su)<sup>3</sup>®

**793. Special Problems in Electrical Engineering.** (1-9F,W,Sp,Su)®

**797. Dissertation Research.** (1-16F,W,Sp,Su)®

**799. Continuing Graduate Advisement.** (1-12F,W,Sp,Su)®

<sup>1</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

<sup>2</sup>Parenthetical numbers preceded by an *f* are the *former* course numbers.

<sup>3</sup>Taught on demand.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

\*Taught 1990-91.

\*\*Taught 1991-92.

## Department of *Elementary Education* College of Education

**Head:** Professor Jay A. Monson  
Office in Emma Eccles Jones Education 385

**Professors** Oral L. Ballam, Donald R. Daugs, Bernard L. Hayes, L. Gail Johnson; **Professors Emeritus** Bryce E. Adkins, E. Malcom Allred; **Associate Professor** Deborah A. Byrnes; **Assistant Professors** Francine Fukui, Richard K. Harmston, Amalya Nattiv, John A. Smith, Deanna D. Winn; **Student Teaching/Field Experience Coordinator** Kathleen O. Johnson; **Advisers** Sheri N. Noble, Sylvia Robinson, Mary Ann Warren; **Temporary Instructor:** Deborah Hobbs; **Adjunct Instructors** Dorothy Dobson, Prent Klag, Rose Newman, Annette Packard, Kaye Rhees; **Temporary Lecturer** Jayne O. Leaman

**Degrees offered:** Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), Master of Arts (MA), and Master of Education (MEd) in Elementary Education; BS and BA in Early Childhood Education; Doctorate of Philosophy in Education (PhD) or Doctorate of Education (EdD) with emphasis in Elementary Education; Certification Endorsement in Early Childhood Education, Middle Education, Gifted and Talented Education

### Objectives

The purposes of the Department of Elementary Education are (1) to develop professional educators and (2) to advance knowledge in the field of education. These purposes are realized through teaching, scholarly activities, and service. The department provides leadership in the preparation of teachers, supervisors, curriculum specialists, and other professional personnel for careers in elementary education, early childhood education, and middle education.

The Department of Elementary Education at Utah State University offers three programs leading to certification as a teacher. (1) Elementary education: this program offers certification to teach in grades one through eight in the public schools. (2) Early childhood education: this program offers certification to teach prekindergarten, kindergarten, and grades one through three in the elementary school. (3) Middle education: this program offers certification to teach in grades five through eight.

### Requirements

**Departmental Entrance Requirements.** Students who wish to be admitted to the Department of Elementary Education must have an overall grade point average of 2.7. Early in the sophomore year the student should apply for admission to the teacher education program (see page 38). A minimum GPA of 2.7 is also required to remain in good standing and to graduate from the program.

**Elementary Education SODIA Program.** The acronym SODIA represents the elementary teacher education program. The name is derived from the initial letter of descriptive words (Self, Others, Disciplines, Implementation, and Associate teaching) which represent emphasis placed at each level of the program.

The elementary education SODIA program is performance-based and field-centered. It utilizes public schools as partners in each phase of the teacher education program. SODIA is an interdisciplinary and interdepartmental program utilizing staff members from the Departments of Psychology, Special Education, Family and Human Development, Health, Physical Education and Recreation, and In-

structional Technology who work in conjunction with the Department of Elementary Education. These University faculty members work with teachers and principals of cooperating public schools and the Edith Bowen Laboratory School on the USU campus in an integrated program.

**Level I, Self,** is represented by the "S" in the acronym SODIA. This is the first level course introducing the field of education and emphasizing the student's self-understanding in relation to ability and desire to teach. A minimum of 10 hours are spent observing in an elementary or middle school classroom.

**Level II, Others,** is represented by the "O" in the acronym SODIA. In this bloc, students receive 15 credits and are assigned as a teacher assistant in one of the public schools. The remainder of the time is spent in seminars and classwork offered on the USU campus.

**Level III, Disciplines,** is represented by the "D" in the acronym SODIA. Students in this bloc receive 15 credits and are assigned to classroom and seminar experiences at the Edith Bowen Laboratory School. The "methods" courses in reading, social studies, language arts, and mathematics are included in this bloc. A five-credit science methods course and a preliminary course in reading are required as a transition from Level II to Level III.

**Level IV, Implementation,** is represented by the "I" in the acronym SODIA. This is the student teaching or internship phase of the program. Student teaching constitutes full days of actual teaching experience for the full quarter. Internships are for the full academic year.

**Level V, Associate Teaching,** is represented by the "A" in the acronym SODIA. Associate teaching is optional and is an individualized program for students who have successfully completed their student teaching, or for those opting for the internship, and/or who wish additional experience in the schools.

Admission to the teacher education program is a prerequisite for enrollment in Level II. A student desiring admission to this program should file an application in the Teacher Education Office, located in room 103 of the Jones Education Building.

All students majoring in elementary education must be registered in the College of Education. An adviser will be assigned from the Department of Elementary Education. Programs of professional education courses as well as courses for fields of concentration or subject matter minors have been developed by the Department of Elementary Education and approved by the Council on Teacher Education and the Utah State Office of Education. For a complete description of the program and requirements for graduation and certification, students should obtain a copy of the *Department of Elementary Education Student Program Planning Guidebook*, available from the USU Bookstore.

Each student completes a professional quarter of student teaching or a year of internship. An application for student teaching/internship must be made at least two quarters in advance and credentials are reevaluated at that time. Not all student teachers/interns can be accommodated by the schools located within Cache County. Students should be financially prepared to spend that time off campus in the event such an arrangement is necessary.

Students who carefully select their elective courses may also qualify for a special endorsement to the basic professional teaching certificate, or may develop an area of specialization in a subject matter field in addition to the subject matter minor and the teaching support minor. Examples of these areas may be instructional technol-

ogy, early childhood education, special education, or middle education. Information concerning special endorsements and additional areas of specialization may be obtained from the Department of Elementary Education.

Students who have teaching certificates in areas other than elementary education may obtain the elementary certificate by meeting the same or equivalent requirements for certification expected of an elementary education major. Those desiring to acquire dual certification should work with an adviser from the Department of Elementary Education.

All courses listed as major subject courses must be taken on an A-B-C-D-F basis and the grade point average for these courses must be 2.7 or better; major subject courses passed with less than a C grade must be repeated.

For more information concerning requirements for University graduation and for basic professional teaching certification in elementary education, early childhood education, and middle education, see major requirement sheets available from the Elementary Education Department Advisement Center, Emma Eccles Jones Education 373.

### **Scholarship Information**

The following scholarships are available to junior and senior students: Edith Bowen, Frye, Stewart, DeHart, Kurzhals, Jackson, and Taylor. To be eligible, students must have completed Level II of the Elementary Education Program and have a cumulative GPA of 3.5. Applications are available at the Elementary Education Department and are due on April 1.

### **Graduate Study**

The Department of Elementary Education, as an integral part of the College of Education, assists in the preparation of graduate students seeking the MEd, MA, and MS degrees, and the PhD or EdD degree. Students desiring information concerning the various graduate programs should consult with the department head and write to the School of Graduate Studies for a graduate catalog which contains the details on the various graduate programs. Application for admission to a graduate program is made through the School of Graduate Studies.

### **Elementary Education Courses**

**100. Orientation to Elementary Education—Level I.** Students will assess themselves as prospective teachers and have an opportunity to do observations in the public schools grades kindergarten through eighth. (3F,W,Sp)

**301. Foundation Studies in Teaching—Level II.** Examines and evaluates varying philosophies and basic principles of elementary education. Students will observe and participate in public school teaching activities. Prerequisite: admission to teacher education. (5F,W,Sp)

**302. Practicum in Elementary Education—Level II.** Credit for practicum work in the public schools in Level II of the training program. Advance application required. Prerequisite: admission to teacher education. (1-9F,W,Sp)

**400. Teaching Reading.** Considers stages of reading development, skills, attitudes, materials, methods of instruction, and experiences of children which contribute to achievement in reading. Prerequisites: admission to teacher education and Level II; must be taken prior to Level III. (3F,W,Sp,Su)©

**401. Teaching Science.** Investigation and practical application of science programs, materials, techniques of instruction, and experiences to help children gain skills, understanding, and attitudes in science. Prerequisites: admission to teacher education;

completion of Level II; and Biol 101, Chem 101, Geol 101, and Phyx 120 or their equivalents; must be taken prior to Level III. (5F,W,Sp,Su)

**402. Practicum in Elementary Education—Level III.** Credit for practicum work at the Edith Bowen Laboratory School in Level III of the training program. Advance application required. (1-6F,W,Sp)

**403. Teaching Language Arts—Level III.** A study of language development in children and its implication for classroom practice in listening, speaking, writing, and reading. Advance application required. Prerequisite: admission to teacher education. (3F,W,Sp)

**404. Developmental and Corrective Reading—Level III.** Intended to give prospective teachers practical experience in implementing developmental reading programs and in diagnosing reading difficulties. Prerequisite: admission to teacher education and EI Ed 400. (3F,W,Sp)

**405. Teaching Social Studies—Level III.** Organizing the elementary curriculum to provide social studies experiences consistent with the nature of the child and our democratic society. Prerequisite: admission to teacher education. (3F,W,Sp)©

**406. Teaching Mathematics—Level III.** The place of mathematics in the elementary school curriculum; methods of teaching several grades. Prerequisite: admission to teacher education. (3F,W,Sp)

**425. Advanced Cooperative Work Experience.** Cooperative education work experience position; increased level of complexity and a more professional level of experience as student advances toward completion of the program. (1-15F,W,Sp,Su)©

**447. Current Early Childhood Practices.** Application of early childhood philosophy, curriculum, and methodology to the classroom—kindergarten through third grade. (3)

**448. Early Childhood Education (K-3).** Study of early childhood (K-3) curriculum, methodology, and learning environments. (5W,Sp)

**450. Elementary Curriculum Seminar—Level IV.** A weekly seminar taken concurrently with the professional quarter of student teaching or the first quarter of the internship. Consideration given to problems arising during the teaching experience. Prerequisites: admission to teacher education and completion of Levels I, II, and III. (3F,W,Sp,Su)

**460. Student Teaching in Elementary Schools—Level IV.** Actual teaching experience in public school classrooms for a full quarter to provide in-depth understanding of the total elementary program. Advance application required. (3-12F,W,Sp,Su)

**465. Student Teaching in Early Childhood Education (Kindergarten).** The student will be assigned to a cooperating teacher in a public school kindergarten. (3-6F,W,Sp,Su)

**466. Student Teaching in Early Childhood Education (Gr 1-3).** The student will be assigned to a cooperating teacher in a public school primary grade (1-2-3). (3-12F,W,Sp,Su)

**468. Associate Teaching in the Elementary Schools—Level V.** For undergraduates whose previous performance in student teaching indicates great teaching potential and who wish additional experience. Also utilized for internship program. (3-12F,W,Sp,Su)©

**556 (d602).<sup>1</sup> Practicum in Improving School System Programs.** A field-based program focusing upon characteristics of effective teaching methodologies, teaching performance, curriculum decision making, value guidelines, and the characteristics of the learner. Cannot be used for masters degree. (1-6)©

**590. Independent Study.** (1-3F,W,Sp,Su)©

### **Graduate<sup>2</sup>**

**600. Classroom Management.** (3)

**601. Practicum in Evaluating School System Programs.** (1-6)©

**602 (d556). Practicum in Improving School System Programs.** (1-6)©

**615. Foundations of Curriculum Development.** (3)

**620. Improvement of Early Childhood Education.** (3)

**621. Workshop in Childhood Education.** (1-3)

**622. Workshop in Early Childhood Education.** (1-6)

**623. Early Childhood Methods and Curriculum.** (3)

- 624. Workshop in Science Education. (3)
- 626. Supervised Practicum in Early Childhood Education. (3)
- 630. Workshop in Mathematics Education. (1-3)
- 633. Supervision and Administration Internship. (3)®
- 634. Issues in Teaching of Reading. (1-9)
- 635. Diagnosis of Reading. (3)
- 636. Remedial Reading Instruction. (3)
- 637. Practicum in Remedial Reading. (3)
- 640. Current Problems in Elementary Education. (3)
- 644. Creative Education. (3)
- 646. Education of the Gifted and Talented. (3)
- 647. Identification and Evaluation in Gifted Education. (3)
- 648. Materials and Methods in Gifted Education. (3)
- 649. Supervised Practicum in Gifted Education. (3-6)
- 650. Interdisciplinary Workshop. (1-3)
- 655. Practicum in the Evaluation of Instruction. (1-6)®
- 656. Practicum in Improvement of Instruction. (1-6)®
- 661. Preparing Inservice Educators for Implementation of Middle School. (3-12)
- 665. Improvement of Reading Instruction. (3)
- 670. Improvement of Science Instruction. (3)
- 671. Multicultural Education. (3)
- 675. Improvement of Mathematics Instruction. (3)
- 680. Improvement of Social Studies Instruction. (3)
- 681. Research Seminar. (1)®

- 685. Improvement of Language Arts Instruction. (3)
- 690. Independent Study. (1-3)®
- 691. Independent Research. (1-3)®
- 696. Masters Project. (3)
- 697. Thesis. (1-12)®
- 699. Continuing Graduate Advisement. (1-12)®
- 702. History and Philosophy of Early Childhood. (3)
- 705. Internship in Program Evaluation. (1-6)®
- 706. Internship in Research. (1-6)®
- 712. Student Teaching Supervision. (1-6)
- 733. Supervision Internship. (3-12)
- 735. Internship in Curriculum Development. (1-6)
- 750. Interdisciplinary Workshop. (1-3)
- 755. Evaluation of Supervisory Performance. (1-6)
- 781. Research Seminar. (1-6)®
- 790. Independent Study. (1-3)®
- 791. Independent Research. (1-3)®
- 797. Dissertation. (1-12)®
- 799. Continuing Graduate Advisement. (1-12)®

<sup>1</sup> Parenthetical numbers preceded by *d* indicate a *dual* listing.

<sup>2</sup> Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through the Life Span Learning Independent Study Division.

## Department of *English* College of Humanities, Arts and Social Sciences

**Head:** Professor Jeffrey Smitten  
Office in Ray B. West 201

**Assistant Head:** Associate Professor Christine Hult  
Office in Ray B. West 201B

**Professors** Jay Anderson, Kenneth B. Hunsaker, Joyce A. Kinkead, Thomas J. Lyon, Willis L. Pitkin, Jr., Reed C. Stock, Barre Toelken, Eugene H. Washington; **Professors Emeritus** Jarvis L. Anderson, T. Y. Booth, John M. Patrick; **Associate Professors** Jan Bakker, Kate M. Begnal, Kenneth W. Brewer, Patricia Gardner, Jan E. Roush, John A. Scherting, Ronald R. Shook, Steve Siporin, Dean O. Skabelund; **Associate Professor Emeritus** Ronald W. Smith; **Assistant Professors** Theodore Andra, David B. Arnett, Zenna Beth Crockett, Sonia S. Manuel-Dupont, Shirlene M. Pope, Anne Shifrer,

Roberta S. Stearman; **Assistant Professors Emeritus** Coralie Beyers, Idella B. Larson; **Lecturers** John A. Butler, Nancy O'Rourke

**Degrees offered:** Bachelor of Science (BS), Bachelor of Arts (BA), Master of Arts (MA), and Master of Science (MS) in English; BS, BA, MA, and MS in American Studies

### *Objectives*

The Department of English offers a variety of courses designed to prepare students for careers in teaching, mass communications, technical writing and editing, and in public relations, as well as to provide preprofessional background for those who plan to continue their study at the graduate or professional levels. Through the English program, students are expected to achieve the following at a level

appropriate to baccalaureate training: (1) competency in English composition, (2) insight into the nature of the English language and into language as a generic concept, and (3) experience with and an understanding of literature.

Seven programs are available for undergraduate study: (1) the standard English major, (2) English major writing emphasis, (3) the English teaching specialization, (4) the English teaching composite major, (5) the English teaching minor, (6) the standard English minor, and (7) the American Studies major.

## Requirements

To graduate with a major in English, students must complete a prescribed program of the department and, in addition, should either qualify for the Bachelor of Arts (BA) degree by achieving a two-year level of competency in a foreign language or the Bachelor of Science (BS) degree without the foreign language competency. Along with either degree program, students may apply for admission to the teacher certification program if they intend to qualify for teaching at the secondary school level (see page 38 and 163-164 for procedures and requirements pertaining to teacher certification as well as the current edition of *Guide to Undergraduate Program in Secondary Education* published by the USU Department of Secondary Education). All English majors and minors must have a GPA of 2.5 or higher in their English courses in order to remain matriculated in English and to obtain official approval for graduation as English majors or minors.

English or American Studies majors may satisfy the University's written communication requirement by taking either English 101 or 111 and either English 200 or 201. English majors are required to complete an additional 6 credits in upper division writing courses.

**Departmental Admission Requirements.** All new students are admitted to the English Department as English or American Studies majors if they have satisfied the requirements for admission to the College of Humanities, Arts and Social Sciences. Students who have been admitted to other colleges but desire to change their major to English or American Studies must present an official copy of their University work to the head of the English Department for approval.

Students registered with the College of Education or other colleges who desire teaching certification in English must be interviewed by the head of the English Department to obtain approval for admission to the teaching major or minor programs in English.

All courses listed as major or minor subject courses must be taken on an A-B-C-D-F basis, and the grade point average for these courses must be 2.5 or better; major subject courses passed with less than a C- grade must be repeated.

### General Education Written Communication Requirement.

See page 21 for information on the University requirement for written communication. Additional information may be obtained from college and department sections in this catalog, college advisory offices, and departmental advisers.

**Major Requirements.** Each English major is required to take English 190, 212, and 200-level survey courses in American, British, or World Literature. The student may demonstrate a background in the survey courses by Advanced Placement examination, by passing the appropriate CLEP tests, or by presenting evidence of equivalent course work. The student should complete as soon as possible the written communication requirement and those courses required of all majors. Upper division courses should not be taken until the lower division requirements have been completed.

**Standard English Major.** The student is required to complete from 51 to 57 credits in courses provided by the English Department, and an additional 12 credits in complementary courses from other areas such as history, philosophy, and communications. However, the complementary courses may be replaced by additional English courses used to help the student develop an area of concentration in language, literature, or writing.

**Course Requirements.** The following technical courses should be taken in sequence: Engl 409, 410, and 510. Students must select at least 6 credits of course work in writing at the 300 level or above. Students are to complete 21 credits in American and English literature by selecting one class from each of the following seven groups: (1) Engl 535 or 538; (2) Engl 539 or 540; (3) Engl 541 or 556; (4) Engl 561 or 562; (5) Engl 563 or 564; (6) Engl 565 or 566; (7) Engl 548 or 567. Students must select at least 6 credits of upper division course work dealing in literature from areas other than the United States and Britain. Students must select 6 credits of course work to represent the study of two different major British authors (Chaucer, Shakespeare, Milton). Students should select course work in specialty areas. These courses must have prefix numbers of 300 or above, and courses should represent three of the following areas: poetry, fiction, drama, criticism, folklore, or other specialty area.

**English Major Writing Emphasis.** In addition to the lower division requirements for all English Majors, students in the writing track are required to complete six credits of lower division course work selected from Engl 109, 202, 203, or 210. Upper division requirements include nine credits in technical courses selected from Engl 405, 410, 413, and 509; 15 credits in writing courses selected from Engl 301, 305, 413, 427, 501, 502, 504, and 597; 15 credits in literature courses with either 587 or 588 required and additional credits distributed among American, British, and world literature. Students are also to develop a 15-credit elective component with the aid of an adviser.

**English Teaching Major.** In addition to the lower division requirements for all English majors, students in the teaching major are required to take Engl 401 (Prerequisite: Engl 301 or SecEd 306), 405, 415, 418; the following in sequence: Engl 409, 410, 510; Engl 417, 587, or 588; 3 credits in world literature, 6 credits in both American and British literature; and 3 credits in folklore/genre/specialty area.

Because the teaching major requirements are subject to State Board of Education changes in certification requirements and the changing needs of secondary schools, students should check the current edition of *Guide to Undergraduate Program in Secondary Education* or the English Major Requirement Sheet, available from the English Department, for an exact list of requirements.

**Composite Teaching Major.** Students in this major should complete the lower division English requirements before admission to the teacher education program and before beginning upper division work. In addition to all of the courses required for the Teaching major, the following requirements must be met: Engl 210 plus 3 additional credits in world literature; 12 credits in ancillary subjects, including 3 credits in communications, ThArt 523, El Ed 400, and one of the following: ThArt 105, 109, 121, and 246.

**English Teaching Minor.** After obtaining approval for admission (see departmental admission requirements above), students must complete the following 30-credit requirement: Engl 212, 251, Engl 260 or 261, Engl 216 or 217, Engl 401 (Engl 301 is a prerequisite), 410, Engl 417 or 418, Engl 587 or 588; and SecEd 320.

Any deviation from this plan must have prior approval from the head of the English Department.

**Standard English Minor.** Graduation approval for a nonteaching minor in English will be given for a program which includes the following minimum requirements: 10 credits of lower division literature, 6 credits of upper division writing, and 12 credits of upper division literature and/or English language study.

The program must represent a balanced study of literary genres and periods, English language study, and composition. It must be approved by the head of the English Department at least one year prior to graduation.

**American Studies Major.** The American Studies program is supervised by the American Studies committee, comprised of representatives from participating departments. As an interdepartmental program, it is designed to allow students maximum freedom in pursuing academic interests by permitting a choice of an area of concentration and relevant courses from the offerings of a variety of departments. The interdisciplinary structure of the program offers students an opportunity to integrate studies in various fields into a broad understanding of American culture and its antecedents.

Students interested in a teaching career have available a special American Studies curriculum. To meet requirements for certification, they should start working on this program early. Specific requirements are outlined as an option in the Composite Major in Social Studies in the *Guide to Undergraduate Program in Secondary Education*.

Upon declaring intention to major in American Studies, students will be assigned an adviser from the department in which concentrated work is planned. With the assistance of an adviser, students will plan programs which (1) meet the standard lower and upper division requirements for the BA or BS degree; (2) meet any specific requirements of the department in the area of concentration; (3) offer preparation for a professional role after graduation; and (4) respect the interdisciplinary spirit of American Studies.

In most cases, American Studies majors must complete a minimum of 35 credits in the area of concentration. Although no minor is required, students must also earn an additional 35 credits in other fields which will broaden understanding of American culture. Courses in at least three of the following fields (excluding the area of concentration) must be represented in the distribution of the 35 credits: history, geography, literature, philosophy, psychology, sociology, anthropology, political science, and economics.

American Studies majors are required to take two interdisciplinary course blocks ("Main Currents in American Culture" and "The American Frontier"). These will occupy most of two quarters.

For additional information concerning the American Studies program, check with the director, John A. Scherting (office in Ray B. West 304A).

## Financial Support

In addition to the scholarships, assistantships, grants-in-aid, and work study programs available through the University, the department employs a few students to work as peer tutors in The Writing Center. The department also oversees some cooperative education and internship opportunities for students.

**Scholarships.** English Department scholarships are available on a competitive basis for sophomores, juniors, and seniors. Applications are accepted in March. See the English Department for more specific information.

## Graduate Study

The Department of English offers the MA or MS degree for English majors and either the MA or MS degree for American

Studies majors. See the current issue of the graduate catalog for further information. Application for admission to a graduate program is made through the School of Graduate Studies.

## English Courses

**Note:** Only Engl 113, 114, 115, 120, 121, 122, 124, 126, and 311 may be used for Humanities credit in General Education by students entering Utah State University fall 1983 and subsequently. Engl 526 may be used for Integrative Option credit.

**001. Basic English.** Developing writing skills through peer-group work and conferences; for students needing additional writing practice before taking Engl 101 or 111. (3F,W,Sp)®

### Lower Division

**WC 101. English Composition.** Developing writing strategies and skills in fluency and revision. (3F,W,Sp,Su)

**WC 105. Vocational English.** Writing in such specialized forms as letters, resumes, and reports; for one- or two-year vocational students. (3)

**109. Elements of Grammar.** (3)©

**WC 111. Strategies of Writing.** Analyzing and composing written discourse; a pass/fail equivalent of Engl 101. (3F,W,Sp,Su)

**HU 113. Great Literature of Europe.** A general survey of major literary works and authors of Europe. Designed to broaden one's knowledge of Europe's literary heritage and development. (3F,W,Sp,Su)

**HU 114. Great Literature of Britain.** A general survey of major literary works and authors of Britain. Designed to broaden one's knowledge of Britain's literary heritage and development. (3F,W,Sp,Su)

**HU 115. Great Literature of America.** A general survey of major literary works and authors of the United States. Designed to broaden one's knowledge of America's literary heritage and development. (3F,W,Sp,Su)

**117. Understanding Poetry.** An introduction to the basic elements of poetry from different cultures, movements, and periods. (3)

**118. Understanding Fiction.** An introduction to the types and basic elements of the short story and novel of different periods and cultures. (3)©

**HU 120. Great Books and Ideas.** Man's ideas about himself, the universe, and the divine. (3)

**HU 121. Great Books and Ideas.** Man's ideas about social relationships. (3)

**HU 122. Great Books and Ideas.** Man's ideas about the modern world. (3)

(Courses 120, 121, and 122 are related, but they are taught as independent units and need not be taken as a series.)

**HU 124. Introduction to Folklore.** Major types of folklore (e.g., legend, folktale, ballad, folksong, custom, belief, art, and craft); practical experience in collecting folklore. (3)

**HU 126. Mythology.** May be repeated from different instructors. (3F,W,Sp,Su)®

**150. American Character in Film.** An exploration of the American national character, using commercial films as a teaching tool. (3Sp)

**151. Main Currents in American Culture.** Lower division interdisciplinary seminar designed to synthesize the content of a block of general courses taken concurrently. Before enrolling, check with the American Studies program director. (2F)

**190. English Orientation.** Orientation to the English Department. Provides initial, objective information about the study of literature, writing, and professional opportunities. Required of all English majors. (1F,W)

**195. Individualized Writing Instruction.** For students desiring further practice in specific areas of writing. Instructor's consent required. (1-3F,W,Sp)



**WC 200. Persuasive Writing.** Writing the essay from various persuasive stances; includes methods of documentation. Prerequisite: Sophomore standing and completion of Engl 101, 111, or equivalent. (3)

**WC 201. Research Writing.** Developing library research methods for writing documented essays and term papers. Prerequisites: Sophomore standing and completion of Engl 101, 111, or equivalent. (3F,W,Sp,Su)

**202. Introduction to Writing Fiction.** Covers the basic elements of writing short fiction: form, structure, plot, theme, characterization, point of view, and imagery. (3F,W,Sp)

**203. Introduction to Writing Poetry.** Covers the basic elements of writing poetry: language detail, tone, voice, literal and figurative imagery, rhythm, open and closed form, structure, and theme. (3F,W,Sp)

**210. Language Awareness: The Uses and Misuses of Language.** Study of language as a tool for problem solving, emotional adjustment, and communication, including ways language may be used to misinform and manipulate. (3)

**212. Introduction to Literary Analysis.** Required of all English majors and teaching minors as a prerequisite to upper division literature courses. (3F,W,Sp,Su)

**216. World Literature Survey to 1650.** (5)

**217. World Literature Survey from 1650.** (5)

**251. American Literature Survey.** (5)

**260. British Literature Survey to 1798.** (5)

**261. British Literature Survey from 1798.** (5)

**273. East Asian Civilization: Arts and Literature.** A general survey of the arts and literature of China, Japan, and Korea in English translation. (3)

**287. Introduction to the Works of Shakespeare.** Survey of the major works of Shakespeare for those who have little or no background in his plays and poems. (3)

### Upper Division

**301. Advanced Writing.** Advanced nonfiction writing strategies, development, and style. Prerequisites: Upper division standing and completion of Engl 200, 201 or equivalent. (3F,W,Sp,Su)

**303. Introduction to Playwriting.** Practice in writing plays. Prerequisite: Engl 202 or equivalent. (3)@

**305. Technical and Professional Writing.** Designing, structuring, and editing technical/scientific communications. Prerequisites: Upper division standing and completion of Engl 200, 201, or equivalent. (3F,W,Sp,Su)

**HU 311. Classical Mythology in Western Art.** Greek and Roman art and mythology as employed or recreated in selected paintings, sculpture, music, and literary works produced in Western Civilization. (3)

**325. Science and Fantasy Fiction.** Explores history, development, directions, and themes of science, speculative, and fantasy fiction. (3)

**330. Women Studies: Women in Literature.** Analysis of women characters in literature. (3)@

**372 (d672). Folklore Colloquium.** Issues, problems, and methodologies in folklore study. (3)

**395. Individualized Writing Instruction.** Working in the Writing Center and with instructor on writing assignments from an approved upper division course in student's major (1 credit of 395 for each 3 credit course in major). Instructor's consent required. (1-3F,W,Sp,Su)

**401. Composition for Teachers.** Principles of effective composition and teaching techniques; extensive practice in writing; evaluation of professional and student work in both discussion and demonstration. Prerequisite: Engl 301 or equivalent course. (3)

**405. Diagnosing Writing Problems.** Methods of recognizing and diagnosing remedial level writing problems, preparing students to teach composition to basic level writers. Prerequisite: Engl 410. (3)

**409. Introduction to Language Analysis.** Overview of the rule-governed behavior of language with emphasis on phonology, syntax, morphology, and semantics. (3)

**410. Grammars.** A comprehensive study of traditional, structural, transformational systems of grammatical analysis with some attention to grammar for prospective teachers. (3F,W,Sp,Su)

**413 (d613). Topics in Writing and Rhetoric.** Intensive study of current trends in writing and rhetoric. (2-3)@

**415. Reading for English Teachers.** Methods of motivating readers and analyzing and resolving the reading problems of secondary school students. (3F)

**416. Children's Literature.** Study of prose and poetry for elementary school children. (3)@

**417. Young Adult Literature.** Study of prose and poetry for the secondary school age. (3W,Sp)@

**418. Literature for Teachers.** Strategies for teaching literature in secondary schools, including evaluation and selection of materials, and methods of presenting literature to students of diverse reading backgrounds. (3Sp)

**420. Modern Poetry.** A study of modern poems and poets. (3)

**422. Ballads and Folksongs.** Study of the lyrics of traditional songs and ballads; theories of transmission, literary and historical importance, notable collectors and recordings. (3)@

**423. American Folklore.** American folk art and literature and the historical and cultural circumstances from which they developed. (3)

**424. American Folk Styles.** Survey of American culture: students learn techniques and perspectives enabling them to look at artifacts as texts to be deciphered for their historical, cultural, and aesthetic meanings. (3)

**425. The Bible as Literature.** A survey of the major writings from the Hebrew tradition in the King James version of the Old and New Testaments. (3)

**426. Mythology.** An advanced survey of world mythologies. May be repeated from different instructors. (3)@

**427. Internship/Cooperative Work Experience.** Course credit for professional experience outside the classroom prior to graduation. Statement of professional goals and a summary report following the experience are required. Prerequisite: Departmental approval. (1-10F,W,Sp,Su)@

**428. Greek Literature.** Masterpieces of Greek literature in translation, with emphasis upon drama. (3)

**429. Roman Literature.** Masterpieces of Roman literature in translation. (3)

**430. History of the Theatre I: Origins to 17th Century.** (3)

**432. History of the Theatre II: 17th Century to WW II.** (3)

**434. History of American Drama and Theatre.** (3)

**436. Masterpieces of British Drama.** Study of major works in British drama from the beginnings to 1890, including Elizabethan, Stuart, restoration, eighteenth and nineteenth century plays. (3)

**448. American Fiction.** (3)

**✓ 50. Student Teaching Seminar.** Focus upon problems arising during student teaching. Includes teaching plans, procedures, adaptive classroom practices, and evaluation. To be taken concurrently with SecEd 460. (3F,W,Sp)

**452 (d652). English Phonetics and Phonology.** An examination of the sound features of the English language, including phonetics, segmental contrasts, distinctiveness, and major phonological processes. (3)

**453 (d653). Language and Society.** (3)

**459. Folklore of Utah.** Study of the lore of major Utah folk groups (ethnic and immigrant, occupational, religious, and regional). (3)

**478. The British Novel.** Survey of the British novel from its beginnings in the eighteenth century to the present. (3)

**492. Senior Practicum.** (1)@

**501 (d606). Advanced Poetry Writing.** Advanced practice in writing poetry. Prerequisite: Engl 203 or equivalent. (3)@

**502 (d602). Advanced Fiction Writing.** Advanced practice in writing fiction. Prerequisite: Engl 202 or equivalent. (3)®

**504 (d604). Advanced Essay Writing.** Developing sophisticated skills for writing the publishable essay. Prerequisites: Upper division standing and completion of Engl 301 or 305 or equivalent writing proficiency or instructor's consent. (3)®

**509. History of the English Language.** (3)

**510. Applications in Linguistics.** Study of language in context: historical, developmental, dialectal language changes, social and pragmatic uses of language, written and oral communication. Recommended prerequisites: Engl 409 and 410. (3)

**521. History of Literary Criticism.** A survey of the major methods and philosophies of literary criticism from the classical to the contemporary. (3)

**524 (d624). Regional Folklore.** Regional folklore of a specific region, identified each quarter taught. (3)®

**IO 526. Legends, Myths, and Folktales.** Substance and significance of folk prose narratives both in the past and in contemporary society. (3)

**532. Seventeenth and Eighteenth Century World Literature.** (3)

**533. Nineteenth and Twentieth Century World Literature.** (3)

**534 (d634). Modern Continental Drama.** (3)

**535. American Literature: 1607-1820.** (3)

**538. American Literature, 1820-1865.** (3)

**539. American Literature: 1865-1920.** (3)

**540. American Literature: 1920-1945.** (3)

**541. Western American Literature.** (3)

**543. The American Frontier.** Upper division interdisciplinary seminar designed to synthesize, amplify, and enrich the content of a block of general education courses taken concurrently as prerequisite to the seminar. (3W)

**546 (d646). Folk Groups and Folklore Genres.** Survey of folk groups and folklore genres. Taught during summer Fife Folklore Conference only. (3Su)

**548. American Literature Since 1945.** American writing since 1945 in the context of significant historical, political, social, and cultural events: Vietnamese War, civil rights movement, women's movement, etc. (3)

**549 (d645). Modern American Drama.** (3)

**556. Topics in American Literature.** Intensive study of select American writers, regional and ethnic groups, and special topics (Black, Hispanic, Mormon literature; Southern literature; nature, naturalism, historical fiction, etc.). (2-3)®

**561. Medieval British Literature.** (3)

**562. Sixteenth Century British Literature.** (3)

**563. Seventeenth Century British Literature.** (3)

**564. Eighteenth Century British Literature.** (3)

**565. Romantic Period British Literature.** (3)

**566. Victorian Period British Literature.** (3)

**567. Twentieth Century British Literature.** (3)

**579 (d679). Folklore Fieldwork.** Introduces advanced student to problems and techniques of fieldwork, including making sound recordings of orally-transmitted expressions, photographs of material traditions, and descriptions of problematic genres. Technical training, ethics, field exercises, analysis, plus perspectives on archiving and publications of results. (3)

**582. Senior Seminar.** Capstone course for students enrolled in English Honors Program. (1-3)

**584 (d684). Modern British Drama.** (3)

**585. Topics in British Literature.** Intensive study of select British writers, themes, or topics. (2-3)®

**586. Chaucer.** (3)

**587. Shakespeare: Comedies and Histories.** (3)

**588. Shakespeare: Tragedies.** (3)

**589. Milton.** (3)

**595. Readings and Conference.** Offered every quarter. Students must have the approval of the head of the department. (1-5)®

**596 (d644). American West: Its Literature and History.** (2-3Su)®

**597. Senior Thesis.** Prerequisite: Enrollment in the English Honors Program. (1-10)®

## Graduate<sup>2</sup>

**600. Bibliography and Research Methods.** (3)

**602 (d502). Advanced Fiction Writing.** (3)®

**604 (d504). Advanced Essay Writing.** (3)®

**605. Rhetoric and Basic Writing.** (3)

**606 (d501). Advanced Poetry Writing.** (3)®

**607. Creative Writing in the Classroom.** (3)

**608. Topics in Technical Writing.** (3)®

**611. Discourse: Analysis and Synthesis.** (3)

**613 (d413). Topics in Writing and Rhetoric.** (2-3)®

**616. Advanced English Methods.** (3)

**617. Modern Composition Theory.** (3)

**618. History of Rhetoric to 1900.** (3)

**621. Seminar in Modern Criticism.** (3)

**622 (f522). Ballads and Folk Songs.** (3)®

**624 (d524). Regional Folklore.** (3)®

**625. Graduate Internship/Cooperative Work Experience.** (1-15)

**634 (d534). Modern Continental Drama.** (3)

**635. Colonial and Federalist Writing in America.** (3)

**639. American Romanticism.** (3)

**640. Seminar: American Realism and Naturalism.** (3)

**642. Modern American Poetry.** (3)

**643. Modern American Fiction.** (3)

**644 (d596). American West: Its Literature and History.** (2-3Su)®

**645 (d549). Modern American Drama.** (3)

**646 (d546). Folk Groups and Folklore Genres.** (3)

**652 (d452). English Phonetics and Phonology.** (3)

**653 (d453). Language and Society.** (3)

**657. American Studies Internship in Mountain West Culture.** (2-13)

**662. Seminar: Sixteenth Century British Literature.** (3)

**663. Seminar: Seventeenth Century British Literature.** (3)

**664. Seminar: Eighteenth Century British Literature.** (3)

**665. Seminar: Romantic Period British Literature.** (3)

666. Seminar: Victorian Period British Literature. (3)  
667. Seminar: Twentieth Century British Literature. (3)  
672 (d372). Folklore Colloquium. (3)®  
673. Folklife Museums. (3)  
674. Outdoor Museum Planning and Administration. (3)  
675. Outdoor Museum Research and Conservation. (3)  
676. Outdoor Museum Interpretation and Educational Programming. (3)  
677. History Museum Internship. (6-12)  
678. Scholarly Editing Internship. (2-6)  
679 (d579). Folklore Fieldwork. (3)  
680. Proseminar. (2)®  
682. Seminar. (3)®

- 684 (d584). Modern British Drama. (3)  
692. Practicum in Writing Instruction. (1-3)®  
693. The Teaching of English. (3)  
695. Independent Study. (1-5)®  
697. Thesis. (1-10)®  
699. Continuing Graduate Advisement. (1-3)®

<sup>1</sup> Parenthetical numbers preceded by *d* indicate a *dual* listing; parenthetical numbers preceded by an *f* are the *former* course numbers.

<sup>2</sup> Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through the Life Span Learning Independent Study Division.

## *Department of*

# *Family and Human Development*

## *College of Family Life*

**Head:** Professor Jay D. Schvaneveldt  
Office in Family Life 211

**Professors** Glen O. Jenson, Brent C. Miller; **Professor Emeritus** C. Jay Skidmore; **Associate Professors** Ann M. B. Austin, Thomas R. Lee, Shelley L.K. Lindauer, D. Kim Openshaw; **Adjunct Associate Professors** Frank R. Ascione, Deborah A. Byrnes, La Vell E. Saunders; **Adjunct Research Associate Professor** Sarah Rule; **Assistant Professors** J. Steven Fulks, Randall M. Jones, Lori A. Roggman; **Lecturer** Farol Ann G. Nelson; **Instructor Emeritus** Elaine T. Ashcroft

**Degrees offered:** Bachelor of Science (BS), Bachelor of Arts (BA), and Master of Science (MS) in Family and Human Development; BS and BA in Early Childhood Education; Doctor of Philosophy (PhD) in Family Life with emphasis in Family and Human Development

**Focus within majors:** Family and Human Development includes Human Development emphasis and Marriage and Family Relationships emphasis; Early Childhood Education includes certification K-3rd grades.

## *Objectives*

The Department of Family and Human Development offers a variety of courses designed to prepare students for careers in teaching or for positions as family and human development specialists in agencies serving children and other family members. Majors are exposed to a curriculum which ranges from infancy to old age, and from marital formation to marital dissolution through death or

divorce. These classes deal with current issues and problems confronting families and children in the nation and the world, and students will develop the necessary skills to professionally deal with these issues.

Students in the department are required to complete at least one practicum, and this may be done in a variety of agencies serving families and children. Practicum experiences are currently available in the Primary Children's Medical Center, Logan Regional Hospital, public schools, Bear River Mental Health, CAPSA, Children's House, Child Development Labs, Family and Child Support Center, day care centers, Planned Parenthood, safe houses, research programs, and others as arranged between the student and the department. Those students majoring in early childhood education complete a formal internship in the child development lab and primary grades as a part of this focus. In addition, the child development lab setting can be used by other students in the department to complete the practicum requirements.

Majors in family and human development, as well as in early childhood education, receive the necessary preparation for graduate study in a family-human development related field or employment in Headstart and day care programs, extension services, hospitals, social/service agencies, senior citizen centers, adoption agencies, family planning, foster care, runaway centers, family crisis centers, parent education programs, and similar agencies. Many majors acquire a teaching certificate so they can also teach in the public schools.

In addition to advanced study or job opportunities for majors in Family and Human Development, students receive increased knowledge and skills in topics which will enhance personal and family life. Preparation for marriage, parenthood, and family living is a central concern in the department.

All majors in the department are accredited by the American Home Economics Association. Certification in Early Childhood Education is also available.

## Requirements

**Departmental Admission Requirements.** Admission requirements for the Department of Family and Human Development are the same as those described for the University on pages 8-11. Students entering the Family and Human Development (FHD) Major with less than 45 college credits must have a 2.0 total GPA. Students applying for entrance to the FHD Major, who have more than 45 college credits, must have a total GPA of 2.5 or more to be admitted into the major, and they must maintain a 2.5 total GPA to be in good standing in the major. A minimum GPA of 2.67 in the major (including college and departmental requirements) is required for graduation.

**College Requirements.** All majors must complete the basic College of Family Life curriculum for common understanding (see page 43). AP and CLEP credit can be used to meet some of the required technical and General Education courses.

**Departmental Requirements.** In addition to the college requirements, the department has four regulations which govern academic conduct. These regulations include:

1. A total grade point of 2.0 and 2.67 in the major (including college and departmental requirements).
2. A required course may only be repeated once to improve a grade.
3. Completion of all major requirements, as illustrated below.
4. The *P/D+*, *D*, *F* option may *not* be used in courses required in the major.

**Family and Human Development Major Requirements.** All majors in family and human development (with the exception of ECE majors) complete a common departmental major of 59 credits as follows:

**Introductory and Research Courses:** FHD 120, 150, 210, and 260; Stat 201 or Psy 380 or Soc 415.

**Marriage and Family Courses:** FHD 304, 376, and 420.

**Family and Human Stress Courses:** FHD 300, 301, and 412.

**Developmental Courses:** FHD 378, 379, 380, and 381.

Students must choose one of the following emphases. **Human Development:** FHD 389, 455, and 475 or **Marriage and Family Relationships:** FHD 370, 388, and 425.

**Early Childhood Education Major Requirements.** Majors in early childhood education are certified to teach in preschool through third grade. Several practica and field experiences with children are provided, and a subject matter minor is selected (e.g. science, language arts, etc.). This major is a cooperative effort between the Department of Family and Human Development and the Department of Elementary Education. Students are required to complete a student teaching practicum in a preschool program, a kindergarten, and in the public schools grades 1, 2, or 3. Additional materials describing the ECE major in the Department of Family and Human Development are available upon request from the ECE advisers or the department head.

For more detailed information about the Family and Human Development and Early Childhood Education majors, see advise-

ment guides available in the administrative office of the department. These guides also provide details about minors and recommended electives. Students should also check with the department for current requirement sheets, which are updated each year.

## Financial Support

In addition to the scholarships, assistantships, grants-in-aid, and work-study programs available through the University, the College of Family Life and the Department of Family and Human Development also give several tuition waivers, scholarships, and other types of support each year. Students should correlate with the Dean's Office in Family Life 205 or the departmental office in Family Life 211.

## Graduate Study

The department offers the Master of Science degree (MS) in Family and Human Development. The college offers the doctorate degree (PhD) with an emphasis in Family and Human Development. Both degrees contain three specialties: infancy and childhood, adolescence and youth, and marriage and family relationships. Further information may be obtained from the department and by referring to the USU Graduate Catalog.

## Family and Human Development Courses

**SS 120. Marriage and the American Family.** Overview of courtship, marriage patterns, child bearing and rearing, and adaptive functions of the family in the U.S. (3F,W,Sp)©

**SS 150. Human Growth and Development.** Overview of development from conception through maturity. (5F,W,Sp)©

**210. Research Methodology in Family and Human Development.** Introduction to common methodologies used in current family and human development research. Emphasis is placed upon becoming a knowledgeable and informed consumer of research. (3F)

**250. Seminar in Early Childhood Education.** Orientation to current philosophies, teaching techniques, and curriculums found in programs for young children. (3F,W)

**252. Practicum in Early Childhood Education.** Practicum experience as a student aide in an early childhood education program (e.g., Child Development Lab, Children's House, child care center, etc.). Taken in conjunction with FHD 250. (1-6F,W)

**260. Guidance of Children.** Review of various guidance philosophies with emphasis on principles and techniques. (3W,Sp)©

**272. Marriage.** The development, maintenance, and dissolution of marital relationships. For men and women. Recommended: FHD 120. (3)©

**300. Child Abuse and Neglect: A Multidisciplinary Approach.** Increases knowledge and awareness of the causes, identification, reporting, and treatment of abused children and abusive parents. (3W)©

**301. Death and Dying as Family Experience.** Understanding and coping with death and dying in modern family systems; education for grief and bereavement. (3Sp)

**SS 304. Human Sexuality and Family Relations.** The family as a primary group and socialization agency in the building of attitudes and influencing behaviors in human sexuality. (3W)

**370. Marriage and Family Therapy: An Introduction.** Philosophy, principles, and techniques of premarital, marriage, and family counseling. Prerequisite: FHD 120 or instructor's approval. (3F)

**376. Contemporary Family in the United States.** Structure and function of the family institution, interaction with other social networks, internal compositions and life-cycle processes, and family as a small group. Recommended: FHD 120. (3F)

**378. Understanding Infants.** Development of the child from conception to two years. Physical, social, emotional growth; parenting skills. Lab required. Recommended: FHD 150. (3F)

**379. Children Two to Five.** Examination of normal growth patterns of the preschool-age child. Observation experiences. Recommended: FHD 150. (3W)

**380. Children Six to Twelve.** Growth and development of normal children. Guidance principles related to behavior of children at these age levels. Lab required. Recommended: FHD 150. (3Sp)

**381. Adolescence.** The social-psychological and physical aspects of becoming an adolescent in modern societies. Social and cultural expectations stemming from the family, school, and the community. Recommended: FHD 150. (3Sp)

**388. Update on Family Issues.** Videotaped course on selected aspects of marriage and family relationships. (3F,W,Sp)®©

**389. Update on Children's Issues.** Videotaped course on selected aspects of growth and development of children. (3F,W,Sp)®©

**412. Families in Crisis.** Designed to enable FHD and other service-oriented students to understand the trauma and recovery process associated with normative and catastrophic crisis. (3W)

**420. Families in Middle and Later Life.** Family development; launch process; intergenerational relations between grown children and their parents; understanding older family members. Recommended: FHD 120. (3Sp)

**425. Internship.** Placement experience in applying skills and knowledge in community agencies. One credit for 30 hours of experience. Senior standing. Apply in advance. (1-12F,W,Sp)

**431. Women and Men.** Women and men in the family, in society, and in relationships with each other. (3)

**440. Family Life Education.** Study of parent, teacher, and community needs in relation to problems of education for family life. Inservice training for teachers and group leaders. (3)

**455. Methods and Curriculum for Preschool Children.** The use of materials, equipment, and activities in planning a curriculum and teaching preschool children. Prerequisite: FHD 150. (3F,Sp)

**475. Practice Teaching in Child Development Laboratory.** A teaching internship in the Child Development Lab program. Arrangements need to be made at least one year in advance. Prerequisites: FHD 150, 260, 455. (3-6F,W,Sp,Su)

**490. Independent Study.** (1-3F,W,Sp,Su)®

**550. Interdisciplinary Workshop.** (1-3F,W,Sp,Su)®

**561. Introduction to VAX and Microcomputer Software (IBM and compatibles).** Introduction to VAX software: SPSSX (statistics), TELLAGRAF (graphics), and EDITOR. Introduction to IBM compatible 386 microcomputers and WordPerfect. Introduction to MacIntosh and its associated software. Other topics as developed. No prerequisites. (1F,Sp)

**565. Parenting and Family Life Education.** Current philosophies, theories, methods, and research in family, marriage, and parent education. Dissemination strategies assessed. Field experience is provided. (3)

### *Graduate*<sup>1</sup>

**601. Socialization in Human Development.** (3W)

**606. Theories of Human Development.** (3F)

**610. Seminar in Family Relations.** (3F)

**625. Graduate Internship.** (1-12F,W,Sp,Su)®

**630. Premarital and Marital Therapy.** Prerequisites: FHD 370 or equivalent; FHD 610 and 670. (3F)

**631. Family Therapy.** Prerequisite: FHD 630. (3F)

**632. Issues in Marriage and Family Therapy.** (3F)

**641. Social Change and the Family.** (3Sp)

**650. Family-child Interaction.** (3F)

**654. Moral Development in the Family.** (3Sp)

**662. Using and Interpreting SPSSX to Analyze Social Research Data.** See instructor before enrolling. (2F,Sp)

**670. Family Theory.** (3W)

**675. Research Seminar in Family and Human Development.** (1-3F,W,Sp,Su)®

**680. Research Methods.** (3Sp)

**681. Methodological Designs in the Study of Change.** Prerequisite: FHD 680 or equivalent. (3F)

**683. Personality and Social Development in Adolescence.** (2-3F)

**684. Family and Peer Relations During Adolescence.** (2-3W)

**685. Family Health and Social Problems During Adolescence.** (2-3Sp)

**686. Infancy.** (3F)

**687. The Preschool Child.** (3W)

**688. Middle Childhood.** (3Sp)

**690. Independent Study.** (1-9F,W,Sp,Su)®

**692. Practicum in Marriage and Family Therapy.** (4)®

**693. Supervision in Marriage and Family Therapy.** Prerequisites: permission of instructor, FHD 630, 631, 632, and concurrent enrollment in FHD 692. (2)®

**697. Thesis Research.** (1-9F,W,Sp,Su)®

**699. Continuing Graduate Advisement.** (1-3F,W,Sp,Su)®

**701. Research Seminar in Human Development.** (3W)

**706. Theoretical Frontiers in Human Development.** (3Sp)

**710. Research Seminar in Family Relations.** (3W)

**725. Advanced Graduate Internship.** (1-12F,W,Sp,Su)®

**770. Theoretical Frontiers in Family Relations.** (3Sp)

**775. Advanced Topics in Family and Human Development.** (3F,W,Sp,Su)®

**790. Independent Study.** Prerequisite: instructor's permission. (1-9F,W,Sp,Su)®

**797. Dissertation Research.** (1-12F,W,Sp,Su)®

<sup>1</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through the Life Span Learning Independent Study Division.

# Department of *Fisheries and Wildlife* College of Natural Resources

**Head:** Professor Raymond D. Dueser  
Office in Natural Resources 206

**Professors** John A. Bissonette, Joseph A. Chapman, John A. Kadlec, Frederic H. Wagner, Michael L. Wolfe; **Professors Emeritus** Jessop B. Low, John M. Neuhold, William F. Sigler, Allen W. Stokes; **Associate Professors** Charles P. Hawkins, Timothy C. Modde, Wayne A. Wurtsbaugh; **Associate Professors Emeritus** William T. Helm, Gar W. Workman; **Assistant Professors** Todd A. Crowl, Thomas C. Edwards, Jr., Barrie K. Gilbert, Chris Luecke, Mark E. Ritchie; **Research Associate Professors** Martha H. Balph, Frederick F. Knowlton, Winifred B. Sidle; **Research Assistant Professors** Jeffrey L. Kershner, Sharon L. Ohlhorst, L. Charles Stoddart; **Adjunct Assistant Professor** Ronald W. Goede

**Associated Units:** Cooperative Fish and Wildlife Research Unit, Predator Ecology and Behavior Project, and U.S. Forest Service Cooperative Fish and Wildlife Habitat Relationships Unit

**Degrees offered:** Bachelor of Science (BS), Master of Science (MS), and Doctor of Philosophy (PhD) in Fisheries and Wildlife; MS and PhD in Ecology (Fisheries and Wildlife); MS and PhD in Ecology (Aquatic)

**Areas of Specialization:** BS degree in Fisheries and Wildlife has programs of emphasis in Fisheries Management and Wildlife Management (other undergraduate options can be arranged to meet student needs); MS and PhD degrees in Fisheries and Wildlife have programs of emphasis in Fishery Management, Wildlife Management, Populations, Behavior, Wildlife Ecology, and Aquatic Ecology

## Objectives

The Department of Fisheries and Wildlife provides undergraduate training for careers in the management of wildlife and fishery resources. It is the department's philosophy to promote a broad interdisciplinary approach to natural resource problems and management.

## Requirements

**Departmental Admission Requirements.** Admission requirements for the Department of Fisheries and Wildlife are the same as those described for the University on pages 8-11. Students in good standing may apply for admission to the department.

**Bachelor of Science in Fisheries and Wildlife.** The first two years include courses designed to give a student a sound scientific background. Students are required to complete Math 105, 215, and 216; Biol 125, 126, and 127; NR 101, 102, and 201; Bot 420; Engl 101 and 201; Spch 105; Econ 201 or FR 420; FW 199, 270, 271, 290, 300, and 386; Chem 121, 122, 124, and 141; Phyx 120; and electives to make a total of 16 to 18 credits per quarter.

During the junior and senior years all students take NR 360, 370, 380, and 390; 6 credits selected from Engl 301, 305, and Comm 530; and FW 431 and 460.

**Fishery Management Option.** In addition to the courses listed for the BS in fisheries and wildlife, the following courses are required: WS 300; FW 370, 570, 571, and 572; Micrb 560; and Ent 537 or Zool 551.

**Wildlife Management Option.** In addition to the courses listed for the BS in fisheries and wildlife, the following courses are required: a minimum of 6 credits from FR 300, RR 300, RS 300, and WS 300; Geog 575 or Soils 358 and 359; Zool 361, 561, and 563; FW 401, 410, 430, 432, and 519; Physl 401.

The undergraduate program can be readily tailored to individual student needs with the help of his or her adviser.

**General Information.** Students should select additional courses to complete the 186-credit requirement (minimum of 60 credits in upper division, 300-level courses and above) and should meet the General Education requirement. General Education requires completion of 46 credits of approved General Education courses including 6 credits in written communication skills. (See General Education on pages 21-25.)

**Environmental Studies Option.** The College of Natural Resources administers an interdisciplinary major in environmental studies. See page 114 for further information.

## Graduate Study

The Department of Fisheries and Wildlife offers MS and PhD degrees in fisheries and wildlife, ecology (fisheries and wildlife), and ecology (aquatic) with programs of emphasis in wildlife biology, fishery biology, and related fields. See the graduate catalog for prerequisites and further information.

## Fisheries and Wildlife Courses

Natural Resources courses 101 through 601 are listed under the College of Natural Resources, pages 45-47.

**199. Wildlife Science Orientation Seminar.** One class meeting per week, graded P-F based on attendance. Discussion of current issues in fisheries and wildlife; invited participation by outside speakers including other faculty. (1F)

**225. Introductory Internship/Co-op.** An introductory level educational work experience in an internship/cooperative education position approved by the department. (1-6F, W, Sp, Su)

**231. Methods of Vertebrate Specimen Preparation.** Designed to teach students how to prepare birds, mammals, and fishes as museum specimens. (2Sp)

**IO 250. World Wildlife.** An overview of the wildlife and fishery resources of the world with emphasis on non-North American forms and their relationships to humans in various cultures. Suitable for nonbiologists as well as biologists. (3W)

**IO 260. Oceanography.** Introduction to the basic aspects of marine environments with discussion of topical issues. Suitable for nonbiologists. (3W)

**270. Fish Systematics and Function.** Survey of fish families, emphasizing morphological, physiological, and behavior adaptations. Emphasis on North American freshwater fauna. (3Sp)

**271. Fish Systematics Laboratory.** Complementary laboratory to FW 270. Students learn to identify freshwater fishes of North America in the laboratory and the field. (2Sp)

**LS 284. General Ecology.** Interrelationships between organisms and their environments at levels of individual organisms, species populations, and ecosystems; emphasis on structure and function of latter two; human implications. Suitable for nonbiologists. (5F,W,Sp,Su)

**290. Game Birds and Mammals.** Taxonomy, distribution, and life histories of waterfowl, upland game birds and mammals, big game, and furbearers. Lab exercises include species identification and techniques of sex and age determination. (3W)

**298. Fish and Wildlife Habitat Analysis.** Introduction and practical experience in techniques of evaluating habitats of aquatic and terrestrial wildlife species. (1Su)

**300. Principles of Fish and Wildlife Management.** Ecological and sociological factors governing the management of fish, game, and nongame wildlife. Prerequisite: some knowledge of ecology. (3Sp)

**310. Endangered Species.** The biology and politics of endangered species with emphasis on endangered vertebrates. (3Sp)

**350. General Fishery Biology.** This course is offered only through the Life Span Learning Independent Study Program. (5)©

**370. Fundamentals of Fish Biology.** An introduction to gross anatomy, development, respiration, excretion, and osmoregulation in teleost fishes. (4F)

**385. Field Ecology.** Field and lab study of populations and ecosystems, both terrestrial and aquatic. (2Su)

**386. General Ecology for Life Science Majors.** Interrelationships among microorganisms, plants and animals, and their environments at the level of individual organisms; species populations and ecosystems with emphasis on the structure and function of the latter two; and human implications. Prerequisites: Biol 125, 126, 127, or permission of instructor. (4F,W)

**IO 395. Environmental History.** An examination of the nature of man's interactions with his environment throughout history and the origins and development of environmental conservation in the modern period. (3Sp)

**401. Fisheries and Wildlife Policy and Administration.** Intended to fill gap between biological emphasis of FW 300, 430, 431, and 432 series and Natural Resource policy emphasis of NR 390. Intended to acquaint students with some of the main nonbiological issues facing wildlife managers and administrators. Prerequisite: NR 390. (3Sp)

**405. Urban Fish and Wildlife Management.** Includes urban wildlife: values and public attitudes, wildlife habitats and environments, urbanization effects, response of wildlife to urbanization, animal damage problems, and enhancing wildlife enjoyment. (3Sp)

**410. Wildlife Law Enforcement.** Review of principles of state and federal regulations of fish and game; discussion of apprehension of violators, rights of the individual, and collection of evidence and its use in court. (3Sp)©

**415. Introduction to Animal Behavior.** General principles emphasizing social behavior and behavioral ecology. Designed for those with biology or psychology backgrounds. (3F)

**425. Advanced Internship/Coop.** Internship/cooperative education work experience; increased level of complexity with more professional level of experience as student advances toward completion of program. (1-15F,W,Sp,Su)

**430. Management of Wildlife Habitat.** Biological requirements of terrestrial wildlife animals, methods of creating or enhancing wildlife habitat and their integration with other land-use practices. Prerequisites: FW 300 and 386. (3F)

**431. Management of Wildlife Populations.** Population characteristics of big game, waterfowl, upland game, and furbearers and their implications for human exploitation. Prerequisites: FW 300 and 386; Stat 201 or 501. (4W)

**432. Management Aspects of Wildlife Behavior.** Behavioral principles important in the management of wildlife. Prerequisite: FW 386. (3Sp)

**460. Limnology.** Introduction to the physical, chemical, and biological factors operative in fresh water habitats. A generalized discussion of aquatic habitats as nonisolated ecosystems. Prerequisites: Chem 121, 122; Phyx 120. (5W)

**461 (d661).<sup>1</sup> Stream Ecology.** Introduction to the physical, chemical, and biological ecology of flowing waters. Emphasis is on the structure and function of natural stream ecosystems. Prerequisite: FW 460 or permission of instructor. (4Sp)

**462. Aquatic Ecology Laboratory.** Field and lab techniques for determining community structure, metabolic parameters, and nonbiotic factors of the aquatic habitat; use of equipment; and analysis of data. Prerequisite: FW 460. (3Sp)

**480. Undergraduate Research.** Individual or team research. Prerequisite: adviser approval. (1-5F,W,Sp,Su)©

**483. Directed Reading.** Prerequisite: adviser approval. (1-5F,W,Sp,Su)©

**491. Wildlife Problems.** Individual study and research upon a selected wildlife problem. Prerequisite: adviser approval. (1-5F,W,Sp,Su)©

**495. Undergraduate Seminar.** Intended to bring upperclassmen up-to-date on topics in the fisheries and wildlife field. (1F,W,Sp)©

**510. Principles of Vertebrate Pest Control.** Explains current legal, ethical, and biological principles for the control and/or management of problem vertebrate species. (3F)

**512. Techniques of Problem Wildlife Management.** Comprehensive course presenting current and acceptable methods for manipulation of animal populations. (5W)

**514. Selected Topics in Problem Wildlife Management.** Seminar course with guest speakers who are authorities in various aspects of problem wildlife management. (4Sp)

**519. Wildlife Techniques.** Field procedures for determining sex and age, habitat utilization, capture and marking, necropsy, harvest surveys, and estimating populations. Includes mapping, orienteering, and field safety. Prerequisites: FW 300, 386; Stat 501; FW 290 suggested. (5F)

**520 (d623). Predator Ecology and Management.** Introduces students to interactions between predators and prey. They can apply this knowledge to unique problems of managing vertebrate predators. (4F)

**525. Habitat Relationships in Managed Forests.** Ecological relationships, management concepts, and policy influencing fish and wildlife habitats in managed forests. (3F)

**527. Conservation Biology.** Principles of the management of small populations, including the effects of habitat fragmentation, demography, and genetics. (4F)

**530. Genetics in Conservation and Management.** Principles of genetics for conservation and population management, including effective population size, stock analysis, gene flow, founder effect, and biotic diversity. (3W)

**\*550. Management of Disturbed Aquatic Ecosystems.** Lecture, reading, and discussion in aquatic ecosystem responses to physical, chemical, and biological disturbances. (3Sp)

**\*\*551. Water Pollution Effects/Assessment.** Laboratory and field techniques for biological assessment of pollution effects. Physiological effects of various toxicants on fish. Fish-kill investigations. (3W)

**\*553. Warmwater Pond Fish Culture.** Principles and procedures for culture of important fin fishes of the world. Emphasis will be placed on species used for food and recreation. Field trips. (3Sp)

**554. Principles of Fish Culture.** The principles of fish culture, fish hatchery management, and nutrition of hatchery-reared fish. (3W)

**555. Diseases of Fish.** The common diseases of both cold and warm water fishes. Discussion of concept of diseases in fish populations. (3W)

**556. Wildlife Parasitology.** Life cycles, pathogenicity, and taxonomy of parasitic protozoa and helminths that infect fish and wildlife. Two lectures and laboratory demonstrations. Prerequisite: general zoology or equivalent. (3Sp)

**570. Fishery Management Field Laboratory.** Techniques of life history study, fish sampling, habitat management and population surveys. Field experience using equipment and preparation of management reports emphasized. (4F)

**571. Principles of Fishery Management.** Study of the development and application of fishery management principles and their historic, biological, societal, economic, and institutional bases. (3W)



572. Fishery Applications. Application of fishery management techniques and principles to the solution of fishery management problems. (3Sp)

### Graduate<sup>2</sup>

601. Advanced Fisheries and Wildlife Program Administration. (3Sp)

605. Topics in Animal Behavior. (1-5)

610. Concepts in Habitat Selection and Foraging Behavior. (3F)

616. Animal Behavior Laboratory. (2)

\*620. Advanced Big Game Management. (3W)

621. Selected Topics in Fish Physiology. (1-3F,W,Sp)

623 (d520). Predator Ecology and Management. (4F)

625. Graduate Internship/Co-op. (1-15F,W,Sp,Su)

627. Wildlife Habitat Evaluation, Planning, and Management. (5Sp,Su)

630. Ecology of Animal Populations. (4)

635. Advanced Vertebrate Pest Management. (3W)

640. Waterfowl and Wetlands Seminar. (1-3F,W,Sp)

\*650 (f560). Fishery Biology. (4Sp)

652. Fisheries Management in Impounded Waters. (3W)

\*655 (f565). Production Biology in Fisheries Environments. (4F)

661 (d461). Stream Ecology. (4Sp)

675. Fish Ecology. (3W)

680. Lentic and Lotic Ecosystems. (1)

685. Freshwater Invertebrate Ecology. (4F)

686. Aquatic Environmental Interactions. (2)

687. Ecology Seminar. (1)®

\*690 (f590). Ecology of Freshwater Wetlands. (4F)

691. Directed Study. (1-5)®

693. Presentation, Publication, and Grantsmanship in the Life Sciences. (3Sp)

695. Department Fisheries and Wildlife Graduate Seminar. (1F,W,Sp)®

697. Thesis Research. (1-15)®

699. Continuing Graduate Advisement. (1-3)®

760. Fish Population Theory. (5)

782. Seminar in Animal Populations. (1)

797. Dissertation Research. (1-15)®

799. Continuing Graduate Advisement. (1-3)®

<sup>1</sup>Parenthetical numbers preceded by *d* indicate a *dual* listing; parenthetical numbers preceded by an *f* are the *former* course numbers.

<sup>2</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through the Life Span Learning Independent Study Division.

\*Taught 1990-91.

\*\*Taught 1991-92.

## Department of Forest Resources College of Natural Resources

**Head: Professor** To be appointed  
Office in Natural Resources 208

**Professors** James J. Kennedy, Ronald M. Lanner, James N. Long, H. Charles Romesburg, Richard M. Schreyer; **Adjunct Professor** Roy C. Sidle; **Professors Emeritus** T.W. Daniel, Raymond R. Moore; **Associate Professors** Frederick A. Baker, Jr., Kent B. Downing, Michael J. Jenkins, David W. Roberts; **Adjunct Associate Professor** Norbert V. DeByle; **Associate Professor Emeritus** Carl M. Johnson; **Assistant Professors** Dale J. Blahna, Joanna L. Endter, Robert J. Lillieholm, Jeffrey J. McDonnell; **Research Assistant Professor** Christine M. Kelly

**Degrees offered:** Bachelor of Science (BS), Master of Science (MS), and Doctor of Philosophy (PhD) in Forestry; BS, MS, and PhD in Recreation Resource Management; Master of Forestry (MF) in Forest Management; MS and PhD in Ecology (Forest); BS, MS, and PhD in Watershed Science; BS in Environmental Studies

**Areas of specialization:** BS degree in Forestry has areas of emphasis in Forest Biology, Forest Management, Forest Recreation, Forest Watershed Management, and Computer Forestry; MS and PhD

degrees in Forestry have areas of emphasis in Forest Management, Recreation Resource Management, Forest Biology, Forest Economics and Policy

### Objectives

The major instructional goal of the Department of Forest Resources is to provide an excellent professional program in multiple-use management of natural resources and quality graduate programs in specific disciplines. To that end, the department continually evaluates and upgrades courses and curricula in response to changes in the profession and to professional and governmental standards, makes effective use of University resources for instructional development, seeks to maintain a student-to-faculty ratio that allows for personalized instruction and advisement, provides adequate field experience as an integral part of professional undergraduate education, encourages and assists students in finding seasonal professional employment, seeks to integrate international students into the program through supplementary advising and tutoring, encourages students to become active in professional organizations, and seeks to attract and retain the highest quality undergraduate and graduate

students. Other departmental goals are to generate new knowledge and to develop applications of current knowledge that will promote understanding of natural resource problems and aid in their solution, to maintain an active program of continuing education, extension, and outreach, and to provide for continuing faculty development.

The department's curricula are aimed at providing a sound general education, as well as a firm grounding in professional subjects. The forestry and recreation resource management curricula, and the Master of Forestry curriculum meet the accreditation standards of the Society of American Foresters. They stress education in biological, physical, and social sciences; humanities; mathematics and computer science; and communication. They provide professional training in all aspects of multiple-use natural resource management. The forestry curriculum places additional emphasis on the biological and physical aspects of resource management, while the recreation curriculum places additional emphasis on the social aspects. These curricula provide a strong background in management science, planning, and policy analysis.

The environmental studies curriculum is designed for students who wish to acquire a broad understanding of human, natural resource, and environmental relationships. It is, in many ways, a traditional "liberal education" curriculum with a strong natural resources emphasis. The curriculum has a minimum of requirements and provides flexibility for the development of either specialization or breadth of content to match the student's interests.

The watershed science curriculum is offered by an interdepartmental unit of the College of Natural Resources. This curriculum is strongly oriented toward science and mathematics and serves as a base for graduate study in hydrology. In conjunction with either the forestry or range science curriculum of the College, the watershed science program qualifies students as hydrologists by Federal standards.

### **Requirements for the Bachelor of Science**

**Forestry Curriculum.** All forestry majors must take the forestry core and complete at least one departmentally approved option or area of emphasis. To graduate in forestry, 199 credits are required.

**Freshman year:** Biol 125, 126; Chem 111; Engl 101, 200<sup>1</sup>; FR 199, 300; Geol 111; NR 101, 102; Phyx 120; Psy 101; and 3 or more credits of General Education or electives.

**Sophomore year:** NR 201; FR 320, 321; FW 284, 300; Math 215; RR 300; RS 300; Soils 358; WS 300; and 3 or more credits of General Education or electives.

**Summer Camp:** FR 301, 302, 303; RS 298<sup>2</sup>; FW 298.

**Junior year:** Engl 305<sup>1</sup>; FR 324, 330, 420, 534; NR 360, 370, 380, 390; WS 420; and 5 or more credits of General Education or electives.

**Senior year:** Bot 560, 563 or Ent 540 or FR 465; FR 443, 445, 510; 24 or more credits of General Education or electives.

**Option Courses.** Approved departmental options in forestry follow:

**Forest Management:** minimum of 18 credits including FR 424; one additional course in protection and one additional course in utilization, one 400 or higher level course in the College of Natural Resources.

**Forest Watershed:** 21 credits including WS 375, 420, 475, 489; CEE 344, Remainder from approved list.

**Forest Recreation:** 18 credits from: RR 300, 451, 510, 520.

**Forest Biology:** Bot 420, FR 424, and 15 credits selected from a departmentally approved list.

**Computer Forestry:** 28 credits including CS 171, 172, 242, 525; Stat 502; FR 550; and BA 308.

**Urban Forestry:** 25 credits in Bot 560, Ent 540, FR 565, 566, and the remainder from the approved list.

### **Recreation Resource Management Curriculum**

All recreation resource management majors must take the recreation resource management core and complete at least one departmentally approved minor. For graduation in recreation resource management, 199 credits are required.

**Freshman year:** Biol 125, 126; Chem 111; Engl 101, 200<sup>1</sup>; FR 199, 300; Geol 111; NR 101, 102; Phyx 120; Psy 101; and 3 or more credits of General Education or electives.

**Sophomore year:** NR 201; FR 320, 321; FW 284, 300; Math 215; RR 300; RS 300; Soils 358; WS 300; and 3 or more credits of General Education or electives.

**Summer Camp:** FR 301, 302, 303; RS 298<sup>2</sup>; FW 298.

**Junior year:** Engl 305<sup>1</sup>; FR 324, 330, 420, 534; NR 360, 370, 380, 390; WS 420; and 5 or more credits of General Education or electives.

**Senior year:** Bot 560, 563, or Ent 540 or FR 465; FR 443, 445, 510; RR 510; 15 or more credits of General Education or electives.

**Option courses:** Students must complete 6 courses from among FR 553 or MHR 311 or 360; Psy 351 or Soc 350; Anthr 401 or 652; BA 451; Soc 415; Soc 342 or 343 or Psy 321.

### **Environmental Studies Curriculum**

The curriculum is divided into three areas: (1) a required core, (2) an area of emphasis, and (3) electives. For graduation in environmental studies, 186 credits are required.

**Core:** NR 101, 102; Biol 125, 126; FR 199; Econ 200 or 201; Soils 358; NR 201; FR 300; RR 300; RS 300; FW 284, 300; WS 300; NR 360, 370, 380, 390; FR 420 or RS 565 or Econ 656; two of PolSc 410, 418, and 464; Phil 327.

**Areas of Emphasis:** The area of emphasis can be completed in one of the following manners: (1) completing the requirements for a double major; (2) completing 18 upper division credits in another department or discipline; or (3) completing the requirements for an area of emphasis designed by the individual student and approved by the environmental studies coordinator.

### **Graduate Study**

The Department of Forest Resources offers the Master of Science, Master of Forestry, and Doctor of Philosophy degrees. See the graduate catalog for prerequisites and further information.

<sup>1</sup>Communication requirements are Engl 101 (or by CLEP examination) or Engl 111, plus Engl 200 and three credits from Engl 305, Spch 105, or Comm 130.

<sup>2</sup>Camp may be taken after the freshman year if Biol 125 and 126 have been completed.

## Forestry Courses

Natural Resources courses 101 through 601 are listed under the College of Natural Resources, pages 45-47.

**199. Professional Orientation Seminar.** Introduction and orientation to the forestry, outdoor recreation, watershed science, and related professional careers. Education, curricula, faculty, professional societies, and employment opportunities. (1F)

**300. Principles of Forestry.** Historic and cultural foundation of present forest use. Current use and management of America's forests emphasizing problems of growth, multiple-use management, and ownership. Contemporary issues examined, such as clear cutting and wilderness area management. (3W)

**301. Forest Surveying.** Practical field problems in surveying methods employed in wildland management. Traverse and topographic methods. Lab fee. (4 Summer Camp)

**302. Forest Practice.** Field study of timber volume and inventory techniques, succession, silviculture, and compartmental examination. Related uses of wildlands. Lab fee (6 Summer Camp)

**303. Utilization Field Trip.** Field trip to lumber, paper, and logging activities, forest management, and silviculture in western forests. Required in summer camp. Fee: about \$50 for travel plus daily expenses. (2Su)

**320. Dendrology.** Taxonomy, nomenclature, identification, geography, and ecological characteristics of major North American forest trees. (4F)

**321. Tree Growth and Structure.** Study of the growth processes, morphology, wood anatomy, and reproduction of forest trees. (4W)

**324. Silviculture I.** Characteristics of tree species influencing silvicultural practice in the United States. Silvicultural methods used in securing natural reproduction of forests; their applications to important species and forest types. Prerequisites: summer camp, FR 320, Soils 358, and FW 284. (5F)

**330. Forest Measurements.** Measurements of timber in log, tree, and stand; log rules and scaling; statistical methods useful in analyzing forest data; timber cruising practices. Prerequisites: summer camp, NR 360, Stat 201 or 501 and Stat 502. (5Sp)

**365. Basic Wildfire Suppression.** Trains individuals in basic wildfire behavior and suppression and qualifies the student to function as a member of a wildfire suppression crew. (2Sp)

**405. Professional Practicum in Forest Resources Planning and Management.** A seminar course designed to integrate seasonal job experience with professional course work in forest resources. Prerequisites: junior standing, permission of instructor, and approved summer job. (1-6F,Sp)

**IO 410. Conservation/Environmental Education.** Acquaints students with nature and extent of our natural resources, principles for their wise use, and procedures for incorporating this knowledge into learning situations. (4Sp)

**420. Introduction to Forest Resource Economics.** Application of economic concepts to private and public sector forest decisions. Investment analysis, benefit-cost analysis, optimal rotation, valuation of nonmarket forest outputs. Prerequisite: Econ 201. (4W)

**424. Silviculture II.** The practices of silviculture as they are applied in different regions of the United States. Prerequisite: FR 324. (4W)

**443. Forest Management.** Physical and economic factors influencing forest regulation for sustained timber yields; management and decision making; timber and multiple-use management plans and planning. Prerequisites: FR 324, 330; NR 360, 380, 390. (4Sp)

**445. Logging.** Elements of timber harvest systems examined with respect to utilization of resources and minimizing impacts on soil and water. (3W)

**465. Wildland Fire Management and Planning.** Fire as a resource management tool with applications in forestry, range, and wildlife fields. Fire policy, prescription planning, economics, fire behavior, and management. (3Sp)

**491. Directed Study.** (1-3)@

**498. Co-op Education.** Directed and evaluated work experience with public and private employers for students in cooperative education programs. (3F,W,Sp,Su)

**510. Human Dimensions of Natural Resource Management.** Will provide an understanding of human influences on the resource management process, including maximizing social benefits, behavior modification, and organizational behavior. (3Sp)

**524. Principles and Practices of Intensive Silviculture.** Designed to familiarize student with silvicultural methods appropriate for intensive forest management includ-

ing artificial regeneration and the assessment and control of basic growth and yield relations. (4F)

**527 (d628). Properties and Management of Wildland Soils.** Biological, chemical, and physical properties of wildland soils; site productivity and classification of wildlands; techniques for managing wildland soils and the consequences of management. (3F)

**\*\*528. Tree Improvement and Forest Genetics.** Study of genetic variation in forest trees and its exploitation in tree breeding programs. (3Sp)

**\*\*534. Remote Sensing of Natural Resources.** Applications of remote sensing to natural resource management; interpretation of aerial photos, satellite and radar imagery; digital analysis; vegetation and soil mapping; photogrammetry; survey techniques. (4F)

**535. Forest Biology Seminar.** Regularly scheduled seminar by faculty and biologists from other institutions on topics related to forest biology. (1W)

**\*\*550. Numerical Classification Methods for Natural Resources Research.** Hierarchical and nonhierarchical classification systems. Cluster analysis and its uses. Case studies and applications in developing information for natural resource management. Three lectures, one lab. Prerequisites: FORTRAN, Stat 501, or permission. (3F)

**552. Forest Resource Planning.** Planning on forest lands under multiple use-sustained yield orientation. Emphasis on use of benefit-cost analysis and mathematical programming in public forest planning. Three lectures, one 3-hour lab. Prerequisite: one course in management planning. (3W)

**553. Natural Resource Administration.** Examination of the organization-administrative structures and processes common to natural resource agencies and how professional-organizational life and resource decisions are affected. Prerequisite: MHR 609 or equivalent. (3F)

**555. Environmental and Natural Resources Law and Policy.** Regulation of water, air, land, and fish and wildlife resources. Federal legislation and court cases are emphasized. Current issues and state law are also considered. (2-3W)

**565. Urban Forest Management.** Biological, administrative, and social aspects of managing urban forests; field exercises in inventory and planning. (4W)

**566. Shade Tree Pathology.** Identification, biology, and management of urban tree diseases of regional and national importance. (5W)

**\*570. Forest Vegetation of the Rocky Mountains.** Ecology of principal taxa of Rocky Mountain forests; regional approach to community composition, dynamics, and distribution; effects of disturbance; vegetation classification by habitat types. Prerequisites: Biol 386, FR 320. (3Sp)

## Graduate<sup>2</sup>

**625. Advanced Silviculture.** (3)

**628 (d527). Properties and Management of Wildland Soils.** (3F)

**630. Agroforestry.** (3Sp)

**641. Current Issues in Multiple-use Forest Management.** (3W)

**642. Advanced Forest Management.** (3Sp)

**643. Natural Resource Policy.** (3)

**653. Natural Resource Administration.** (3F)

**655. Directed Studies in Urban Forestry.** (1-3F,W,Sp,Su)

**656. Directed Studies in Forest Pathology.** (1-3F,W,Sp,Su)

**657. Directed Studies in Shade Tree Pathology.** (1-3F,W,Sp,Su)

**665. Forest Biology.** (3F)

**670. Forest Ecology.** (3W)

**671. Perturbation Ecology in Forested Systems.** (3Sp)

**680. Forest Science Seminar.** (1-3)@

**\*681. Natural Resource Research Design.** (5F)

**687. Ecology Seminar.** (1)@

691. Directed Study. (1-3)®

697. Thesis Research. (1-10)®

699. Continuing Graduate Advisement. (1-3)®

780. Forest Science Seminar. (1-3)®

797. Dissertation Research. (1-10)®

799. Continuing Graduate Advisement. (1-3)®

<sup>1</sup>Parenthetical numbers preceded by *d* indicate a dual listing.

<sup>2</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

\*Taught 1990-91.

\*\*Taught 1991-92.

## Recreation Resource Management Courses

**IO 250. Wilderness in America.** Review of the social, cultural, and historic foundations of wilderness concepts, public agencies responsible for wilderness management, and allocation-management problems, including several case studies. (3W)

**300. Recreational Use of Wildlands.** Factors responsible for recreational use, legislative programs, philosophical concepts, and descriptions of recreation agencies involved in wildland recreation management. (3F)

**346. Ski Mountaineering.** Introductory course dealing with snow safety, personal survival, winter mountaineering and field skills, search and rescue techniques, avalanche hazards, and winter equipment selection and use. (3W)

**405. Professional Practicum in Forest Resources Planning and Management.** A seminar course designed to integrate seasonal job experience with professional course work in forest resources. Prerequisites: junior standing, permission of instructor, approved summer job. (1-6F,Sp)

**451. Interpretive Planning.** Analysis and development of interpretive programs for recreational areas. Techniques of natural history interpretation. Evaluation and planning for visitor information programs. (3Sp)

491. Directed Study. (1-3)®

**510. Outdoor Recreation Behavior.** Examination of the cultural, social, and psychological influences on human behavior in a wildland recreation setting; analysis of planning; and management implications. Prerequisites: RR 300, Soc 350. (4F)

530. Tourism Development. (3)

## Graduate<sup>1</sup>

651. Forest Recreation. (3)

652. Forest Recreation II. (3)

680. Outdoor Recreation Seminar. (1-3)®

691. Directed Study. (1-3)®

697. Thesis Research. (1-10)®

699. Continuing Graduate Advisement. (1-3)®

780. Outdoor Recreation Seminar. (1-3)®

797. Dissertation Research. (1-10)®

799. Continuing Graduate Advisement. (1-3)®

<sup>1</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

## Watershed Science Unit

Director: Associate Professor Charles P. Hawkins

Assistant Professor James P. Dobrowolski

## Objectives

Watershed science is concerned with water-oriented aspects of natural resource management with emphasis on water resource management. The Watershed Science Unit, an interdepartmental organization between the Fisheries and Wildlife, Forest Resources, and Range Science Departments, administers programs in watershed science at the undergraduate and graduate levels, and in watershed management at the undergraduate level. The watershed science curriculum, strongly oriented toward basic sciences, serves as a base for study in wildland hydrology and qualifies students as hydrologists by Office of Personnel Management standards. Options available at the undergraduate level emphasize watershed management, hydrology, and ecology. Graduate programs include both MS and PhD degrees in watershed science.

## Requirements

### Bachelor of Science in Watershed Science

All Watershed Science majors must complete the following core courses: Biol 125, 126, 386; Chem 121, 122, 141; Geol 111; Math 220, 221; Phyx 111, 112; Soils 358, 359; 1-3 credits of professional orientation courses selected from FW 199, FR 199, and RS 199; NR 101, 102, 201, 360, 370, 380, 390; WS 300; 2 courses selected from FW 300, FR 300, RR 300, and RS 300.

The following courses must be completed during Summer Camp: FR 301, 302, 303; RS 298; FW 298. The credits earned at camp do not count toward the 186 credits required for graduation.

In addition to the courses listed above, students must complete courses listed for one of the following options:

**Hydrology Option.** Bimet 200; CEE 344; FW 460, 461; FR 534; Soils 565, 566; WS 420, 475, 489, 545, 649.

**Management Option.** Bimet 200; FW 461, 571; FR 324, 534; RS 563; Soils 527; WS 420, 475, 489, 545, 649.

**Ecology Option.** Bimet 550; Geol 560; FW 460, 461; Zool 580; FR 527, 534; RS 541 or Bot 420; RS 461; Soils 565, 566; WS 420, 475; FW 462; WS 649.

## Watershed Science Courses

**300. Watershed Management.** Principles and methods of managing range and forest land for optimum production and regulation of water yields, and for maintaining soil stability. (3W,Sp)

**375. Watershed Instrumentation.** Application of data collection devices and systems of measurements of wildland watershed parameters; installation and operation of hydrometeorologic equipment; techniques for interpretation and analysis of data. (3F)

**405. Professional Practicum in Forest Resources Planning and Management.** A seminar course designed to integrate seasonal job experience with professional course work in forest resources. Prerequisites: junior standing, permission of instructor, approved summer job. (1-6F,Sp)

**420. Forest and Range Hydrology.** Hydrologic principles applied to the management of wildland watersheds. Effects of wildland management activities on watershed function. Lab and field exercises in applied techniques of wildland hydrology. Prerequisite: WS 300 or consent of instructor. (5F)

**475. Wildland Water Quality.** Water quality parameters and use criteria; "background" quality, sources of pollution, and effects of land management on wildland water quality; sampling techniques. (3Sp)

**480. Watershed Science Problems.** Individual study and research upon selected problems in watershed science and related subjects. (1-6F,W,Sp)®

**489. Wildland Erosion and Sedimentation.** Processes of soil loss and deposition; structural, mechanical, and vegetative practices to control erosion on wildland watersheds. Prerequisite: permission of instructor. (3W)

**545. Disturbed Land Hydrology.** Study of hydrologic concerns associated with drastic land disturbance. Implications of wildland rehabilitation and mined land reclamation treatments to water quantity, quality, and timing will be emphasized. Prerequisite: WS 420 or equivalent. (3Sp)

**546. Snow Dynamics.** Fundamentals of snow dynamics and avalanche forecasting, management of snow in recreational areas. (1-3W)

### Graduate<sup>1</sup>

**649 (f541).<sup>2</sup> Small Watershed Hydrology.** Also listed as CEE 649. (4Sp)

**670 (f570). Watershed Hydrologic Modeling.** (3W)

**682. Watershed Science Seminar.** (1)®

**690. Watershed Science Problems.** (1-6)®

**697. Watershed Science Thesis.** (1-15)®

**699. Continuing Graduate Advisement.** (1-3)®

**797. Watershed Science Dissertation.** (1-15)®

**799. Continuing Graduate Advisement.** (1-3)®

<sup>1</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

<sup>2</sup>Parenthetical numbers preceded by an *f* are the *former* course numbers.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

## Department of

# Geography and Earth Resources

## College of Natural Resources

**Head: Professor Derrick J. Thom**  
Office in Natural Resources 201

**Associate Professors** Ted J. Alsop, Clifford B. Craig; **Assistant Professors** Michael P. O'Neill, R. Douglas Ramsey

**Degrees offered:** Bachelor of Science (BS) and Bachelor of Arts (BA) in Geography

### Objectives

The undergraduate program in geography provides a broad background in systematic geographic processing and analysis, emphasizing the acquisition of skills and specialization that will prepare the student for professional employment or graduate school. The geography student is expected to integrate courses from this department and from other disciplines in the three sub-areas of the geography program: regional studies, systematic geography, and development of technical skills. Faculty expertise allows the student the opportunity to specialize in remote sensing, geographic information systems, climatology, environmental modeling, international development, community and rural planning, and geographic education. The focus of these specialization areas is to provide the student with marketable skills that would lead to a successful career.

The Department of Geography and Earth Resources maintains laboratories with state-of-the-art equipment for research and teaching in the fields of satellite remote sensing, digital image processing, automated mapping, geographic information systems, map analysis, and environmental modeling. Geography majors can apply for scholarships, internships, and assistantships offered by the Geography and Earth Resources Department and the College of Natural

Resources, or may qualify for part-time employment with ongoing research projects receiving funding in the Geography and Earth Resources Department.

### Requirements

**Major in Geography.** Every geography major is required to complete 48 credits. A grade of *C* or better is required in any course in geography to meet the requirements for a major, minor, teaching major, or teaching minor in geography. A 2.5 grade point average in geography courses is required for graduation.

Required introductory courses include Geog 101 or 103, Geog 113, and NR 101. Required methods and techniques courses include Geog 185, Geog 390 or NR 360, and Geog 588 or NR 380. In addition, majors are required to take an additional 6 credits from each of the regional, systematic, and methods courses designated in the catalog. The remaining 8 credits are elective.

The geography program offers the student the opportunity to specialize in remote sensing, GIS, climatology, environmental modeling, international development, community and rural planning, and geographic education. Students interested in fields of specialization will be advised by their adviser to take predetermined courses to complete the specialization requirement.

**Minor in Geography** (24 credits). Geog 101 or 103, 113, and 185 are required for a geography minor. The remaining 11 credits are elective and should be upper division courses elected from both the systematic and regional fields.

**Teaching Major in Geography.** A total of 48 credits is required, as follows: Introductory required courses—Geog 101, 103, and 113; required regional course—Geog 308; required methods and tech-

niques courses—Geog 185 and 580. The remaining 24 credits are elective and should be taken from the systematic and regional fields.

**Teaching Minor (30 credits).** Geog 101, 103, 113, 185, and 580 are required. Teaching minors are encouraged to take additional regional and systematic courses.

## Geography Courses

### Introductory

**SS 101. Human Geography.** A spatial study of human behavior within selected socio-cultural setting (i.e., value systems, cultural landscapes, rural-urban behavior, and human appetites). (5F,W)

**SS 103. World Regional Geography.** A survey of world cultural regions with an analysis of political, economic, and resource patterns in their physical setting. (5W,Sp)©

**PS 113. Physical Geography.** An introduction to physical geography consisting of four lectures and one demonstration each week. A geographic analysis of the processes and distribution of the elements of the natural environment, i.e., atmosphere, lithosphere, biosphere, and hydrosphere. (5F,W,Sp)©

**IO 171. Human Impact on Environment.** Assessment of natural and man-related processes that together act to modify the environment. Regional variations will be considered. (5)

**185. Map Interpretation.** A basic survey of the philosophical, theoretical, and practical nature of maps with an emphasis on map reading, interpretation, and analysis. (3)

**223. Economic Geography.** Geographic analysis of world patterns of economic activities, i.e., production, consumption, and exchange, with emphasis on factors of industrial location. (3)

**225. Introductory Cooperative Internship.** An introductory-level educational work experience in a cooperative education position approved by the department. Credit arranged. (1-6F,W,Sp,Su)

### Regional

**302. Geography of Africa.** The physical and cultural geography of sub-Saharan Africa. Attention is drawn to relationships between man and environment and to economic and political changes. (3)

**307. Geography of Anglo-America.** A survey of population, natural resources, and geographic regions of America and Canada, and their implications in the economic and political affairs of the world. (3)©

**308. Geography of Utah.** Physical and cultural geography of Utah. Ways in which cultural adjustments have been made to aridity, proximity to California, the urban sprawl, and outdoor recreation. (3)

**314. Geography of Asia.** A geographic analysis of physical and human resources of Asia. Contemporary political, economic, and social problems are evaluated in their regional context. (3)

**325. Geography of Europe.** The influence of geography on domestic and international problems, cultural, ethnic, and linguistic backgrounds, boundaries, population trends, economic and government systems. (3)©

**328. Geography of Latin America.** The physical and socioeconomic characteristics of Latin America. The spatial patterns of human and environmental phenomena are discussed with emphasis on cultural, historical, and political geography. (3)

**330. Geography of Developing Lands.** A geographic analysis of developing and emergent countries in terms of internal and external problems and interrelationships. (3)

### Systematic

**343. Political Geography.** The relationship between earth and state. World political phenomena studied from a geographic point of view including international boundaries, territorial seas, and landlocked states. (3)

**351. Geography of Population and Settlement.** The impact of technology and population growth on natural resources. Attention is drawn to the distribution of population and settlement in relation to the environment. (3)

**355. Geography of Food.** An analysis and description of the world's food production and consumption. This regional study emphasizes differences in food patterns between developed and developing countries. (3)

**361. Geography of Urban Planning.** Analysis of the organization and interrelationships of urban-city space. Emphasis on spatial planning of rural-urban environments for improved quality of life. (3)

**381. Physiography of the United States.** Study of the physiographic regions of the United States as produced by mass wasting, fluvial, aeolian, glacial, and coastal processes. Regional landscape differences are also studied. (3)

**PS 382. Regional Climatology.** Descriptive treatment of regional and world climates with emphasis on the geographical features and the associated physical mechanisms that produce different climatic regions. (3)

### Methods and Techniques

**385. Beginning Cartography and Graphics.** Principles and techniques used in design and construction of maps, charts, and map projections. (3)

**390. Statistical and Spatial Analysis in Geography.** Introduction to the scientific approach in analyzing geographic data. Emphasizes sampling methods, statistical tests, and measures of spatial variation applied to geography. (3)

**425. Advanced Cooperative Internship.** Cooperative education/work experience; increased complexity and a more professional level of experience as student advances toward completion of the program. Credit arranged. (1-15)

**570. History of Geographic Thought.** Designed to acquaint students with the aims, methods, and accomplishments of geography as a professional field and a discipline in the past, present, and future. (3)

**571 (d671). Aerial Photo Interpretation I.** Use of aerial photographs for the analysis of landscapes and for the interpretation of individual features in their physical and cultural complex. (3)

**572 (d672). Aerial Photo Interpretation II.** Determination of location, character, and nature of objects imaged on aerial photographs. Use of precise measurements from aerial photographs for identifying, locating, and describing imaged objects. (3)

**575 (d675). Geographic Applications of Remote Sensing I.** Provides information needed to understand and apply the techniques of remote sensing to a wide range of resource applications. (3)

**576 (d676). Remote Sensing II.** Advanced techniques in the analysis of earth feature space using remotely-sensed imagery and data in a digital format. Individual projects will employ and/or develop research models. (3)

**580 (d680). Teaching Geography.** Designed to assist the classroom teacher in the presentation of geographic information. Techniques, methods, and sources of data will be stressed. (3)

**585 (d685). Cartography.** Advanced techniques in map construction, design, classification, analysis, and evaluation. (3)

**588 (d688). Geographic Methods.** Designed to acquaint the student with techniques and resources utilized in geographic research. Projects requiring this methodology will be required relating to problems in Cache Valley. (3)

**590. Geography Field Practicum.** A course for students in geography who are involved in field research and/or internships. (1-6)

**595 (d695). Computer Cartography I.** Introduction to use of computers for displaying geographic data. Several mapping algorithms on microcomputers and mainframe computers will be used and evaluated. Prerequisite: Geog 385. (3)

**596 (d696). Computer Cartography II.** Investigation of complex computer mapping algorithms for presenting geographic data. Introduction to geographic information systems as tools for analytical research. Prerequisite: Geog 595. (3)

**598. Special Topics.** Designed to provide special insight and in-depth study of topics of present concern. (1-6)©

**599 (d699). Readings and Conference.** (1-3)©

### Graduate

**625. Graduate Cooperative Internship.** (1-15)

**671 (d571). Aerial Photo Interpretation I.** (3)

672 (d572). Aerial Photo Interpretation II. (3)

675 (d575). Geographic Applications of Remote Sensing I. (3)

676 (d576). Remote Sensing II. (3)

680 (d580). Teaching Geography. (3W)

685 (d585). Cartography. (3W)

688 (d588). Geographic Methods. (3Sp)

695 (d595). Computer Cartography I. (3)

696 (d596). Computer Cartography II. (3)

699 (d599). Readings and Conference. (1-3)®

<sup>1</sup>Parenthetical numbers preceded by *d* indicate a *dual* listing.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through the Life Span Learning Independent Study Division.

## Department of Geology College of Science

**Head:** Associate Professor Donald W. Fiesinger  
Office in Geology 205

**Professor** Robert Q. Oaks, Jr.; **Professor Emeritus** Clyde T. Hardy;  
**Associate Professors** Peter T. Kolesar, W. David Liddell, James P.  
McCalpin; **Assistant Professors** James P. Evans, Thomas E. Lach-  
mar

**Degrees offered:** Bachelor of Science (BS), Bachelor of Arts (BA),  
and Master of Science (MS) in Geology; MS in Ecology (Geology)

### Objectives

Geology is the study of the planet Earth, the materials of which it is made, the processes that act on these materials, the products formed, and the history of the planet and its life forms since its origin. Geology considers the physical forces that act within and on the Earth, the chemistry of its constituent materials, and the biology of its past inhabitants as revealed by fossils. Geologists integrate biology, chemistry, engineering, mathematics, and physics in the study of our natural surroundings. The knowledge thus obtained is used by geologists to explore for energy, mineral, and water resources, identify geologically stable sites for major structures, and to provide foreknowledge of some of the dangers associated with the mobile forces of a dynamic Earth. Geologists provide fundamental information required by modern society to plan for cultural and industrial development, reduce geological hazards, identify potential resources, and assist in the design of waste disposal facilities.

The Department of Geology prepares students for professional careers in the geosciences and provides the background required for advanced studies. The department offers three options of study to meet the growing demand for geoscientists with training in general geology, hydrogeology-engineering geology, or geoarchaeology. All options provide exposure to the sciences and an appreciation of our physical surroundings. The BS program in Geology meets the curriculum standards established by the American Institute of Professional Geologists.

The Department of Geology is housed within the Geology Building, which is located at the northeast corner of the Old Main Quad. Renovated in 1988-89, the Geology Building provides spacious well-equipped teaching labs, classrooms, and facilities for the de-

partment, including a display and study area for students, document room, map room, preparation facilities, and research labs.

### Requirements

**Departmental Admission Requirements.** Admission requirements for the Department of Geology are the same as those described for the University.

**Bachelor of Arts Degree.** For a BA in Geology, the foreign language requirement must be satisfied in addition to the Bachelor of Science Geology requirements.

**Bachelor of Science Degree.** Three options of study are available for a BS in Geology: General Geology, Hydrogeology-Engineering Geology, and Geoarchaeology.

For a BS in Geology (General Geology option), the following courses are required: Geol 111, 200, 400, 405, 410, 416, 420, 422, 430, 470, 520, 540, 560; Chem 121, 122, 123, 124, 160; Phyx 221, 222, 223; Stat 501 or CS 171; Biol 127; Math 220, 221.

For a BS in Geology (Hydrogeology-Engineering Geology option), the following courses are required: Geol 111, 200, 400, 405, 410, 420, 422, 470, 520, 540, 544, 546, 548, 560, 564; Math 220, 221, 222, 321, 322; Chem 121, 122, 123, 124, 160; Phyx 221, 222, 223; Stat 501; CS 171; Soils 513; Engr 200, 204; CEE 221.

For a BS in Geology (Geoarchaeology option), the following courses are required: Geol 111, 200, 400, 420, 422, 430, 470, 560; Anthr 110, 231, 235, 433, 435, 480 (Human Osteology), 480 (Primate Paleontology); Chem 121, 122, 123, 124, 160; Math 220, 221; Stat 501 or CS 171; Biol 125, 126, 127.

The Geology Major Requirement Sheet, available from the Department of Geology office, Geology Building 205, provides a recommended plan of study for each of these options. Some required courses, however, are only offered every other year. It is imperative that students remain in contact with the Geology adviser on a regular basis (at least every fall and spring quarter) to avoid problems in scheduling these required courses.

**Geology Minor.** A minimum of 24 credit hours is required for an approved minor in Geology. Required courses are Geol 111 or 101, and 200. Elective courses must be 300-level or above. At least 12 credits must be at the 400-level or above.



**Geology Teaching Minor.** Completion of the Geology teaching minor satisfies most requirements for the Earth Science endorsement of the Utah State Office of Education. Required courses are Geol 111 or 101, 200, 400, 420, 430 or 470, and 560.

**Composite Teaching Major.** A composite teaching major is offered in Earth Science. For a listing of course requirements, see the Secondary Education section of this catalog, the *Guide to the Undergraduate Program in Secondary Education at USU* available at the USU Bookstore, or the Geology Major Requirement Sheet available from the Department of Geology.

**Field Trips and Labs.** Most geology courses have required laboratories and/or field trips. Those enrolled are expected to dress properly for the conditions and observe safety precautions issued by the instructors. Most courses require modest lab fees.

## Graduate Study

**Master of Science Degree.** The Department of Geology offers advanced study and research leading to the Master of Science degree.

**Ecology Curriculum.** The Department of Geology collaborates with the USU Ecology Center in offering an interdepartmental curriculum in ecology (physical).

## Geology Courses

**PS 101. Introductory Geology.** Physical processes that shape the earth, and physical and biological history of the planet. Four lectures and one lab per week. (5F,W,Sp,Su)@

**PS 111. Physical Geology.** Physical processes, both internal and external, that shape the earth. Relationship between geology and other physical sciences emphasized. Four lectures and one lab per week. (5F,W,Sp)

**PS 200. Earth History.** Physical and biological history of the earth as revealed by the geologic record. Interpretive techniques. Three lectures and one lab per week. Prerequisite: Geol 101 or 111. (4Sp)

**225. Introductory Internship/Co-op.** Introductory educational work experience. (1-6F,W,Sp,Su)

**350. Geology Field Excursions.** Geologic features and processes observed in the field. Prerequisites: Geol 101 or 111 and permission of instructor. (1-3F,Sp,Su)@

**400. Mineralogy.** Identification of minerals by physical and chemical properties. Introduction to crystallography and crystal chemistry. Three lectures and two labs per week. Prerequisites: Geol 111, Chem 123 and 160. (5F)

**405. Optical Mineralogy and Petrography.** Introduction to the theory of optical crystallography. Determination of minerals by using the petrographic microscope. Three lectures and one lab per week. Prerequisites: Geol 400 and Phyx 223. (3W)

**410. Sedimentary Petrology.** Classification and origin of sedimentary rocks with emphasis on mineral composition. Three lectures and one lab per week. Prerequisites: Geol 400, 405, and 422. (4Sp)

**\*416. Igneous and Metamorphic Petrology.** Classification and origin of igneous and metamorphic rocks with emphasis on mineral composition. Three lectures and one lab per week. Prerequisites: Geol 400 and 405. (4W)

**420. Structural Geology.** Interpretation of deformed rocks using techniques of modern structural analysis, emphasizing the relationship between mechanics, mechanisms, and geometries of deformation. Three lectures and two labs per week. Prerequisites: Geol 111, Phyx 221; or permission of instructor. (5W)

**422. Sedimentation and Stratigraphy.** Sedimentary environments and processes, stratigraphic units and principles, methods of sedimentary and stratigraphic analysis. Three lectures and one lab per week. Prerequisites: Geol 101 or 111, and Geol 200. (4F)

**425. Advanced Internship/Co-op.** Advanced educational work experience. (1-15F,W,Sp,Su)

**\*\*430. Paleontology.** Classification and evolution of invertebrates and microfossils. Use of fossils as stratigraphic and paleoenvironmental indicators. Three lectures and two labs per week. Prerequisites: Geol 200, Biol 125, 127. (5Sp)

**470. Geologic Field Methods.** Basic methods of field geology including recognition of geologic features, interpretation and preparation of geologic maps and cross sections. One lecture and two labs per week. Prerequisite: Geol 420. (3Sp)

**490. Special Problems.** Directed study of selected topics. Written report required. (1-6F,W,Sp)@

**\*\*516 (f616).<sup>1</sup> Igneous and Metamorphic Petrography.** Classification and description of igneous and metamorphic rocks utilizing the petrographic microscope. Two lectures and two labs per week. Prerequisites: Geol 405, 416. (4Sp)

**\*520. Geology Field Camp.** Integrative field activities to provide in-depth skills and knowledge of the methods of field geology. Prerequisites: Geol 400, 420, 422, 470; Geol 410, 416, 430 recommended; or permission of instructor. (4Su)

**\*\*530. Tectonics and Global Geophysics.** Fundamentals of the physics of the Earth's interior and the theory of plate tectonics; recognition of large-scale crustal deformation and plate interactions; tectonic development of North America. Four lectures per week. Prerequisite: Geol 420. (4F)

**540. Geochemistry.** Explores the application of chemistry to the solution of varied geologic problems. Three lectures per week. Prerequisites: Geol 400; Geol 410 recommended. (3W)

**\*\*544. Exploration Geophysics.** Survey of geophysical techniques used in exploration for hydrocarbons, groundwater, and ore deposits. Emphasis on field surveys, interpretation of data, and exploration applications. Three lectures and one lab per week. Prerequisites: Geol 111, 200, 410, 422; and Phyx 223. (4W)

**546. Hydrogeologic Systems.** Regional groundwater flow systems and their geologic environment; natural chemistry of groundwater and environmental isotope methods. Three lectures and one lab per week. Prerequisites: Geol 111 and 548; Math 322 and Geol 560 recommended; or permission of instructor. (4Sp)

**548. Groundwater Geology.** Geologic conditions that control the occurrence and quality of groundwater; groundwater regions of the United States. Four lectures per week. Prerequisites: Geol 111 and 560 or permission of instructor. (4F)

**\*552. Metallic Mineral Deposits.** Origin and geologic occurrence of metallic mineral deposits. Three lectures and one lab per week. Prerequisites: Geol 410, 416, 420. (4Sp)

**\*554. Petroleum Exploration.** Origin and geologic occurrences of petroleum. Subsurface methods utilized in exploration with emphasis on geophysics. Three lectures and one lab per week. Prerequisites: Geol 420, 422. (4W)

**560. Surficial Geology.** Geomorphic processes, origin of land forms, characteristics of surficial (unconsolidated) deposits. Emphasis on glacial, fluvial, lacustrine environments; surficial geologic mapping. Four lectures and one lab per week. Prerequisites: Geol 111, 420, 422, or permission of instructor. (5F)

**\*564. Photogeology.** Interpretation of geologic features on aerial photographs. One lecture and two labs per week. Prerequisites: Geol 420 and 560. (3Sp)

**\*\*580. Clay Mineralogy.** Techniques of clay mineral analysis; detailed clay mineral structures; physico-chemical constraints on clay formation and diagenesis; use of clays in paleoenvironmental interpretation. Three lectures and one lab per week. Prerequisite: Geol 400. (4W)

**590. Topics for Teachers.** Special topics in geology for elementary and secondary science teachers to provide an understanding of the geology of Utah and the western United States. Emphasis on field and lab activities, and acquisition of geologic materials for classroom use. Prerequisite: Geol 101 or 111; or permission of instructor. (1-5Su)

## Graduate<sup>2</sup>

**610. Noncarbonate Sedimentary Rocks.** (4)

**612. Carbonate Sedimentary Rocks.** (3)

618. Topics in Igneous Petrology (Topic). (3)

624. Advanced Structural Geology. (4)

628. Advanced Geological Mapping. (4)

630. Environmental and Engineering Geology. (3)

636. Paleogeology. (4)

640. Topics in Hydrogeology (Topic). (3)

680. Seminar. (1-6)®

697. Thesis. (1-12)®

699. Continuing Graduate Advisement. (1-3)®

<sup>1</sup>Parenthetical numbers preceded by an *f* are the *former* course numbers.

<sup>2</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through the Life Span Learning Independent Study Division.

\*Taught 1990-91.

\*\*Taught 1991-92.

## Department of

# Health, Physical Education and Recreation

## College of Education

**Head:** Professor Robert E. Sorenson  
Office in PE 122

**Professors** Lanny J. Nalder, Janice Pearce; **Associate Professors** Rich Gordin, Deana Lorentzen; **Assistant Professors** Ted Coleman, Steven E. Dunn, Hilda Fronske, Donna Gordon, Arthur R. Jones, Dennis A. Nelson, Bradford N. Strand, Rolayne Wilson; **Lecturers** Raymond Corn, Peter J. Mathesius; **Temporary Lecturers** Harold Potter, Fiona Reilly

**Degrees offered:** Bachelor of Science (BS) in Health Education; BS in Physical Education; BS in Parks and Recreation; BS in Dance Education; Master of Science (MS), Master of Education (MEd) in Health, Physical Education and Recreation

### Objectives

**Activity Courses.** USU students are served by an extensive elective activity course program. The number and diversity of

courses encourage students to increase their lifetime participation skills, to achieve and maintain a high level of personal fitness, to enjoy opportunities for creativity and expression, and to adopt a preventive medicine life-style conducive to a life of health and well-being.

**Recreational and Intramural Activities.** The intramural program is planned and conducted to meet the needs of all students regardless of skill or ability. The major objectives are to offer a wide variety of sports experiences, to encourage lifetime sports participation, to develop habits of fair play, and to provide for leadership experiences. The intramural concept not only embraces the traditional highly-organized program with teams, leagues, and tournaments, but also the concept of voluntary free play activities where opportunity is provided for physical recreation activities for all segments of the University community.

## Requirements

**Departmental Admission Requirements.** Admission requirements for the Department of Health, Physical Education and Recreation are the same as those described for the University on pages 8-11. Students in good standing who wish to major in health, physical education, recreation, or dance may apply for admission to the department.

**Secondary Teaching Majors and Minors.** An application for admission to teacher education should be completed before the junior year (see College of Education for requirements). Admissions approval is a prerequisite to teacher certification candidacy and to enrollment in education and educational psychology courses.

### Physical Education Major: Teaching Option

The teaching option in physical education offers a program of study leading to a Bachelor of Science degree. Along with this teaching major, the student must complete a teaching minor and 48 credits of professional education classes. The required courses in the curriculum include PE P 200, 201, 206, 326, 364, 365, 458, 469, 481, 483, 486, 487, 488; PE 300, 463; one method of coaching class; and nine credits of skill development.

### Physical Education Major: Exercise Science Option

The exercise science option in physical education offers a program leading to a Bachelor of Science degree. This option is designed to prepare the physical education major to pursue a vocation in private fitness or corporate fitness, or to pursue the Master of Science degree in Cardiac Fitness and Rehabilitation. The curriculum consists of 80 credits. The required core includes PE P 200, 322, 326, 458, 481, 483, 487, 488; PE 300, 463; HE P 250, 545; and NFS 122. The student must also select at least 45 additional credits from adviser approved electives, including a maximum of six activity classes. All students must complete a six-credit internship in cooperative education as part of the elective requirement.

### Physical Education Major: Pre-Physical Therapy Option

The pre-physical therapy option in physical education offers a program leading to a Bachelor of Science degree in physical education. This option is designed to prepare the student to enter a postbaccalaureate degree program in professional physical therapy. The curriculum consists of 90 credits. The required core includes: PE P 202, 322, 326, 458, 481, 483, 487, 488; PE 300, 463; HE P 250, 545; and NFS 122. The student must also select 55 elective credits from the following areas: Mathematics, Chemistry, Physics, Biology, Psychology, and First Aid. All students must complete a six-credit internship in cooperative education as part of the elective requirement.

### Physical Education Minor: Teaching Option

The physical education minor is designed to prepare the student to teach physical education in the secondary school. The required courses in this 33-credit minor include PE P 206, 326, 364, 365, 458, 481, 483, 486, one methods of coaching class, and a minimum of four credits in skill development.

### Physical Education Minor: Coaching Option

The physical education coaching minor is designed to assist the prospective teacher who may be assigned coaching duties in the

secondary school. This 34-credit minor includes PE P 322, 326, 458, 481, 483, 500, 505, four credits in skill development, and six credits in the methods of coaching areas.

### Health Education Major: School Health Option (Teacher Certification)

The school health education option offers a program of study leading to a Bachelor of Science degree in Health Education. With this teaching major of 45 credit hours, it is necessary for a student to also complete an approved teaching minor, ranging from 24 to 28 credit hours, plus 48 credit hours of professional education classes. The school health education curriculum consists of the following 35-credit required core: Physl 103, 130; NFS 122; and HE P 250, 401, 429, 441, 456, 457, 458. An additional ten credits must be selected from the following: HE P 431, 440, 451<sup>1</sup>, 482<sup>2</sup>, 545, 590; Pub H 302, 512, 530; Biol 308; SW 365, 375; Soc 333; and HE P 555, 556. (HE P 459 will count toward the professional education component.)

### Health Education Minor: School Health Option (Teacher Certification)

For a school health education minor, students must complete the following courses, totaling 28 credits: Physl 130; NFS 122; and HE P 250, 429, 441, 457, 458, 459.

### Health Education Major: Community Health Option

The community health education option offers a program of study leading to a Bachelor of Science degree in Health Education. This option requires completion of the following required core: Physl 103, 130; NFS 122; HE P 250, 401, 429, 440, 441, 451<sup>1</sup>, 456, 457, 458, 459, 482<sup>2</sup>, 545; InsT 442; Pub H 512, 530. From 29 to 34 credits of approved work must be taken from the following group of electives: Spch 105, 260; Psy 110 or FHD 150; Psy 121, 372, 380; Stat 201; FHD 301; BIS 140; Ins T 522; NFS 222; Soc 333; SW 365; PE P 326, 481, 483, 601; HE P 420, 431, 555, 556.

### Health Education Major: Pre-Physical Therapy Option

The pre-physical therapy option provides an opportunity for students to complete an academic major in Health Education while, at the same time, taking courses preparatory for admission to a physical therapy program. Students are advised to work closely with an academic adviser. Required courses include: PE P/HE P 202; NFS 122; HE P 250, 401, 429, 431, 440, 451, 457, 545; SW 375; Soc 333; PE P 322, 326, 481, 483, 488.

### Health Education Minor: Community Health Option

For a community health education minor, students must complete the following courses, totaling 29 credits: NFS 122; HE P 250, 401, 429, 441, 451<sup>1</sup>, 457, 459, and 545.

### Health Education Major: Community Health for Nurses Option

A student who has completed a nursing program and is currently a licensed RN, or a student currently enrolled in the Weber State/Utah State Nursing Program, can earn a BS degree in community health by completing the following core of required courses: NFS 122; HE P 250, 401, 440, 441, 451<sup>1</sup>, 457, 459, 482<sup>2</sup>; Pub H 512, 530; and Ins T 442. In addition, 8 to 12 credits must be taken from the following electives: HE P 420, 429, 431, 456, 458, 545; Soc 333; and SW 375.

<sup>1</sup>Prerequisite: HE P 401.

<sup>2</sup>Prerequisite: HE P 451.

### Teaching Major in Dance

A minimum of 48 credits is required for a teaching major in dance. All dance majors must complete six consecutive quarters with the department's performing group, *Danceworks*.

### Teaching Minor in Dance

A minimum of 26 credits is required for a teaching minor in dance.

Dance Education students should be aware that they must maintain a 2.5 GPA, and should fill out an application for admission to teacher education during their sophomore year. Approval is a prerequisite to certification candidacy and to enrollment in education and psychology classes.

### Dance Performance Major

Majors in dance performance complete a program of study of a minimum of 68 credits. Graduates from this major option will be able to select from a variety of career options. Those wishing to begin a business of their own are strongly encouraged to obtain a business minor.

### Dance Performance Minor

Students must complete a minimum of 28 credits for the dance performance minor.

### Recreational Dance Minor

This minor option prepares the student to teach recreational dance forms in formal and informal social settings. A minimum of 28 credits is required.

For detailed listings of required and elective courses, refer to the Dance Program major requirement sheet. Students should see their assigned advisers as soon as possible after entering the program to receive assistance in selecting the best option to meet their goals.

### Parks and Recreation Major

The HPER Department offers a program of study leading to a Bachelor of Science degree in Parks and Recreation. This program prepares students to become professionals in the public, private, commercial, and voluntary settings of parks and recreation who are capable of leading, programming, planning, designing, and administering these programs. For the Bachelor of Science degree the following courses are required: PR P 100, 200, 206, 403, 404, 406, 409, 450, 480, 500, 501, 505, 525, 550, 551, 552, 560. In addition PR P 410, a 12-credit one-quarter internship experience, is required.

### Parks and Recreation Minor

A minor in Parks and Recreation consists of a minimum of 30 credits of course work selected from the core courses. The required courses in this 30-credit minor include PR P 100, 200, 206, 403, 404, 406, 505, 551, 552; and 3 credits of PR P 225, Introductory Cooperative Work Experience.

### Graduate Study

The department offers courses leading to the Master of Science and Master of Education degrees in health, physical education, and recreation.

## Health, Physical Education and Recreation Courses

### Professional Courses in Health Education

**202. Introduction to Physical Therapy.** Introduces prephysical therapy students to the discipline of physical therapy and familiarizes them with its associated spectrum of opportunities and responsibilities. (2F)

**225. Introductory Cooperative Work Experience.** An introductory level educational work experience in a cooperative education position approved by the department. (1-6F,W,Sp,Su)®

**IO 250. Health and Wellness.** Designed to assist students in planning a life-style conducive to activating and improving one's optimal health and wellness, human ecology, and health investiture. (3F,W,Sp,Su)

**401. Principles of Community Health Education.** Emphasis on professional preparation for community agencies, facilities, and programs with focus on educating the public on health issues. Prerequisite: HE P 250 or consent of instructor. (3F)

**420. Women and Health.** Health issues of women: differing life-styles and health, reducing risks, women and drugs, family planning, and health problems related to the female reproductive system. (3W)

**425. Advanced Cooperative Work Experience.** Cooperative education work experience position; increased level of complexity and a more professional level of experience as student advances toward completion of the program. (1-15F,W,Sp,Su)

**429. First Aid and Emergency Care.** American Red Cross course provides information necessary for development of first aid knowledge, ability, and personal judgment. Functional capabilities developed to provide initial care necessary to maintain life support. (3F,W,Sp,Su)

**430. Cardiopulmonary Resuscitation.** Techniques and skills of airway management and cardiopulmonary resuscitation for the layperson, taught according to 1986 revised standards. No prerequisites necessary. Offered off-campus only, through the Extension Class Division. (1F,W,Sp,Su)

**431. First Aid Instructors Course.** Methods of teaching first aid, evaluation of teaching methods, and experience in administering tests. American Red Cross Certification available to those who meet the requirements. Prerequisite: HE P 429. (3Sp)

**440 (d640).<sup>1</sup> Stress Management.** Deals with concepts and principles which help individuals to maximize positive stress outcomes and minimize negative stress effects in obtaining and maintaining a normal, healthy homeostatic condition. (3W,Sp)

**441. Alcohol, Tobacco, and Drugs.** Students evaluate the use, misuse, and abuse of drugs in relation to the physical, mental, social, emotional, and value dimensions of individuals and society. (4F,Sp,Su)

**451. Planning and Evaluation in Community Health Education.** Essentials of systems and procedures for appropriate planning and evaluation of programs in health education and promotion. Prerequisite: HE P 401 or consent of instructor. (3W)

**456. Health Foundations of Education.** Responsibilities of public school teachers relating to health services, health environment, and health instruction. Implications of state school health laws are discussed. (3F)

**457. Consumer Health.** Focuses on helping students to become discriminating consumers of health information, health products, and health services. (3F)

**458. Sex Education in School Health Curriculum.** Discusses how to teach human sexuality, highlighting issues such as growth and maturation, sex roles, venereal disease, and parenting. (3W)

**459. Methods and Materials in Health Education.** Based on principles of learning and teaching strategies; students plan, present, and evaluate health lessons. A teaching resource file is developed. (4W,Sp)

**482. Field Work in Health Education.** Supervised student participation in school or community health programs or directed projects. Prerequisites: HE P 401 and 451. (1-5F,W,Sp,Su)

**510 (d610). Current Trends in Health Education.** Focuses on trends and issues in health; analyzes directions in which health education can go to confront the issues and formulate solutions. (3W)

**545 (d645). Health Aspects of Aging.** Major physical health aspects of aging and the aged including life expectancies, diseases, diet and exercise, medical care, death, loneliness, and communication with the aged. (3W,Sp)

**555. Practicum in Evaluating School System Programs.** An in-service seminar for experienced teachers. Emphasizes a look at strengths and weaknesses of existing programs, proposed programs, and ways to assess specific school or district programs. (1-6F,W,Sp,Su)®

**556. Practicum in Improving School System Programs.** An in-service seminar for experienced teachers which emphasizes improvement of instruction. (1-6F,W,Sp,Su)®

**590. Independent Study.** (1-3F,W,Sp,Su)®

**591. Independent Research.** (1-3F,W,Sp,Su)®

### *Graduate<sup>2</sup>*

**610 (d510). Current Trends in Health Education.** (3W)

**625. Graduate Cooperative Work Experience.** (1-15)

**640 (d440). Stress Management.** (3W,Sp)

**645 (d545). Health Aspects of Aging.** (3W,Sp)

**655. Practicum in the Evaluation of Instruction.** (1-6)®

**656. Practicum in the Improvement of Instruction.** (1-6)®

**682. Seminar in Health Education.** (1-5)®

**690. Independent Study.** (1-3)®

**691. Independent Research.** (1-3)®

**697. Thesis.** (1-9)®

**699. Continuing Graduate Advisement.** (1-12)®

<sup>1</sup>Parenthetical numbers preceded by a *d* indicate a *dual* listing.

<sup>2</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

### *Professional Courses in Physical Education*

**200. Introduction to Physical Education.** Designed to introduce major students to the profession of physical education—its nature, background, and role in today's schools and society. (2F,W)

**201. Introduction to Teaching Physical Education.** Designed to provide students opportunities to practice and develop teaching methods. Provides orientation to, and preparation for, student teaching. (2F,W,Sp)

**202. Introduction to Physical Therapy.** Introduces prephysical therapy students to the discipline of physical therapy and familiarizes them with its associated spectrum of opportunities and responsibilities. (2F)

**204, 205. Sports Officiating.** Knowledge of the rules and mechanics of officiating football, basketball, volleyball, and softball. Attention is given to instruction of other game officials. PEP 204 deals with football. PEP 205 deals with basketball in the winter, and with volleyball and softball in the spring. (2F) (2W,Sp)

**206. Administration of Intramural Sports.** (3F,W)

**220. Fundamentals of Tennis.** Provides students with the knowledge, skills, and strategies for successful participation in tennis. (1F,Sp)

**221. Fundamentals of Ballroom and Square Dance.** A professional course designed to develop the fundamental skills of ballroom and square dancing. (1W)

**222. Fundamentals of Badminton.** Provides knowledge, skills, and understanding of badminton for successful participation in badminton, and teaching competency as well. (1F,W)

**224. Fundamentals of Gymnastics.** Provides fundamental and technical skills of men's and women's gymnastics. (1F,W)

**225. Introductory Cooperative Work Experience.** An introductory level educational work experience in a cooperative position approved by the department. Credit arranged. (1-6F,W,Sp,Su)®

**226. Fundamentals of Volleyball.** Provides knowledge, skills, and understanding for successful participation in volleyball and teaching competency as well. (1F,Sp)

**230. Fundamentals of Soccer.** This course is intended to instruct the physical education major/minor in the fundamental skills of soccer. (1Sp)

**231. Fundamentals of Basketball.** Provides physical education majors with the knowledge, skills, and understanding of basketball to allow successful participation in the sport as well as teaching competency. (1W)

**301. Physical Education in the Elementary School.** Designed for elementary education majors. Stresses development of a positive body image, basic movement, exploration, locomotor and manipulative skills, planning, organizing, and teaching. (3Su)

**302. Practicum in Elementary School Physical Education.** Focuses on selection of activities and the construction and use of inexpensive and innovative equipment. Students plan and teach approved activities in elementary schools. (3F,W,Sp)

**303. Physical Education in the Elementary School (K-3).** Designed to introduce students to the core program in movement and fitness. Contains developmental activities focusing on body and space awareness. (3F,W,Sp,Su)

**304. Physical Education in the Elementary School (4-6).** Focuses on basic sport skills, fitness, games and sports, rhythms, and gymnastics for grades 4 through 6. (3F,W,Sp,Su)

**322. Prevention and Care of Athletic Injuries.** (2F,Sp)

**326. Anatomical Kinesiology.** An understanding of human anatomy and basic mechanical principles which is fundamental to the application of efficient human movement. (3F,W)

**364. Strategies and Materials for Teaching Individual and Dual Sports.** Deals with strategies, techniques, and materials involved in planning and implementing quality physical education programs in dual and individual sports. Lesson, unit planning, and evaluation are discussed. (2F,Sp)

**365. Strategies and Materials for Teaching Team Sports.** Deals with strategies, techniques, and materials involved in planning and implementing quality physical education programs in team sports. Lesson, unit planning, and evaluation are discussed. (2F,W)

**407. Gender and Sport.** To survey the multidisciplinary analysis of the problems, patterns, and processes associated with the involvement of women in sports programs. (3F)

**422. Advanced Prevention and Care of Athletic Injuries.** Exposes students to advanced concepts and practical laboratory experiences in the prevention and care of athletic injuries. Students will be exposed to all concepts necessary to plan, coordinate, and supervise all components of an athletic training room. Approval of instructor required. (3F,Sp)

**425. Advanced Cooperative Work Experience.** Cooperative education work experience position; increased level of complexity and a more professional level of experience as student advances toward completion of the program. (1-15F,W,Sp,Su)®

**457. Methods of Teaching and Coaching Wrestling.** Prepares future teachers/coaches of wrestling. Explores responsibilities a coach will encounter in preparing a team for competition; teaching strategies for a physical education class. (2W)

**458. Principles of Conditioning (Fitness and Weight Training).** Prospective teachers will develop methods and teaching skills for conditioning the human body using various fitness components in sports, exercise, and conditioning classes. (3W,Sp,Su)

**460. Methods in Physical Education.** Planning, strategies, techniques, and methods of teaching in physical education. Students participate in discussion and practical experience. Laboratory work experience required. (4F,W,Sp)

**466. Methods of Teaching and Coaching Gymnastics.** Prepares students as future teachers and coaches of men's and women's gymnastics. How to organize classes or teams in proper training conditions while maintaining a safe environment. (2W)

**469. Field Based Practicum in Physical Education.** Designed to provide the physical education major with practical field-based experiences via micro-teaching opportunities in cooperating schools. (2F,W,Sp)

**470. Football Coaching Methods.** (2Sp)

**471. Basketball Coaching Methods.** (2F)

**472. Track and Field Coaching Methods.** (2Sp)

**474. Methods of Coaching Volleyball.** Comprehensive plan for coaching/teaching on a highly skilled level. Provides background in the methods necessary to better understand and coach volleyball. (2F)

**480. Mental Aspects of Sports Performance.** This course attempts to provide a current knowledge of sport psychology and the applications this knowledge has for teaching sports and coaching in public schools. (3W)

**481. Physiology of Exercise.** A study of physiological changes that occur as a result of exercise and work. The course involves laboratory practicum as a means of demonstrating physiological change. Prerequisite: Physl 130. (3W,Sp,Su)

**482. Physical Education for the Handicapped.** Philosophy and understanding the needs of the handicapped in physical education. Concepts, methods, curriculum, equipment, and facilities for effective use are presented. Laboratory work required. (3F)

**483. Biomechanics.** Focuses on improved teaching and coaching through biomechanical and anatomical analysis of sports and related activities. Prerequisite: PE P 326. (3W,Sp)

**486. Administration of Physical Education.** Focuses on administrative procedures in secondary education; includes curriculum development, and program planning. (3W,Sp)

**487. Evaluation in Physical Education.** Focuses on the nature and use of a variety of tests in physical education. Practical application, interpretation, and use of test results are stressed. (3F,Sp)

**488. Adapted Physical Education.** Designed to help prospective teachers recognize student physical impairments and handicaps, their etiology, prevention, and rehabilitation. Practical work in screening, diagnosis, and remediation. Prerequisite: PE P 483. (3W)

**500 (d600).<sup>1</sup> Administration of Athletics.** Discussion of issues in high school athletics relative to budget, public relations, equipment, schedules, facilities, hiring, retention, evaluation, etc. (3Sp)

**501 (d601). Leadership in Health, Physical Education and Recreation.** A group approach to improvement and innovation in leadership and supervisory skills. Familiarization with administrative skills and duties through discussion and lab approach. (3Sp)

**505 (d605). Psychological Aspects of Sports Performance.** Psychological theory and principles applied to sports. Includes motivational techniques, psychological evaluation, stress and anxiety in sports, personality and sports performance. (3Sp)

**507 (d607). Sport in Society.** Introduces students to complex role and social significance of sport in contemporary society; students become familiar with aims, scope, and potential contributions of sport in society. (3F)

**543 (d643). History and Philosophy of Physical Education and Sport.** History of physical education; philosophical influences which have contributed to contemporary physical education; methods of educational instruction using the primary philosophical positions. (3W)

**555. Practicum in Evaluating School System Programs.** An in-service seminar for experienced teachers. Emphasizes a look at strengths and weaknesses of existing programs, proposed programs, and ways to assess specific school or district programs. (1-6)®

**556. Practicum in Improving School System Programs.** An in-service seminar for experienced teachers which emphasizes improvement of instruction. (1-6)®

**590. Independent Study.** (1-3)®

**591. Independent Research.** (1-3)®

## Graduate<sup>2</sup>

**600 (d500). Administration of Athletics.** (3Sp)

**601 (d501). Leadership in Health, Physical Education and Recreation.** (3Sp)

**602. Seminar in Risk Reduction.** (1W)

**605 (d505). Psychological Aspects of Sports Performance.** (3Sp)

**607 (d507). Sport in Society.** (3F)

**625. Graduate Cooperative Work Experience.** (1-15F,W,Sp,Su)®

**630. Advanced Biomechanics.** (3F,Alt Su)

**640. Advanced Exercise Physiology and Laboratory Practicum.** (5F)

**642. Curriculum in Physical Education.** (3Sp,Alt Su)

**643 (d543). History and Philosophy of Physical Education and Sport.** (3F)

**645. Electrocardiography and Exercise Testing Protocols.** (5W)

**650. Interdisciplinary Workshop.** (1-3)

**654. Exercise Prescription Writing.** (3Sp)

**655. Practicum in the Evaluation of Instruction.** (1-6)®

**656. Practicum in the Improvement of Instruction.** (1-6)®

**657. Practicum in Cardiac Rehabilitation and Adult Fitness.** (1-10F,W,Sp)

**681. Research Seminar.** (3F)

**683. Motor Learning.** (3W)

**685. Principles and Techniques of Conditioning and Rehabilitation.** (3Sp)

**690. Independent Study.** (1-3F,W,Sp,Su)®

**691. Independent Research.** (1-3F,W,Sp,Su)®

**696. Masters Project.** (3F,W,Sp,Su)

**697. Thesis.** (1-9)®

**699. Continuing Graduate Advisement.** (1-12)®

<sup>1</sup>Parenthetical numbers preceded by a *d* indicate a *dual* listing.

<sup>2</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

## Professional Courses in Parks and Recreation

**100. Recreation and Leisure in Modern Society.** Introduces the role of leisure and recreation in society, history, trends, issues, and socioeconomic values. Evaluates the role and responsibility of public and private agencies. (3F,Sp)

**200. Social Recreation.** Demonstrations and practical experience in the nature of social recreation; use of recreation with various age groups; planning, design, and evaluation of social recreation. (3F,W,Sp)

**206. Administration of Intramural Sports.** (3F,W)

**225. Introductory Cooperative Work Experience.** An introductory level educational work experience in a cooperative education position approved by the department. (1-6F,W,Sp,Su)

**403. Recreation Programming.** Principles of programming, their models and methods; classification and analyses of activities; structural organization of recreation programs; program evaluation. (3W)

**404. Community Recreation.** Preparation in community organization of recreation; role of agency operation centering on budgetary procedures and grantsmanship; role of interagency relationships. (3F)

**406. Outdoor Recreation.** Overview, scope, and extent of outdoor recreation planning; the agencies that provide services; the methodology of planning and evaluating programs and resources. (3W)

**409. Camp Management and Counseling.** Preparation in the camp management and administrative process; camp counseling process; techniques of camp activity skills. (3Sp)

**\*410. Internship in Recreation.** Designed to give students practical experience working full-time for a recreation organization for one quarter. Prerequisites: PR P 100, 200, 206, 403, 404, 406, and 409 or 505. (12F,W,Sp,Su)

**425. Advanced Cooperative Work Experience.** Cooperative education work experience position; increased level of complexity and a more professional level of experience as student advances toward completion of the program. (1-15F,W,Sp,Su)

**450 (d600). Problems in Recreation.** Study of issues of public and school recreation, youth-serving organizations, and community groups using case studies and discussion of current issues. (3F)

**480 (d680). Seminar in Recreation.** Student presentation of thesis and project studies. Informal discussions, critical analysis of problems, informal lectures by invited speakers and class members. (3Sp)

**500. Aquatic Recreation Resource Management.** Study of the principles, practices, and guidelines for management of effective public and private aquatic resources. Focus on planning, development, and facility design. (3Sp)

**501 (d601).<sup>1</sup> Leadership in Health, Physical Education and Recreation.** A group approach to improvement and innovation in leadership and supervisory skills. Familiarization with administrative skills and duties through discussion and lab approach. (3Sp)

**505 (d605). Therapeutic Recreation.** An analysis of various special population groups served by recreation; the clinical application of recreation programs and activities; special institution's procedures, terminology, and operation. (3W)

**525 (d650). Advanced Therapeutic Recreation.** Highlights the advanced protocol procedures of disability identification, program development, treatment planning, progress note writing, and protocol evaluation. (3Sp)

**550. Recreation Areas and Facilities.** A study of the basic planning procedures, techniques, and methods of parks, community recreation, and school physical education facilities. (3F)

**551. Philosophy of Recreation.** Insight into the problems Americans face as the result of increased leisure. Exploration of possible solutions to these problems through the medium of recreation. (3W)

**552 (d652). Recreation Administration.** Problems of organization and administration of parks and recreation departments, including personnel management considerations. (3W)

**560. Park Management.** Park maintenance management, including planning and organizing, personnel, buildings, structures, general outdoor, grounds, equipment, and public impact. (3Sp)

**590. Independent Study.** (1-3)®

**591. Independent Research.** (1-3F,W,Sp,Su)®

### *Graduate<sup>2</sup>*

**600 (d450). Problems in Recreation.** (3F)

**601 (d501). Leadership in Health, Physical Education and Recreation.** (3Sp)

**605 (d505). Therapeutic Recreation.** (3W)

**625. Graduate Cooperative Work Experience.** (1-15F,W,Sp,Su)®

**650 (d525). Advanced Therapeutic Recreation.** (3Sp)

**652 (d552). Recreation Administration.** (3Sp)

**680 (d480). Seminar in Recreation.** (3Sp)

**690. Independent Study.** (1-3F,W,Sp,Su)®

**691. Independent Research.** (1-3F,W,Sp,Su)®

**697. Thesis.** (1-9)®

**699. Continuing Graduate Advisement.** (1-12)®

\*Taught 1990-91.

<sup>1</sup>Parenthetical numbers preceded by a *d* indicate a *dual listing*.

<sup>2</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

### *Activity Courses in Physical Education*

**101. Skiing.** Designed for beginners and novices. (1W)®

**102. Intermediate Skiing.** Focuses on christie turns to parallel skiing. (1W)®

**103. Advanced Skiing.** Designed for students who practice parallel skiing. Focuses on a variety of advanced skiing styles and techniques. (1W)®

**104. Track and Field.** (1Sp)®

**106. Indoor Track and Field.** (1Sp)®

**107. Cross Country.** (1F)®

**108. Jogging.** (1F,W,Sp,Su)®

**109. Bowling.** (1F,W,Sp,Su)®

**111. Weight Training.** (1F,W,Sp)®

**112. Advanced Physical Conditioning.** Designed for members and prospective members of competitive teams and for the student desiring a personalized program. (1F,Sp)®

**113. Body Conditioning.** (1F,W,Sp,Su)®

**115. Gymnastics.** Designed for beginning and novice gymnasts. Focuses on tumbling fundamentals and introduction to the Olympic events. (1F,W,Sp)®

**120. Golf.** (1F,Sp,Su)®

**124. Pre Ski Conditioning.** (1F)®

**127. Hiking.** (1Sp)®

**128. Cycling.** Conditioning class with emphasis on training for both touring and racing. Introduction to road safety principles, various riding techniques, and cycle maintenance. (1)®

**132. Self Defense.** (1F,W,Sp)®

**134. Badminton.** (1F,W,Sp)®

**136. Tennis.** (1F,Sp,Su)®

**142. Varsity Football.** (1F)®

**143. Softball.** (1Sp)®

**146. Basketball.** (1F,W,Sp)®

**148. Volleyball.** (1F,W,Sp,Su)®

**152. Soccer.** (1F)®

**155. Racquetball.** (1F,W,Sp,Su)®

**160. Swimming.** (1F,W,Sp,Su)®

**175. Advanced Precision Rhythms.** Advanced marching skills, individual and group choreography, and advanced performance routines. (1W)®

**195. Aerobic Dance.** (1F,W,Sp,Su)®

**300. Dynamic Fitness.** Designed to develop positive health practices in the areas of physical activity, diet, rest, and relaxation of living through classroom, laboratory, and activity experiences. (3F,W,Sp,Su)®

**303. Advanced Dynamic Fitness.** Advanced techniques for developing positive health priorities in the areas of physical activity, diet, rest, and relaxation through laboratory, classroom, and activity experiences. Prerequisite: PE 300. (3F,W,Sp)

**462. Water Safety Instructor.** Attention is given to methods of teaching swimming, lifesaving. American Red Cross certification is given students who pass the exam. Prerequisite: American Red Cross Advanced Lifesaving certificate. (3W,Sp)®

**463. Lifeguard Training.** Designed to prepare students as pool or nonsurf open water lifeguards. Presents knowledge and skills necessary for lifeguard functions. American Red Cross certification available. (3F,W,Sp)

### *Activity Courses in Recreation Education*

**103. Billiards.** (1F,W,Sp,Su)®

**115. Map Reading/Orienteering.** Orienteering is a timed cross country race. Includes use of topographic maps and compass. Opportunity is provided for participation in at least one local meet. (2)®



**120. Cross Country Skiing.** Focuses on knowledge, techniques, equipment, and safety necessary to participate in and enjoy winter recreational activities: cross country ski touring and snowshoeing. (1W)®

### *Professional Courses in Dance Education*

**225. Introductory Cooperative Work Experience.** An introductory level educational work experience in a cooperative education position approved by the department. (1-6F,W,Sp,Su)

**226. Fundamentals of Drill Teams and Pep Clubs.** An introduction to basic drill team organization and instruction. (2Sp)

**227. Fundamentals of International Folk Dance.** A course designed to develop teaching techniques in folk dance. Prerequisite: DE 176. (1Sp)

**250. Forum Studio Performance—Performers.** Practicum course in modern dance designed to provide students with experience in performing and producing a studio performance. (1-2Sp)

**290. Fundamentals of Modern Dance.** Theory of modern dance as a preparation for teaching and choreography. A lecture/lab class for dance majors and minors. Prerequisite: 3 credits of modern dance at level II or above. (1F)

**291. Modern Dance I.** Concentrates on beginning level skills in modern dance technique. For majors or nonmajors with at least one year's experience in any form of dance. (1F,W,Sp)®

**292. Modern Dance II.** Concentrates on modern dance technique for the intermediate level student. For majors or nonmajors with at least one year's experience in modern dance. (2F,W,Sp)®

**310. Rhythms and Movement Exploration for Elementary Schools.** (3)

**311. Dance Composition.** Experience in individual composing based upon the basic elements of modern dance. (2F)

**312. Choreography.** Experience in composing for groups using various forms and stimuli for modern dance. (2W)

**\*\*313. Dance Production.** This course prepares dance majors for all aspects of dance concert production through lecture, research, and assigned projects. (3Sp)

**\*314. Dance History.** A history of dance from the primitive through Greek, medieval, and renaissance periods into the theatrical dance forms: ballet and modern. (3Sp)

**350. Forum Studio Performance—Choreographers.** Practicum course in modern dance designed to provide students with experience in choreography and producing a studio performance. (2-4Sp)

**393. Modern Dance III.** Modern dance technique for the advanced student. For majors or nonmajors who have had at least two year's experience in modern dance. (3F,W)®

**425. Advanced Cooperative Work Experience.** Cooperative education work experience position; increased level of complexity and a more professional level of experience as student advances toward completion of the program. (1-15F,W,Sp,Su)

**462. Methods of Movement Exploration for Elementary Teachers.** Designed for elementary teachers. Movement experiences will range from classroom situation and curriculum development to large open space activities and performance. (3F,W,Sp)

**463. Methods of Square and Ballroom Dance.** A professional lecture/lab course designed to develop teaching techniques in square dance and ballroom dance. (3W)

**467. Methods of Teaching Modern Dance.** Designed to prepare dance majors/minors to teach modern dance in the secondary schools. The students will be given an opportunity to build teaching skills using a variety of approaches. Prerequisites: DE P 290, 291, 292. (3Sp)

**490. Practicum—Danceworks.** Designed to provide students with experience in choreographing, performing, and producing dance concerts, lecture-demonstrations, and master classes. (1-3F,W,Sp)

**590. Independent Study.** (1-3)

### *Activity Courses in Dance Education*

**170. Introduction to Modern Dance.** This course is designed to introduce the art of modern dance to the nondance major. Students are given the opportunity to begin

working with the technical and creative aspects of dance with the intention of broadening their movement skills and their understanding of the form. (1F,W,Sp)®

**173. Square Dance.** Designed for beginners and novices. Includes an introduction to all basic square dance patterns. (1)®

**174. Elementary Precision Rhythms.** Aggiettes. (1)®

**176. International Folk/Clogging.** Designed to develop basic fundamental folk dancing skills and rhythms and to acquaint the students with a brief history of folk dance. Will include an introduction to beginning clogging skills. (1F)®

**178. Ballroom Dance.** Designed for beginners and novices. Includes introduction to all basic ballroom dance steps. (1F,W,Sp)®

**179. Intermediate Ballroom Dance.** Designed for those with some background and experience. Focuses on advanced steps, techniques, and styling. (1W)®

**181. Beginning Ballet.** A discipline in recognized classic form. Includes barre exercises, port de bras, and center practice in balance, jumping, and turns. (1F,W,Sp)®

**190. Tap Dance.** Designed to prepare the dance major in fundamental and technical skills of tap dancing. Provides knowledge and experience in choreography and preparation of dance performances. (1Sp)

**191. Modern Jazz Dance.** Provides training and experience in the styles of jazz, one of the most popular forms of American dance. Prerequisite: one year of modern dance or ballet. (1W)

**282. Intermediate Ballet.** A continuation of 181 with more emphasis on exactness and precision of line. Prerequisite: three years of ballet or permission of instructor. (1F,W,Sp)

**383. Advanced Ballet.** Designed to provide an advanced-level technique class of an hour-and-a-half for the more advanced dancer. Barre and center exercises are longer and more complex than in the intermediate ballet class. Classical variations and Pas de Deux will be taught when applicable. (1F,W,Sp)

### *Dance West Summer Classes*

**DE 170W. Jazz.** Provides training and experience in the styles of jazz, one of the popular forms of American dance. (1Su)

**DE 180W. Dance West Performance.** Students will learn dances to be performed in "The West: America's Odyssey." Prerequisite: audition. (1-3Su)

**DE 184W. Beginning Classical Ballet.** A discipline in recognized classic form. Includes barre exercises, port de bras, and center practice in balance, jumping, and turns. (2Su)

**DE 187W. Beginning Classical Modern Dance.** Designed to develop coordination, ease, and poise in handling the body. Focuses on dance as an art using the body as a medium of expression. (2Su)

**DE 190W. Tap Dance.** Provides a fundamental knowledge in the technical skills of tap dancing. (1Su)

**DE 285W. Intermediate Classical Ballet.** Barre exercises, port de bras, and center practice in balance, jumps, beats, and turns with more emphasis on exactness and precision of line. Prerequisite: one year of ballet or permission of instructor. (2Su)®

**DE 288W. Intermediate Classical Modern Dance.** Stresses alignment of the skeletal structure, freedom and movement of the torso, and technical work enabling the dancer to secure the natural axis of balance. Prerequisite: one year modern dance or permission of instructor. (2Su)

**DE 386W. Advanced Classical Ballet.** Pointe and pas de deux. Intensified center floor work concentrating on longer adagio and allegro combinations. Prerequisite: five years of ballet or permission of instructor. (3Su)®

**DE 389W. Advanced Classical Modern Dance.** Designed to explore the sociological impact of the various cultures upon movement. Prerequisite: three years modern dance or permission of instructor. (3Su)

**DE P 450W. American Character Ballet.** Focuses on Burch Mann's influence upon dance character and heritage. The birth of human spirit in the American heritage of the dance. (3Su)

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

\*Taught 1990-91.

\*\*Taught 1991-92.

# Department of History

## College of Humanities, Arts and Social Sciences

**Head:** Associate Professor R. Edward Glatfelter  
Office in Main 303

**Professors** Jay Anderson, Norman L. Jones, William F. Lye, Clyde A. Milner, II, Carol A. O'Connor, F. Ross Peterson, Barre Toelken; **Professors Emeritus** S. George Ellsworth, Charles S. Peterson; **Associate Professors** C. Robert Cole, Michael L. Nicholls, Leonard N. Rosenband, Steve Siporin; **Assistant Professors** David R. Lewis, Daniel J. McInerney, Frances B. Titchener

**Degrees offered:** Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), and Master of Arts (MA) in History; Master of Social Science (MSS)

### Objectives

The Department of History offers courses leading to careers in teaching, research, and public service. In addition the department provides a wide variety of courses supporting other fields of specialization, and in general education.

### Requirements

**Departmental Requirements.** Admission requirements for the Department of History are the same as those described for the University on pages 8-11. Students in good standing may apply for admission to the department.

A grade of C or better is required in any history course used to meet the requirements for a major, minor, teaching major, or teaching minor in history. A 2.5 grade point average is required for graduation.

**Major in History.** Fifty-three credits of history course work are required. The student should complete as soon as possible survey courses in American Civilization (Hist 170), and either Comparative World Civilizations (Hist 101, 102, 103), or Western Civilization (Hist 104, 105). The student should then take such upper division courses as will satisfy his or her particular interest. All seniors should take History 499, a senior proseminar. English 101 and 201 are the departmental communications requirements.

Those who plan to do graduate work in history should complete at least two years of a foreign language as an undergraduate. During the senior year they are also urged to take the Graduate Record Examinations.

The study of history requires an understanding of many fields of human endeavor. The student majoring in history must select a minor and should take electives in fields closely related to history, such as economics, geography, anthropology, political science, and sociology. Especially recommended are courses in the history of art, literature, music, drama, political thought, economics, social thought, and philosophy.

**Teaching Major in History.** History constitutes the major subject matter in the social studies curriculum of the junior and senior

high schools. Those who plan to teach in secondary schools should also consult with the College of Education and obtain a secondary school teaching certificate. Course work for a teaching major in history should include the basic survey courses in American History (Hist 170), the Comparative Civilizations group (Hist 101, 102, 103), or the Western Civilization group (Hist 104, 105). They should organize their remaining course work to include at least 6 credits of upper division American history, at least 6 credits of upper division European history, and some credits of upper division history in other world areas.

A teaching major in history should include a broad foundation in the social sciences, and therefore the minor should be in one of the social sciences. Economics, political science, and sociology are recommended. Upper division courses in history and work in the minor and allied fields should be selected in consultation with one's adviser.

**Minor in History.** A minimum of 30 credits is required for a minor in history. Hist 101, 102, and 103, or Hist 104, 105, and 170 are recommended.

**Teaching Minor in History.** A total of 30 credits constitutes a teaching minor. Hist 101, 102, and 103, or Hist 104, 105, and 170 are required. In addition, the student should complete 14 or 15 credits of upper division work.

An application for admission to teacher education should ordinarily be completed during the sophomore year (see College of Education for requirements). Approval is a prerequisite to certification candidacy and to enrollment in education and psychology courses.

### Graduate Study

The Department of History offers programs leading to the Master of Arts, the Master of Science, and the Master of Social Science. For details see the graduate catalog.

### History Courses

#### Lower Division

**101. Comparative Civilizations: Ancient and Medieval.** Survey of the major civilizations of the world concerned with political, social, economic, artistic, and intellectual attainments of mankind. Earliest times to about A.D. 1300. (3)©

**102. Comparative Civilizations: Early Modern.** A comparative survey of major world civilizations during the period of transformation to European domination. From about 1300 to 1850. (3)©

**103. Comparative Civilizations: Modern.** A comparative survey of major world civilizations in the modern period. Special attention given to political, social, intellectual, and technological transformations of the past century. (3)©

**SS 104. Western Civilizations: Ancient and Medieval.** A survey of European civilization from its origins to about A.D. 1500. Emphasis on cultural, political, religious, social, economic, intellectual, and artistic achievements. (5F,W,Sp)

**SS 105. Western Civilization: Modern.** A survey of European civilization from the Reformation to the present day. (5F,W,Sp)

**HU 124. Introduction to Folklore.** Major types of folklore (e.g., legend, folktale, ballad, folksong, custom, belief, art, and craft); practical experience in collecting folklore. (3)

**150. American Character in Film.** An exploration of the American national character, using commercial films as a teaching tool. (3)

**151. Main Currents in American Culture.** Lower division interdisciplinary seminar designed to synthesize, amplify, and enrich the content of a block of general courses taken concurrently as prerequisite to the seminar. (2)

**SS 170. American Civilization.** The fundamentals of American history. Successful completion of this course meets the American institutions requirement established by the State Legislature. (SF,W,Sp)©

**270. Aztecs, Incas, and Mayas.** Art, culture, religion, and social organization of the high Indian civilizations of Latin America; the European discovery and subsequent conquest of the Incas, Aztecs, and Mayas. (4)

**271. An Introductory Survey of Latin American Civilizations.** One-quarter survey of Latin American history. Provides opportunity to learn about the history and modern development of Latin America. (4)

**273. East Asian Civilization: Arts and Literature.** A general survey of arts and literature of China, Japan, and Korea in English translation. (3)

### Upper Division

**300. Sources and Literature of History.** General reference works to the study of European, American, and Asian history. For all persons preparing to teach or write history. Prerequisite: freshman sequence. Taken in the sophomore year upon completion of prerequisites. (3)

## PERIOD SURVEY COURSES

### Europe

**304. Greek History.** Greek civilization to the Roman conquest, 146 B.C. Emphasizes political, social, intellectual, and artistic developments and contributions. (5)

**306. Roman History.** From the earliest times to the decline of the Roman Empire in the west in the fifth century A.D. (5)

**308. History and Thought of the New Testament.** Historical and intellectual context of the development of the New Testament. Character, ideas, and historical setting of the various documents. (3Sp)

**309. History of Christianity.** History of the Christian faith in the western world. (3)

**311. Medieval Europe (A.D. 500-1500).** Political, economic, social, and cultural developments during the Middle Ages. (3)

**321. Renaissance and Reformation (A.D. 1250-1600).** The Italian Renaissance and the Reformation, their spread in Europe. Transition to modern Europe in political, economic, religious, social, and intellectual systems and values. (5)

**322. Old Regime and Enlightenment.** The institutions and ideas which produced modern European attitudes toward revolution and reaction, and the nature of politics and economics during the age of absolutism. (3)

**324. Revolutionary and Imperial France (1789-1815).** Origins, causes, and events of the French Revolution in terms of social, political, economic, and intellectual factors. An analysis of the roots of nationalism and dictatorship. (3)

**325. The Century of European Revolution: 1815-1917.** Reaction, nationalism, imperialism, liberalism, and socialism against a background of politics, economics, and diplomacy. (3)

**327. The Century of Total War: 1914-Present.** Political and economic developments in Europe, America, Asia, and Africa since the end of World War I. (3)

**334. Kievan and Muscovite Russia.** Origins of the Russian people and state, the disruption of their development by the Mongol conquest, and the emergence of Muscovite society. (3)

**335. Imperial Russia.** Political, economic, and cultural development of the Russian people from Peter the Great to 1917. Analysis of the non-Marxian revolutionary movement. (3)

**336. Russian Revolutions and Soviet Regime.** Development of the Russian revolution, and the economic/political development of the Soviet state from its founding to the present day. (3)

**337. Ancient and Medieval England to 1603.** From Julius Caesar to the death of Richard III: a history of England's political, social, economic, and cultural origins. (3)

**338. Foundations of Modern England, 1603-1815.** English reformation, revolution, and enlightenment: the beginnings of modern social, political, economic, and cultural institutions. (3)

**339. Empire and Industrialization in Britain Since 1815.** The relationship of social, economic, political, and cultural change to imperialism and industrialization in nineteenth and twentieth century Britain. (3)

**341. Germany Since 1789.** Development of modern Germany; the growth of Germany as an economic, military, and international power in the nineteenth and twentieth centuries. (3)

**342. A History of Nazi Germany.** A detailed analysis of the rise of Hitler and the impact he had on Germany and the world. (3)

### Africa

**351. Traditional Africa.** Geography, ethnology, and early history of Africa to the coming of the colonial powers. (3)

**352. Colonial and Modern Africa.** From the coming of the colonial powers, through the colonial period, to the present movements of independence. (3)

**353. History of Southern Africa.** The political, social, and economic history of Africa south of the Zambezi River, stressing the interaction of Negro, Khosian, and European cultures. (3)

### Asia

**361. Traditional East Asia.** Development of the civilizations of China, Japan, and Korea from their origins to the time of the Ch'ing Dynasty in China. (3)

**362. Modernization of East Asia.** The modern transformation of traditional cultures of China, Japan, and Korea during the last two centuries. Emphasis on comparative modernization of China and Japan. (5)

**367. History of China.** Development of traditional Chinese culture and the effect on that culture of the growth of Western influence. (3)

**368. History of Japan.** The development of Japan with a special emphasis on the modern transformation in the last century. (3)

### Folklore

**372 (d672).<sup>1</sup> Folklore Colloquium.** Issues, problems, and methodologies in folklore study. (3)©

### General Education

**IO 395. Environmental History.** An examination of man's interactions with his environment throughout history and the origins and development of environmental conservation in the modern period. (3)

**IO 401. The Civilizing of Human Societies.** An integrated thematic approach to the investigation of social, political, religious, economic, technological, and aesthetic forces which have propelled human societies towards civilization. (5)

### United States

**422. Ballads and Folksongs.** Study of the lyrics of traditional songs and ballads; theories of transmission, literary and historical importance, notable collectors and recordings. (3)©

**423. American Folklore.** American folk art and literature and the historical and cultural circumstances from which they developed. (3)

**424. American Folk Styles.** In this survey of material culture, students learn techniques and perspectives enabling them to look at artifacts as texts to be deciphered for their historical, cultural, and aesthetic meanings. (3)

**432. Colonial America.** Survey of the British North American colonies from their founding to 1763. (5)

**434. The New Nation.** The course of American history from 1763 to 1800 with special emphasis on the American Revolution and the subsequent efforts to found the new government. (3)

**436. Jefferson and Jackson.** The survey of the political, social, and economic developments of the new nation from 1800 to 1850. Special emphasis is placed on the structure of the American party system, sectionalism, the abolitionists, and other reform groups. (3)

**438. The Civil War and Reconstruction.** An analysis of the most trying period in American history with special emphasis on the causes of the war and the result. (3)©

**442. Era of Wealth and Reform (1877-1916).** The transformation of America from rural to an industrial and urban nation. Emphasis on economic change, political parties, and the populist and progressive reform movements. (3)

**444. United States in War and Depression (1914-1945).** American domestic and foreign history through the First World War, the Great Depression, and World War II. (3)

**446. Recent America (1945-present).** Domestic and foreign policy since World War II. Emphasis on the cold war and the political and social developments of contemporary United States. (3)©

**447. American Foreign Policy in the Pacific.** An analysis of the contemporary foreign policies of the major countries surrounding the North Pacific. (See PolSc 447.) (5)

**448. Chicano History.** This course addresses itself to explaining what is a Chicano and what role Chicanos play in contemporary American life. The historical and cultural roots of Chicanos will be treated in detail. (3)

**449. History of Black America.** The black in American history, from the background of early African civilizations, through slavery to freedom, and the difficult quest for democracy and equality. (3)

**450. American Indian History.** From colonial times to the present. Emphasis on the West. Effects of intercultural contacts and economic and political problems will be studied. (3)

**452. American Military History.** The history of the development of the American military establishment and its relationship to the changing American and global environment. (3)

**455. The American West, 1803-1912.** The history of the trans-Mississippi West of the United States from the Louisiana Purchase to the statehood of New Mexico and Arizona. (5)

**456. The Twentieth Century West.** Regional development of the trans-Mississippi West since 1900 with emphasis upon environmental considerations, continuing frontier themes, and urban, economic, and cultural growth. (3)

**457. History of Utah.** Geography and native peoples, early explorations, political, social, and economic developments to the present. (5)

**459. Folklore of Utah.** Study of the lore of major Utah folk groups (ethnic and immigrant, occupational, religious, and regional). (3)

**460. History of Women in America.** Problems and purposes of women's history; changes in the role and status of women from colonial times to the present; rise of feminism, its relation to other reform movements, its leaders and critics. (3)

**462. History of the Urban West.** Introduction to urban history focusing on the development of selected Western American cities, including Salt Lake City, and on recurrent urban problems and the ways these have been handled. (3)

## Latin America

**471. Colonial Latin America.** European exploration and conquest; Indians, Africans, and the emergence of Mestizo/Creole societies; the wars of independence and the final crisis of the colonial system. (3)

**472. Modern Latin America.** Aftermath of independence; civil wars, foreign interventions and the forging of new nations; U.S.-Latin American relations; and the political and social revolutions of the twentieth century. (4)

**473. Contemporary Latin America.** Present affairs and problems of each Latin American nation, providing insight within social, economic, and political realms, as viewed from various internal and external levels. (3)

**474. History of Mexico.** European conquest; the colonial system and the wars of independence; foreign invasions and the wars of the reform; Zapata, Villa, and the Mexican Revolution; the struggle for development, land, and justice in the modern era. (3)

**475. History of Brazil.** Indian pre-history; African slavery and implantation of Portuguese rule; transition to independence; coffee, abolition, and the crisis of the Imperial era; Republican Brazil and the Revolution of 1930; contemporary developments. (3)

## Diplomatic History

**476. The United States and Latin America.** Diplomatic, economic, and cultural aspects of Inter-American relations; Latin American perspectives on the "Monroe Doctrine," "Manifest Destiny," "Dollar Diplomacy," and the "Good Neighbor;" current controversies over U.S. policy. (3)

**477. World Imperialism.** Examines imperialism from antiquity to the present, focusing on Africa, Greece, Italy, Europe, China, Russia, and the U.S. (3Sp)

**478. United States and Europe Since 1789.** The study of diplomatic relations between Europe and America from the American War of Independence to the present. (3)

## Canada

**481. History of Canada.** From earliest times to the present. (3)

## Directed Studies

**489. Special Studies.** An examination of special areas and themes in history. (1-3F,W,Sp)©

**491. Readings and Conference.** (1-3F,W,Sp)©

**495. History of Scientific Thought.** Examination of key episodes in the history of science and associated ideas about the nature of scientific knowledge and the ways it may be acquired. (4W)

**499. Proseminar.** A seminar emphasizing research and writing skills in selected topics in history. (3)

## ADVANCED UPPER DIVISION THEME AND TOPIC COURSES

### Europe

**501. Ideas in Early European History.** From Plato to Voltaire, studied against a background of contemporary economic, social, and political developments. (3)

**502. Ideas in Modern European History.** The historical impact in the nineteenth and twentieth centuries of romantic, scientific, and futuristic ideas. (3)

**513. Economic History of Russia.** Development of the Russian economy from earliest times to 1930, emphasizing the interaction between economic forces and policies of the state. (3)

### United States

**524 (d624). Regional Folklore.** Regional folklore of a specific region, identified each quarter taught. (3)©

**IO 526. Legends, Myths, and Folktales.** Substance and significance of folk prose narratives both in the past and in contemporary society. (3W)©

**541. Cultural History of the United States.** A social and intellectual history of the United States with emphasis on the development of major thought patterns in relation to their social-economic context. (5)

**543. The American Frontier.** Upper division interdisciplinary seminar designed to synthesize, amplify, and enrich the content of a block of general education courses taken concurrently as prerequisite to the seminar. (3)

**545. Constitutional History of the United States.** Survey of the evolution of our constitution's history; special emphasis on Supreme Court decisions and philosophies; concludes with analysis of constitution's role in contemporary society. (4)

**546 (d646). Folk Groups and Folklore Genres.** Survey of folk groups and folklore genres. Taught during Fife Folklore Conference only. (See English 546.) (3Su)

**579 (d679). Folklore Fieldwork.** Introduces advanced student to problems and techniques of fieldwork, including making sound recordings of orally-transmitted expressions, photographs of material traditions, and descriptions of problematic genres. Technical training, ethics, field exercises, analysis, plus perspectives on archiving and publication of results. (3)

### Senior Professional Course

**596 (d644). American West: Its Literature and History.** (See English 596.) (2-3)

### Graduate<sup>2</sup>

**600 (f586). Historical Method and Research.** (3)

**601 (f588). Local History Methods.** (3)

**602. Historical Criticism: Practicum.** (3)

**603. Historiography.** (3)

**605. Philosophy of History.** (3)

**610. Colloquium in Special Studies.** (3)®

**611 (f590). Oral History.** (3)

**612 (f592). Archives Management.** (3)

**613. Historical Editing.** (3)

**614. Historical Preservation.** (3)

**620. Colloquium in European History.** (3)®

**621. European History.** (1-5)®

**622 (f522). Ballads and Folksongs.** (3)®

**624 (d524). Regional Folklore.** (3)®

**630. Colloquium in American History.** (3)®

**631. American History.** (1-5)®

**635. Colloquium in Western American History.** (3)®

**637. Teaching Utah History.** (3)

**644. (d596). American West: Its Literature and History.** (See English 644.) (2-3)

**646 (d546). Folk Groups and Folklore Genres.** (See English 646.) (3Su)

**650. Colloquium in African History.** (3)®

**651. African History.** (1-5)®

**657. American Studies Internship in Mountain West Culture.** (2-13)

**660. Colloquium in East Asian History.** (3)®

**661. Asian History.** (1-5)®

**670. Colloquium in Latin American History.** (3)®

**671. Latin American History.** (1-5)®

**672 (d372). Folklore Colloquium.** (3)®

**673. Folklife Museums.** (3)

**674. Outdoor Museum Planning and Administration.** (3)

**675. Outdoor Museum Research and Conservation.** (3)

**676. Outdoor Museum Interpretation and Educational Programming.** (3)

**677. History Museum Internship.** (6-12)

**678. Scholarly Editing Internship.** (2-6)

**679 (d579). Folklore Fieldwork.** (3)

**689. Research Seminar.** (3)®

**691. Readings and Conferences in Special Areas.** (1-3)®

**697. Thesis Research.** (1-9)®

**699. Continuing Graduate Advisement.** (1-3)®

<sup>1</sup>Parenthetical numbers preceded by *d* indicate a *dual* listing; parenthetical numbers preceded by an *f* are the *former* course numbers.

<sup>2</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through the Life Span Learning Independent Study Division.

## Department of Home Economics and Consumer Education College of Family Life

**Head:** Associate Professor Jane L. McCullough  
Office in Family Life 303

**Professor** Joan R. McFadden; **Professor Emeritus** Alison C. Thorne; **Associate Professors** Leona Hawks, Jean M. Lown, Marilyn B. Noyes, Tom C. Peterson, Barbara R. Rowe; **Associate Professor Emeritus** LaRae B. Chatelain; **Assistant Professors** Norleen Ackerman, Jeanette Arbuthnot, Ruth V. Clayton, Ann C. Deegan, Janet E. Preston, Elizabeth Rogers, JoAnn Wilson; **Temporary Instruc-**

**tor** Louise P. Young; **Lecturers** Marty Cannon, Brent S. Windley; **Academic Adviser** Jan Moyes

**Degrees offered:** Bachelor of Science (BS) and Bachelor of Arts (BA) in Home Economics Education; BS and BA in Fashion Merchandising; BS and BA in Interior Design; Master of Science (MS) in Home Economics and Consumer Education

**Area of specialization:** Vocational Home Economics Education

## Objectives

The Department of Home Economics and Consumer Education offers three majors—fashion merchandising, home economics education, and interior design.

## Departmental Admission Requirements

Admission requirements for the Department of Home Economics and Consumer Education are the same as those described for the University on pages 8-11. Students in good standing may apply for admission to the department.

A 2.5 grade point average is required in the major area. A grade of C or better must be earned in all major required courses. Courses required for the major may be repeated only once. *P/D/F* may not be used in major area courses or in supporting courses.

Courses required for the professional component of a program will be accepted if they have been completed within the past ten years. The current instructor of any course for which students need an update will work with students to meet this requirement. To provide a common base of understanding, all majors in the college need to complete 14-16 credits selected from the groups of courses listed in the College of Family Life section of this catalog.

## Fashion Merchandising Major

A major in this area prepares students for positions in fashion merchandising and related apparel and textile careers. It stresses the way fashions begin and are developed, how apparel is marketed, and how fashion businesses are operated. It includes a minor in business, involving course work in management, marketing, sales promotion, retailing, and entrepreneurial activity.

The suggested sequence for completing required course work for the Fashion Merchandising Major is as follows:

**Freshman Year (45-47 total credits):** Engl 101 or 111; HECE 103 (1 credit required) 105, 111, 112 (1 credit of 4 required); Phil 111; Psy 101; Soc 101; Math 105; BIS 140; 5 credits of Physical Science; 3 credits Family Life Core; 3-5 elective credits.

**Sophomore Year (45-47 total credits):** Engl 200 or 201; Acctg 201; HECE 112, 215, 224, 266; MHR 299; Econ 200 and 201; 3 credits Family Life Core; 3 credits Life Science; 4 credits Life or Physical Science; elective skills course; 3-4 elective credits.

**Junior Year (45-47 total credits):** HECE 112, 335, 336, 374, 386, 396; MHR 311, 364; BA 350; Spch 105 or 305; Stat 230 or Psy 380; 3 credits Family Life Core; 5-7 elective credits.

**Senior Year (45-47 total credits):** HECE 112, 406, 425 (6 credits required), 466, 499; BA 451, 454, 455; 13-19 elective credits.

## Home Economics Education Major

This major provides professional preparation for teaching in the public schools, employment with extension services, or employment as a home economist in business or government agencies. The composite major includes study in all areas of home economics plus professional education classes. The opportunity for preparation to teach secondary school occupational programs is provided.

The suggested sequence for completing required course work for the Home Economics Education Major is as follows:

**Freshman Year:** HECE 105, 125, 201, 210; FL 110; FHD 120, 150; NFS 122, 123; BIS 140; Engl 101 or 111; Math 101; Psy 101; Physl 130.

**Sophomore Year:** HECE 202, 203, 224, 265, 304; NFS 222, 225; Chem 111, 141; Engl 200 or 201; 5 credits of Americanization; 6 credits of Humanities. Students should also sign up for the child development lab experience and apply to secondary education during their sophomore year.

**Junior Year:** HECE 255, 300, 320, 349, 351, 355, 445; FHD 304; NFS 407, 408; Engl 301 or 305, or SecEd 306; Psy 366; SecEd 301, 302; 3 credits of integrative option or science.

**Senior Year:** HECE 440, 450, 460; FHD 455, 475; Ins T 442; Sp Ed 301; SecEd 404, 510.

## Interior Design Major

The major in interior design has been developed to prepare an individual for entry into the profession of interior design. To this end, each student must identify, research, and creatively solve problems pertaining to the function and quality of the interior environment.

An interior designer performs services relative to interior spaces, both commercial and residential. These services will include programming, design analysis, space planning, and aesthetics, using specialized knowledge of interior construction, building codes, equipment, materials, and furnishings. Another component of each student's training in interior design is the preparation of drawings and documents relative to the design of interior spaces, in order to enhance and protect the health, safety, and welfare of the public.

The suggested sequence for completing required course work for the Interior Design Major is as follows:

**Freshman Year:** HECE 101 (2 credits), 105, 125, 135, 231; FL 110; Art 102, 120; 11 credits of Learning Skills (to include BIS 140); 5 credits of Americanization; 5 credits of Physical Science.

**Sophomore Year:** HECE 101 (1 credit), 224, 232, 233, 234, 271, 281, 291; Engl 200 or 201; NFS 122; 6 credits of Art History (HU) 275, 276, or 277; 5 credits of Physical Science; 5 credits of Life Science.

**Junior Year:** HECE 101 (1 credit), 301, 309, 310, 311, 313, 321, 331, 332, 333, 371, 372, 465; MHR 299; ITE 322. HECE 425 should be taken after the junior year.

**Senior Year:** HECE 101 (2 credits), 401, 422, 434, 471, 472, 3 credits of HECE electives (255, 349 or 355); 6 credits of art electives (skills courses); English 301 or 305; 3 credits of FHD (SS) electives (120, 150, or 304); 3 credits of Life Science or Physical Science; LAEP (HU) 103; any other needed electives.

**Sophomore Review.** In addition to basic undergraduate and graduation requirements set forth in this catalog, there are several additions that apply to those students wishing to matriculate to junior or senior class standing in the Interior Design Major.

At the end of their sophomore year, all students must submit their work for review by the Interior Design faculty for advancement to upper class standing. This review takes place during the latter part of spring quarter. Students wishing to enroll in junior level courses must first submit a project from eight of the following courses: HECE 125, 135, 232, 233, 234, 271, 281, 291; Art 102, 120; one elective Art skills class.

Students will be provided a space for the display of their portfolios. The manner in which the work is exhibited is at the discretion of the student and will be considered in the overall portfolio evaluation.

The second component of the sophomore review will be an analysis of the student's academic performance. Courses required for sophomore status are: HECE 105, 125, 135, 224, 231, 232, 233, 234, 271, 281, 291; Art 102, 120; six credits from Art 275 or 276 or 277; one Art skills course.

Students with a cumulative GPA of 3.0 or above will be automatically advanced to upper division status following the successful completion of the first portion of this review. Students with a GPA of less than 3.0 will be accepted into upper division courses as space permits, with higher GPA's being considered first, in addition to the successful completion of the first part of this review.

## Graduate Study

Graduate study in the Department of Home Economics and Consumer Education encompasses programs in each of three major areas of emphasis: fashion merchandising, consumer studies, and home economics education.

There are a variety of fellowships and assistantships available. Refer to the graduate catalog.

## Home Economics and Consumer Education Courses

**100. Interdisciplinary Workshop.** Varied educational experiences presented in a concentrated manner. (1-3)<sup>1</sup>

**101. Interior Design Professional Orientation Seminar.** Weekly seminars to provide an orientation to the professional aspects of interior design. Exploration of related careers and professional societies; invited participation by outside speakers. (1F,W,Sp)®

**103. Beginning Clothing Construction.** Introductory level sewing techniques and use of sewing machine and serger. Project will depend on credits taken. No previous experience necessary. (1-3Sp)

**HU 105. Design in Everyday Living.** Investigation of the basic elements and principles of design in relation to the living experiences of everyday life and the practical application of theory involved. (3F,W,Sp)

**111. Introduction to Fashion Merchandising.** An investigation of the components and language of fashion, including an analysis of the fashion business and vocational opportunities therein. (3F,W,Sp)

**112. Fashion Seminar.** Seminars to provide students with professional direction, exploration of career possibilities, and information. Invited speakers are from fashion merchandising related fields and interests. (1F,W)®

**125. Introduction to Interior Design.** Exploring the basic philosophy of interior design. Analysis of the elements and principles of design when applied to interior design. Local field trips. (3F,W,Sp)

**135. Design Theory.** Impact of historic design theories as factors influencing contemporary design. Positive and negative evaluation of current trends. Three one-hour lectures per week. (3Sp)

**201. Concepts of Home Economics Education.** Introduction to concepts needed in preparation for teaching secondary home economics. The course will also include an overview of current trends in home economics. (3F,W)

**202. Field Based Experiences for Preservice Teachers in Secondary Schools.** Experience in a public school home economics department as a teacher's intern. Student must set up contract with college supervisor prior to experience. (3F)

**203. Home Economics Professional Development Seminar.** Seminars providing an orientation to the professional aspects of home economics. Exploration of related careers, exposure to practicing professional home economists, current research reports, field trips, and career development. One to two credits required. (1W,Sp)®

**210. Intermediate Clothing Construction.** Intermediate level clothing construction techniques, pattern alteration, fit, and use of sewing machine and serger. Previous sewing experience necessary. (3F)

**215. Fashion Coordination.** Experiences in identifying and coordinating fashion designs, fabrics, and accessories. General clothing care and wardrobe selection for men and women. (3W,Sp)

**224. Textiles.** A study of fibers, yarns, fabric construction, and finishes as related to the appreciation, selection, use, and care of current textiles. Three lectures, one lab. (4F,W,Sp)

**225. Introductory Internship.** Introductory level experience in an internship position approved by the department. One credit for 50 hours of experience. Maximum of 6 credits. Sophomore standing. (1-6F,W,Sp,Su)

**231. Interior Graphics I.** Introduction to drafting tools, symbols, and techniques used in interior design presentation. Development of basic graphic communication skills. Three two-hour studios per week. (3Sp)

**232. Interior Graphics II.** Techniques and approaches to graphic presentations of interior design solutions. Floor plans, furniture layouts, shade, shadow, measuring, and detailing. Three two-hour studios per week. Prerequisite: HECE 231. (3F)

**233. Interior Graphics III.** Introduction to three-dimensional drawing. Isometric and perspective. Development of methods of rapid graphic communication techniques. Three two-hour studios per week. Prerequisite: HECE 232. (3W)

**234. Interior Graphics IV.** Techniques and approaches to complete professional presentations exploring various types of media and presentation techniques. Three two-hour studios per week. Prerequisite: HECE 233. (3Sp)

**235. Family Resource Management.** Identifies resources of families in developing countries and analyzes how these resources are managed with emphasis on subsistence activities. (3)<sup>1</sup>

**IO 238. Sex Roles in American Society.** An examination of the socialization of females and males for their expected roles in American society. (3F,W,Sp)

**SS 255. The Consumer and the Market.** The role of the individual and the family as consumers; consumer rights, decision making, and redress; the government, the market, and consumers as interacting agents. (3F,W,Sp)

**265. Family Housing.** Housing families in social, psychological, and physical environments. Influence of technology, economics, and community in housing acquisitions. Housing types, space allocations, and current trends. (3F,Sp)

**266. Merchandise Buying and Control.** Application of mathematics to the merchandising and control functions specific to careers in fashion merchandising. Prerequisites: Math 101 or 105, BIS 140, Acctg 201. (3Sp)

**271. Human Dimensions in Interior Design.** Focus on the psychological, sociological, and special needs that influence the use of spatial relationships. Three two-hour studios per week. (3F)

**281. Color Theory.** Physical and psychological attributes of color. Various color systems and the impact of color on the design process. Two one-hour lectures and one two-hour lab per week. (3W)

**291. Interior Space Planning.** Fundamental aspects of spatial organization of architectural elements and furnishings. One one-hour lecture and two two-hour studios. Prerequisite: HECE 234. (3Sp)

**300. Household Equipment.** Consumer selection, operation, use, and care of appliances and fixtures. Evaluation of performance, energy efficiency, materials, construction, quality, design, and cost. (3W)

**301. Computer Aided Drafting and Design of Interior Spaces I.** Basics of computer aided drafting and design for interior design students. One one-hour lecture and two two-hour labs per week. (3W)

**304. Fitting and Flat Pattern Design.** Application of fitting and flat pattern theories and principles to achieve individual fit and design in garments. Prerequisites: HECE 105, 210, or equivalent. (3F)

**309. History of Interior Furnishings I: Ancients-Renaissance.** Experience in identification of historical architectural spaces and elements, interior furnishings, and materials dating from Ancients through Renaissance. Three one-hour lectures per week. (3F)

**310. History of Interior Furnishings II: American Colonial through Victorian.** Identification of historical architectural styles and elements in interior furnishings and materials from American Colonial through Victorian. Overview of historic preservation. Three one-hour lectures per week. (3W)

**311. History of Interior Furnishings III: Arts and Crafts through Contemporary.** Contemporary architectural styles, interior furnishings, furniture, textiles, and materials from the late nineteenth century to the present. Three one-hour lectures per week. (3Sp)

**313. Interior Materials.** Identification of current interior materials; their characteristics, use, and care. Experience in specifications estimation, workroom procedures, and development of working resource file. Three one-hour lectures, one two-hour lab. (4F)

**320. Speed Tailoring.** Constructing a tailored jacket or short coat using speed tailoring techniques. (3W)



**321. Interior Lighting.** Lighting design—types, techniques, and application of lighting for user needs in residential and contract spaces. Two one-hour lectures, one two-hour lab per week. Prerequisite: HECE 331. (3W)

**331. Design Studio Fundamentals.** Analysis of various approaches used in problem solving. Graphic and verbal presentation of solutions with emphasis on evaluation. Three two-hour studios per week. Prerequisites: HECE 234, 291. (3F)

**332, 333. Interior Design Studio (Topic).** Studio projects of varied complexity and type, including work in residential, hospitality, retail, medical, office, and other contract and institutional design. Three two-hour studios per week. Prerequisites: HECE 331; HECE 332 must be taken before 333. (3W) (3Sp)

**335. History of Textiles and Apparel I.** A survey of the major style periods in textile and apparel design from ancient times through Western Europe in the 16th century. (4W)

**336. History of Textiles and Apparel II.** A study of fashion changes in Western European textiles and apparel from the 17th century to the present. (4Sp)

**349. Management and Decision Making.** Values and goals in decision making concerning use of family resources. (3F,W)

**350. Home Management House.** Application of management theory in a living situation. Residence in Home Management House for five weeks. Application must be approved by instructor before registration. Prerequisites: HECE 349, NFS 225. (4)<sup>1</sup>

**351. Home Management Problems.** Application of management theory applied through individual project. Prerequisites: NFS 225, HECE 349. (4Sp)

**SS 355. Family Finance.** Managing family resources to achieve value-based financial goals. Consideration of financial alternatives available to families and factors determining financial decision-making. (3F,W,Sp)

**371. Architectural Systems I: Basic Systems.** Familiarization with the various systems incorporated into contemporary architectural construction and their interrelationships. Three one-hour lectures per week. (3W)

**372. Architectural Systems II: Construction Drawings.** Investigation of construction drawings and how to interpret them correctly. Terminology of the related professions. Building code implications. Three one-hour lectures per week. (3Sp)

**374. Textile Problems.** Evaluation of the physical, economic, and aesthetic properties of textile products to determine suitability for a desired end use. Two one-hour lectures and one two-hour lab per week. Prerequisite: HECE 224. (3W)<sup>1</sup>

**386. Fashion Analysis.** Study of clothing fashion as an object (design and construction quality) and a process (fashion communication theories). Analysis of current fashion trends. Prerequisites: HECE 215 and 224. (3W)

**396. Fashion Promotion.** Visual merchandising and special events production. Prerequisite: HECE 105 or equivalent. (4W)

**401. Computer Aided Drafting and Design of Interior Spaces II.** Continued exploration and study of computer aided design with an emphasis on creative applications and proficiencies. One one-hour lecture, two two-hour labs per week. Prerequisite: HECE 301. (3F)

**406 (d606).<sup>2</sup> Behavioral Science Concepts in Clothing.** Application of concepts from cultural anthropology, economics, psychology, and sociology to the study of clothing and personal appearance and consumer behavior. Recommended: one sociology or psychology course. (3F)

**422. Professional Practice in Interior Design.** Overview of business practices and principles for interior design including: salesmanship, marketing, client and trade relationships, establishing an interior design practice, and fee structure. Three one-hour lectures per week. (3F)

**425. Advanced Internship.** Midmanagement level experience in a position approved by the department. One credit for each 40 hours of experience. Junior standing required. (1-12F,W,Sp,Su)

**434. Interior Design Studio (Topic).** Studio projects of varied complexity and type; including work in residential, hospitality, retail, medical, office, and other contract and institutional design. Three two-hour studios per week. Prerequisite: HECE 333. (3F)

**440. Teacher-learning Strategies in Home Economics.** Development of competency in curriculum planning, and skill and sensitivity in the use of various teaching-learning strategies and resources. Prerequisites: HECE 201, SecEd 301, Psy 366 (or take concurrently). (4F,Sp)

**445. Occupational Home Economics.** Methods of successfully planning and maintaining home economics occupational programs in secondary schools. (3W)

**450. Curriculum Seminar.** Take with HECE 460. Register with the instructor of HECE 440 one quarter prior to student teaching. (3F,W)

**460. Student Teaching in Secondary Schools.** Prerequisite: HECE 440. (12F,W)

**465. Housing Problems.** Organization and use of space, house design and remodeling for different family stages, handicapped, and aged. International shelter and housing problems compared. (3W)

**466. Fashion Marketing Strategies.** Application of effective fashion merchandising practices for small and large retail businesses. Prerequisites: HECE 386, 396, BA 350, or consent of instructor. (3F)

**471. Senior Design Project I.** Research and programming phase of comprehensive design project. Preparation of proposal documents discussing the design concept and schematics. Three two-hour studios per week. Prerequisites: HECE 332, 333, 434. (3W)

**472. Senior Design Project II.** Continuation of HECE 471 design project. Development of detailed drawings and final presentation and construction documents. Three three-hour studios per week. Prerequisite: HECE 471. (5Sp)

**490. Independent Study.** Students must identify a project with the instructor before registering. (1-7F,W,Sp,Su)®

**499. Current Issues in Fashion Merchandising.** Current problems in clothing and textiles. Focus is on topics of interest in Fashion Marketing. Prerequisite: senior standing (3Sp)

**550. Interdisciplinary Workshop.** (1-3)<sup>1</sup>®

**561. Introduction to VAX and Microcomputer Software (IBM and Compatibles).** Introduction to VAX software: SPSSX (statistics), TELLAGRAF (graphics), and EDITOR. Introduction to IBM compatible 386 microcomputers and WordPerfect. Introduction to MacIntosh and its associated software. Other topics as developed. No prerequisites. (1F,Sp)

### Graduate<sup>3</sup>

**602. Fashion Theory.** (3)

**604. Research Trends in Apparel Marketing.** (3W)

**606 (d406). Behavioral Science Concepts in Clothing.** (3W)

**612. Administration and Supervision in Home Economics.** (3)

**615. Home Economics Classroom Management and Discipline.** (3)<sup>1</sup>

**617. Curriculum Development.** (3)

**618. Curriculum Testing and Evaluation.** (3)

**620. International Apparel and Textile Trade.** (3)

**622. Teaching Techniques for Human Sexuality.** (3)

**625. Graduate Internship.** (1-12F,W,Sp,Su)®

**\*629. Family Economic Status.** (3F)

**630. Consumer Problems.** (3W)

**635. The Family and Economic Change.** (3)

**640. Current Perspectives in Home Economics Education.** (3-6)

**645. Adult Education in Home Economics.** (3)

**649. History and Philosophy of Home Management.** (3F)

**652. Consumer Studies Resources.** (3F)

**655. Consumer Credit.** (3Sp)

**656. Family Financial Problems and Counseling Strategies.** (3F)

**662. Using and Interpreting SPSSX to Analyze Social Research Data.** (2F,Sp,Su)

**665. Current Developments in Housing.** (3)

**666. Fashion Merchandising Problems.** (3)

670. Home Economics Colloquium. (1-3)  
 671. Seminar. (1-3)®  
 675. Current Issues in Research. (3F)  
 680. Research Methods in Home Economics and Consumer Education. (3)  
 690. Independent Study. (1-5F,W,Sp,Su)®  
 697. Thesis Research. (1-9F,W,Sp,Su)®  
 699. Continuing Graduate Advisement. (1-3F,W,Sp,Su)®  
 700. Leadership in Vocational Education. (3)¹

733. Supervision Practicum. (3-12)¹  
 781. Research Seminar. (1-6)¹  
 797. Dissertation Research. (1-18)¹®

¹Offered as needed.

²Parenthetical numbers preceded by *d* indicate a *dual* listing.

³Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

®Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

\*Taught 1990-91.

## Department of

# Industrial Technology and Education

## College of Engineering

**Head: Professor Maurice G. Thomas**  
 Office in Industrial Science 112E

**Associate Professors** Ward P. Belliston, Jay C. Hicken, Reed M. Nielsen, Jr.; **Assistant Professors** Edward M. Reeve, Gary A. Stewardson, Charles E. Tinney, G. William Watt, David P. Widauf; **Lecturers** Mark W. Bannatyne, Charles B. Larsen, D. Richard Nelsen

**Degrees offered:** Bachelor of Science (BS) in Industrial Teacher Education with specialization in Industrial Arts/Technology Teacher Education, and Trade and Technical Teacher Education; BS in Industrial Technology with specializations in Aerospace Technology and Flight Technology; Program emphasis in Airway Science—Maintenance, Welding, and Electronics are also offered; Master of Science (MS) in Industrial Technology and Education

**Associate of Applied Science (AAS) Degree:** Aeronautics Technology (A & P) and Drafting Technology

## Objectives

The Industrial Technology and Education Department curricula are designed to prepare graduates for a wide array of teaching, technical, and supervisory positions.

The **Industrial Teacher Education** programs prepare graduates to be teachers in public schools, technical schools, and community colleges. **Aerospace Technology** graduates are prepared to fill a variety of technical/management positions in the aerospace manufacturing industries. The **Flight Technology** curriculum prepares graduates to be commercial pilots. The **Airway Science** emphasis is a Federal Aviation Administration certified program to train individuals for careers in the FAA. The **AAS aeronautics** program prepares individuals to be aircraft mechanics. The **AAS program in drafting** trains people to be mechanical and computer-aided drafters.

## Admission Requirements

Admissions requirements are commensurate with those outlined for the University (pages 8-11) with the exception that transferring students from General Registration or from another department or institution must be approved by a departmental admissions committee.

## Professional Technology Program (PTP)

The Professional Technology Program (PTP) applies to all Aerospace Technology and Flight Technology majors. Students entering USU fall 1986 and after (freshmen and transfer students) must meet PTP requirements. Currently enrolled USU students must also meet these requirements. The purpose of this program is to provide a quality education for students by (1) requiring that they be fully prepared for upper division course work by having satisfactorily completed all required preprofessional courses, and (2) limiting enrollment in upper division courses, consistent with resources available within the department and college.

Enrollment in upper division ITE courses (300-level and above) is available only to students who have been accepted into the PTP or into an appropriate graduate program, or to students with a non-ITE major requiring a specific class.

To be eligible to apply for admission to a professional program, a student must be in good academic standing in the University and college, must achieve a grade of C- or better in every required preprofessional course, and must have an overall grade point average of 2.3 in required preprofessional course work completed at USU.

Although transfer credit accepted by the department and college may be applied toward PTP admission requirements, the grades received will not be used in the USU GPA calculation. A final decision on admission of a transfer student into the PTP will not be made until after the applicant has completed at least 15 credits of acceptable course work at USU.

Eligible students must apply for admission to the PTP during the quarter in which they are completing the required preprofessional courses. Students may request permission to take a limited number (not to exceed 15 credits) of upper division courses if they are within 10 credits of completing the necessary requirements and have submitted a PTP application; however, the final decision rests with the appropriate department head and the college academic adviser.

For all technology majors in the Professional Program, the following academic regulations apply in addition to University regulations:

1. A minimum GPA of 2.0 must be maintained in technology/math/science/business courses required for, or used as technical electives in, the chosen major. Courses which were part of the preprofessional program requirements and general education courses are not included in this GPA calculation.

2. No more than 10 hours of *D* or *D+* credit may be applied toward meeting graduation requirements in technology/math/science/business classes.

3. College of Engineering courses may be repeated only once. Audits count as a time taking a class unless prior written approval is obtained from the department head. A maximum of three required or elective courses completed as part of a Professional Program can be repeated in order to meet graduation requirements. (Courses completed as part of a preprofessional program are not included in this total of three repeats.)

4. The *P-D-F* grading option may not be used in required or elective courses completed as part of a Professional Program. (The *P-D-F* grading option is approved for General Education courses.)

5. The academic regulations listed above (1-4) apply to required course work and any technology/math/science/business course which could be used to satisfy graduation requirements for the chosen degree. That is, once a student completes a particular technical elective, it becomes a required course for that student.

6. Students in violation of departmental or college academic regulations, no longer eligible for graduation, or not making satisfactory progress toward a degree, will be placed on probation.

a. Students will be placed on probation if they (i) earn an *F* in a technology/math/science/business course which could be used to satisfy graduation requirements for the chosen degree (see item 5 above); (ii) have more than 10 hours of *D* credit (see item 2 above); or (iii) have a GPA of less than 2.0 (see item 1 above).

b. Students remain on probation until they improve their standing by repeating and passing all failed classes, repeating classes to reduce the number of *D* credits to 10 or less, and/or by raising their GPA above 2.0.

c. While on probation, a student must earn a quarterly GPA of 2.0 or higher in technology/math/science/business classes and must not earn any *D*'s or *F*'s.

While on probation, a student may not preregister. The student's major code will be changed to a preprofessional code. The student must meet at least quarterly with the College Academic Adviser to work out a schedule having the primary goal of correcting the existing academic problems.

## Requirements

### Bachelor of Science in Industrial Teacher Education

**Industrial Arts/Technology Teacher Education.** This option prepares the student to teach in junior and senior high schools. The curriculum requirements include the following: ITE 100, 101, 102, 103, 104, 121, 151, 164, 171, 201, 202, 203, 230, 231, 303, 374, 443, 450, 460, 521, 522, 524, 580; Math 105, 106; Chem 101; Engl 101, 201, 305; Ins T 442; Phyx 101; Psy 101, 366; SecEd 301, 302, 404, 510; and Sp Ed 301. Students in this degree also take ITE depth courses (minimum of 15 credits), General Education courses, and

electives. See major requirement sheet, available from the department, for further information.

**Trade and Technical Teacher Education.** This option prepares the student to teach vocational courses at the high school or post high school level. The curriculum requirements include the following: technical and trade courses, 43 credits; professional courses, 40 credits; general education, 49 credits; technical education, 19 credits; and general electives, 35 credits.

State certification requires a minimum of two years of approved vocational experience. Successful completion of a trade competency examination or industry school courses is accepted in lieu of vocational experience.

### Bachelor of Science in Industrial Technology

**Aerospace Specialization.** Graduates in Aerospace Technology are prepared to enter the aerospace industry in a variety of technical/management positions including aviation, manufacturing, production, and design. The basic curriculum includes courses in computer aided drafting and design, electronics, controls, machining operations, materials and processes, automation/robotics, NDT, composites, management, quality control, computer science, and safety. In addition, students select a concentration in either aeronautics, welding, or electronics.

The courses for the **Aerospace Technology** specialization are as follows: ITE 120, 121, 133, 144, 151, 164, 185, 186, 230, 231, 237, 301, 361, 382, 385, 420, 430, 458, 568, 580; Spch 305 or Engl 305; BIS 140; Math 105, 106, 215, 216; Engl 101, 201; Phyx 111, 112; BA 308, 370; Chem 111; Stat 508; CS 170; MHR 311, 360.

Students in the **Aerospace/Aeronautics** emphasis must also take ITE 113, 114, 117, 210, 217, 302, 333, and 419. Students in the **Aerospace/Welding** emphasis must also take ITE 165, 267, 363, 367, 464, 574, 575, and 576. Students in the **Aerospace/Electronics** emphasis must also take ITE 140, 205, 240, 260, 337, 338, 339, 341, and 437.

The **Flight Technology** specialization prepares graduates to be commercial pilots. The degree requirements include completion of the following FAA licenses: private, instrument, commercial, CFI, CFII, and Multi-Engine. The courses for this specialization are as follows: ITE 114, 117, 120, 121, 133, 144, 185, 210, 217, 218, 230, 231, 233, 234, 235, 237, 243, 251, 252, 253, 254, 301, 302, 304, 312, 319, 336, 432, 434, 442, 444, 447, 568, 580; Engl 101, 201; Spch 305 or Engl 305; BIS 140; Math 105, 106; Chem 111; Phyx 111, 112; MHR 299, 311, 360.

In addition, students in Flight Technology must complete a minor in Management. To do this, they must choose four classes from the following list: MHR 364, 414, 415, 461; Econ 520, 521. A GPA of 2.2 or higher must be earned in the classes used for the Management minor.

### Airway Science

The Federal Aviation Administration has designated USU as an Airway Science institution for its programs in aircraft maintenance and electronics. This designation gives graduates priority in employment in FAA careers. See the department for details.

### Associate of Applied Science Vocational-technical Programs

The two-year curricula develop strong vocational skills in one of two areas of specialization—*aeronautics* or *drafting*. Most of the credits earned in these programs may be applied toward a related BS degree should the student decide to continue his or her education.

**Airframe and Powerplant Technician Associate of Applied Science Degree Program.** The two-year technical program leads to either an Associate of Applied Science (AAS) degree or a certificate. Required courses are: ITE 113, 114, 117, 118, 120, 124, 125, 144, 151, 164, 210, 211, 212, 213, 214, 215, 217, 218, 219, 220, 230, 231, 242, 243, and 244; Math 106. General Education credits (26) are required for the AAS degree as described on pages 18-21. Federal Aviation Administration airframe and powerplant certification is available without general education requirements. See requirement sheet, available from the department, for further details.

**Drafting Technology Two-year Associate of Applied Science Degree Program.** A two-year technical drafting and design program leading to an AAS degree is available to those desiring to directly enter the drafting and design occupation. The program emphasizes computer aided drafting and design. Curriculum requirements include the following: ITE 101, 103, 120, 121, 151, 201, 230, 232, 320, 322, 323, 324, 325, 327, 493; CS 150; Math 105, 106; and Engl 101, 201. Students in this program also fulfill General Education Requirements and complete technical electives and other electives. See requirement sheet, available from the department, for further details.

### Graduate Study

The Master of Science (MS) degree is available to individuals interested in graduate study. Programs are offered in Industrial Teacher Education and Aerospace Technology. Candidates can choose either the Plan A thesis option or the Plan B nonthesis program.

For additional information on the programs for these degrees, see the graduate catalog.

### Industrial Technology and Education Courses

**100. Orientation.** Introduction to the industrial arts/technology education profession, including programs, facilities, purposes, and opportunities. (1F)

**101. Communications Technology Education.** Exploration of the techniques and processes used to transmit ideas, knowledge, or information with emphasis on laboratory and classroom activities in graphic and electronic communication. (3F)

**102. Energy/Power/Transportation Technology Education.** Exploration of the concepts and processes relating to the source, conversion, transmission, and control of energy relating to use in industry, domestic, and transportation. (3W)

**103. Manufacturing Technology Education.** Exploration of the techniques and processes used to produce goods, including researching, securing, and processing materials to produce finished products. (3F)

**104. Construction Technology Education.** Exploration of the materials, processes, and management of the construction industry. (3W)

**108. Electronic Instrumentation.** Study of electronic circuit fabrication and the basic theory of operation of power supplies, analog and digital multimeters, function generators, oscilloscopes, and transistor curve tracer. (1)

**113. Flight Principles.** Basic flight theory and physics of flight, aircraft control systems related to flight. Ground handling and servicing of aircraft. Special lab fee. (2F)

**114. Aircraft Science.** Materials and hardware, nondestructive inspection applicable to aircraft. Plumbing methods, maintenance publications, and aircraft weight and balance control. (3F)

**117. Aerospace Structures.** Accepted methods and repair for metal, wood, and composite structures aircraft. Organic finishes and application techniques. (5F)

**118. Aircraft Structures Laboratory.** Laboratory applications and practical experience with subjects covered in ITE 117. (4F)

**120. Drafting.** Lettering, print reading, geometric construction, sketching, multiview drawings, pictorials, dimensioning theory and practice, sectional views, and auxiliary views. (3F,W)

**121. Computer Aided Drafting.** Fundamentals of computer aided drafting, preparation of industrial working drawings, and plan reading. Prerequisite: ITE 101 or 120. (3W,Sp)

**122. Drafting Practicum.** Provides additional drawing board experience. Concurrent registration with ITE 120 or 121. (1-2F,W,Sp)

**124. Aircraft Maintenance.** Maintenance, repair, alteration, and inspection of aircraft. Assembly and rigging of control systems. Prerequisites: ITE 113, 114. (5Sp)

**125. Aircraft Maintenance Laboratory.** Application of maintenance procedures studied in ITE 124. Prerequisites: ITE 113, 114. (4Sp)

**133. Digital Logic.** Study of number systems, base two, octal, hexadecimal, logic gates, flip flops, counters, and Boolean algebra concepts, combinatorial and sequential logic. (3F)

**140. Introduction to Semiconductors.** Principles, characteristics, parameters, specifications, and applications of semiconductor devices. Prerequisite: ITE 231. (3Sp)

**144. Hydraulics and Pneumatics.** Principles of hydraulics and pneumatics; the components and circuitry used in transferring fluid energy. (2F)

**151. Machining Operations.** Function, setup, and operation of machine tools. Emphasis on precision measurement and layout, cutting tool theory and grinding, drilling, tapping, turning, boring, milling, and surface grinding. (3W)

**160. Technical Plastics.** Production, techniques, optimum uses, maintenance, shapes, colors, strengths, and design. (3)

**164. Basic Welding.** Theory, operating principles, equipment, and industrial application of SMAW, OAW, and OFC. Laboratory practice with SMAW, OAW, OFC, and brazing. (3Sp)

**165. SMA Welding Certification.** Development of welding skills to meet the AWS D1.1 Code. Course may be repeated for maximum of 12 credits. Prerequisite: ITE 164. (2F)®

**171. Technical Woods.** Operation of basic machine woodworking equipment with study of their uses and nomenclature. (3W)

**185. Industrial Materials.** Structure, characteristics, and testing methods used to identify properties and select materials for industrial applications. Includes metals, plastics, elastomers, ceramics, and composites. (3W)

**186. Industrial Processes.** Theory, operation, and application of manufacturing processes. Includes production design and selection, metal casting, machine tools, forging, powder metallurgy, finishing, and plastic forming processes. (3W)

**201. Communications Technology Education.** Continued study of effects, implications, and processes of communication in today's technological society. Emphasis will be given to electronic communication and basic graphics. Prerequisite: ITE 101. (3Sp)

**202. Energy/Power/Transportation Technology Education.** A level two course to continue the exploration of energy/power/transportation technology with emphasis on the conversion and application of alternative energy sources. Prerequisite: ITE 102. (3F)

**203. Manufacturing Technology Education.** A level two course emphasizing materials and processes with applications to manufacturing including modeling, process sequencing, production, and automation. Prerequisite: ITE 103. (3Sp)

**205. Digital Circuits Technology.** Study of logic families, flip flops, counters, encoders, decoders, multiplexers, and registers. Prerequisite: ITE 133. (3W)

**210. Aerospace Propulsion Systems.** Theory of operation, maintenance, and repair of reciprocating, turbine, and rocket propulsion engines. (5F)

**211. Aircraft Powerplant Laboratory.** Application of principles and components studied in ITE 210. (4F)

**212. Aircraft Powerplant Accessories.** Operation, maintenance, and repairs of powerplant accessories. (5W)

**213. Aircraft Powerplant Accessories Laboratory.** Laboratory applications of principles and components studied in ITE 212. (4W)

**214. Aircraft Powerplant Maintenance.** Operation of powerplants, including inspection, servicing, propeller operation, and maintenance. (5Sp)

**215. Aircraft Powerplant Maintenance Laboratory.** Laboratory application of principles and components studied in ITE 214. (4Sp)

- 217. Aerospace Systems.** Theory and operation of aerospace environmental systems, communication, navigation and guidance systems, fuel and propellant systems, fire detection, and warning. (3W)
- 218. Aircraft Hydraulics, Landing Gear, and Brakes.** Theory and operation of aircraft hydraulic, landing gear, and brake system. Prerequisite: ITE 144. (3W)
- 219. Aerospace Systems Lab.** Laboratory application of principles and components studied in ITE 217. (1W)
- 220. Aircraft Hydraulics, Landing Gear, and Brakes Lab.** Laboratory application of principles and components studied in ITE 218. (1W)
- 227. Computer Engineering Drafting.** Utilization of microcomputer to prepare basic engineering drawings. Students will be introduced to several drafting software packages. (3W)
- 230. Electronics.** Systems, components, circuits, measurements, laws, and construction practices related to DC electricity. Prerequisite: Math 106. (3F)
- 231. Electronics.** Principles, circuits, laws, measurements, components, energy sources, and applications related to AC electricity. Prerequisite: ITE 230 or equivalent. (3W)
- 232. Electronic Drafting and Fabrication.** Fundamentals of electronic drafting, layout, and construction. Includes printed circuit development and project fabrication. Prerequisites: ITE 121 and 230. (3F)
- 233. Private Pilot Ground School.** Instructions in principles of flight, aircraft and engine operation, weather, navigation, radio aids to navigation, radio communications, and federal air regulations. Preparation for FAA Private Pilot written exam. (5F,W)
- 234. Solo Flight.** FAA approved flight training program from first flight through solo flight. (1W)
- 235. Private Pilot Certification.** FAA approved flight training program meeting all requirements for, and in the issuance of, the Private Pilot Airplane License. (2Sp)®
- 237. Microprocessors I.** Introduction to the architecture, organization, terminology, and machine language programming of microprocessors. Prerequisite: ITE 133. (3Sp)
- 238. Pulse Circuits.** Study of RC and RL networks, differentiators, integrators, RC stepped attenuators, clippers, clamping, and the switching characteristics of diodes and transistors. (3Sp)
- 240. Basic Electronic Circuits.** Principles and applications of selected circuits, such as power supplies, amplifiers, oscillators, etc., commonly found in a wide variety of electronic devices. Prerequisite: ITE 140. (3F)
- 242. Regulations, Records, and Certification.** Maintenance forms, records, and regulations releasing aircraft to airworthy status. Certification of maintenance technicians is also included. (2Sp)
- 243. Aircraft Electrical Systems and Equipment.** Aircraft electrical power generating systems. Theory of generation, alternators, regulation, and control systems. Prerequisite: ITE 230. (3Sp)
- 244. Aircraft Electrical Systems Laboratory.** Laboratory application of principles and systems studied in ITE 243. Prerequisite: ITE 230. (3Sp)
- 251. Intermediate Flight.** FAA approved flight training program that fulfills the cross country requirements for commercial and instrument ratings. (2F)
- 252. Commercial Pilot Ground School I.** Instrument flight procedures including air traffic control, navigation, charts, meteorology, emergency procedures, and decision making. (3W)
- 253. Commercial Pilot Ground School II.** Commercial flight operations including performance, cross country planning, advanced systems operations, complex airplanes, and flight maneuvers. (3Sp)
- 254. Instrument Certification.** FAA approved flight training program meeting all the requirements for, and the issuance of, the Instrument Pilot Airplane Rating. (3F,W,Sp,Su)
- 260. Communications Circuits.** Study of AM and FM transceivers. Prerequisite: ITE 240. (3F)
- 267. GTA and SMA Welding.** Development of skills to meet ASME qualification requirements for GTAW, GMAW, and FAW. Prerequisite: ITE 164. (3W)
- 301. Process Planning, Specifications, Standards, and Codes.** Engineering drawing interpretation, process sequencing, specifications, standards—ASTM, SAE, ANSI, AN, MS, NAS, regulations—FAA, codes—ASME, ANSI, AWS, mil standards. (3W)
- 302. National Airspace Systems and Control.** Study of the national air traffic control system, airspace usage, and facilities. (3Sp)
- 303. Field-based Experience.** Field-based experiences in secondary schools prior to student teaching. Students complete 30 hours of tutoring and aid teachers with managerial, clerical, and other professional tasks. (2F,W,Sp)
- 304. Flight Safety.** Development of flight safety programs, techniques and procedures of accident investigation, human factors and limitations, effects of weather, hazards related to trans-atmospheric flight operation. (3F)
- 305. Digital Systems Technology.** Application of digital circuits such as memory circuits, A/D and D/A converters, RAM and ROM devices, parts, and programming with introduction to microprocessors. (3Sp)
- 312. Aviation Law.** Law as it affects the aviation industry. Rights and responsibilities of individual organizations and the aviation community. Regulations and liability pertaining to the design, manufacture, operation, and maintenance of aircraft. (3W)
- 319. Commercial Flight.** FAA approved flight training program meeting all the requirements for complex airplane operations. (2W)
- 320. Descriptive Geometry.** View relationships, spatial visualization, and problems relating to points, lines, and planes. Prerequisite: ITE 120. (3W)
- 322. Architectural Drafting and Specifications.** Plan and elevation views, detail drawings, conventional practices, design considerations, and specifications for dwellings. Prerequisite: ITE 120. (3F)
- 323. Machine Drafting.** Techniques, symbols, conventions used in representation of gears, cams, jigs, and fixtures. Prerequisite: ITE 121. (3F)
- 324. Technical Illustration.** Methods of converting orthographic drawings into three-dimensional drawings. Shading, inking, and airbrush techniques are introduced. Prerequisite: ITE 121. (3Sp)
- 325. Production Drafting.** Advanced techniques of production drawings; details, assembly production dimensions, tolerances, position tolerances, classes of fits, surface quality, and specification. Prerequisite: ITE 121. (3W)
- 327. Advanced Computer Aided Drafting.** Advanced methods of preparing industrial drawings using microcomputers. Prerequisite: ITE 121 or 227. (3Sp)
- 328. Advanced Turbine Engines.** Advanced study of turbo-jet propulsion. Comparative examination of jet, fan jet, turbo-prop, and turbo-shaft engines. (3)
- 333. Aerospace Vehicle Construction.** Construction and manufacture or remanufacture of aircraft, rotorcraft, and space vehicles and their components. Prerequisites: ITE 117, 118, 210, 211. (3Sp)
- 336. Commercial Pilot Certification.** Flight instruction to meet FAA requirements and completion of tests for certification. Prerequisite: Private pilot certificate. (2F,W,Sp)®
- 337. Electronic Devices II.** Study of LED, Varactor, Diac, Zener, Thyristor, U.J.T., Fet, Mosfet, phototransistor, optocouplers, and isolators. Prerequisite: ITE 240. (3W)
- 338. Microprocessors II.** Assembly language programming, bus, timing, I/O, PIAs, printer subroutines, and logical operations in solving real world and community problems. (3F)
- 339. Industrial Electronics.** Concepts of electron devices and circuits used in industrial applications for measurement and control purposes. Prerequisite: ITE 140. (3Sp)
- 340. Optoelectronics.** Study of optical principles, light sources, displays, light-reactive devices, and fiber optic technology. Prerequisite: ITE 260. (3)
- 341. Communications Circuits II.** Transmitters and receivers, both AM and FM, modern frequency modulation and demodulation, transmission lines and cables, waveguides, and radio wave propagation. Prerequisite: ITE 260. (3W)
- 351. Machine Tool Technology.** Complex set up and machining processes. Taper cutting, gear theory, indexing, cuttergrinding, profile milling, and shaping. Prerequisite: ITE 151 or equivalent. (3)
- 352. Machine Tool Programming.** Theory and application of NC and CNC machine tools. Dimensioning systems, manuscript development, tape generation, and error analysis. Prerequisite: ITE 351. (3)
- 361. Programmable Manufacturing Automation.** Principles, operation, and application of computer controlled industrial machines. Introduction to computer managed systems including CAD/CAM, CIM, DNC, artificial intelligence, and expert systems. (3F)

**363. Advanced Fusion Joining Processes.** A study of the SAW, ESW, EMAW-EG, RW, PAW frequency, electron beam, laser, friction, and other welding processes. Prerequisites: ITE 165, 267, and Phyx 112. (5F)

**365. Industrial Brazing and Soldering.** Fundamentals of brazing and soldering processes, joint designs, metallurgy, and applications of brazing. (3)

**367. Welding Design.** Fundamentals of design relating to load stresses and welding details used in the design of welded products. Prerequisite: ITE 385. (3Sp)

**368. Estimation, Justification, and Value Analysis.** Estimating cost of industrial projects, selection and justification of investments in manufacturing systems, value analysis methods, economic risk, engineering economy, and decision science. (3)

**370. Cabinet Making and Furniture Construction.** Construction, design, and opportunity for application of original designs. Practical work in the construction of fine furniture and built-in cabinet work. Prerequisite: ITE 171. (3Sp)

**371. Industrial Woods.** Applications of materials and processes considered new in the woodworking industry, including laminating, plastics in furniture, electronic gluing. Prerequisite: ITE 171. (3F)

**372. Dwelling Construction and Estimating.** Specifications, regulations, and building codes applied to construction; estimation, layout, and practical experience in light construction. Prerequisite: ITE 171. (3Sp)

**373. Wood Finishing.** Application of opaque and translucent finishes by brush, cloth, roller, or spray. Study of materials and types of paints, stains, fillers, and sealers. (3)

**374. Facility and Equipment Maintenance.** Systems approach to facility, equipment, and tool maintenance including principles of woodworking machine construction, adjustment, and sharpening. (3Sp)

**375. Power and Energy.** Principles and application of alternative power and energy systems, including solar thermal, wind power, and biogas. (3)

**380. Industrial Design.** Analysis, creation, and development of functional design in terms of tools, processes, forms, and materials of industry. (3)

**382. Nondestructive Testing Principles.** Fundamental concepts relating to liquid penetrant, magnetic particles, ultrasonic, radiographic, and other NDT processes. Prerequisites: Math 106 and Phyx 112. (5W)

**385. Mechanics and Properties of Materials.** Introduction to the basics of strength of materials with applications to metals and composites and explanations of their properties in terms of material structure. Prerequisites: ITE 185, 186, Math 215, Phyx 112, Chem 111. (5F)

**390. Principles and Objectives of Industrial Education.** A comprehensive study of the philosophy and purposes of industrial education programs and their place in the total program of modern education. (3)

**391. Occupational Analysis.** Student completes an analysis of one unit of a trade or occupation. Individualized, student-paced instruction. (3F,Su)

**392. Organization and Development of Instruction Materials.** Principles and practice in analyzing occupations for instructional purposes. The selection and arrangement of instructional materials to be used in planning industrial education course work. (3Sp,Su)

**393. Evaluation of Industrial Subjects.** Evaluation factors including attitudes, skills, work habits, technical information, and instrument construction for evaluation of the above. (3F,W,Sp)

**394. Training Supervision.** Provides experience in a variety of industrial training, qualification, and supervision situations. Prerequisites: upper division status and permission of instructor. (1-3F,W,Sp)

**419 (d619). Technical Aerodynamics.** Aerodynamic concepts, airfoil theory, NACA airfoils, lift and drag calculations and coefficients, wind tunnel testing, and aircraft performance estimating. Prerequisites: Math 216, ITE 113, 385. (3Sp)

**420 (d620). Composite Manufacturing Processes.** Composite manufacturing processes, composite materials survey, tooling design and fabrication, autoclave processes, vacuum bag techniques, filament winding processes, equipment requirements, materials cutting and storage, composite materials testing. Prerequisite: ITE 185. (4W)

**424. Internship.** Planned work experience in industry, related to the selected option. A maximum of 6 credits per school year and 12 credits for the course recommended. (1-6F,W,Sp,Su)®

**430. Corrosion and Corrosion Control.** An analysis of the mechanism of corrosion of ferrous and nonferrous metals, and the procedures used to control corrosion. Prerequisite: ITE 385. (3Sp)

**432. Certified Flight Instructor Ground School.** Fundamentals of instruction, aerodynamics, airplane performance, systems, weather, Federal Aviation Regulations, navigation, flight physiology, and preparation for the FAA Instructor Airplane written exams. (3F)

**434. Certified Flight Instructor Certification.** FAA approved flight training program meeting all the requirements for, and the issuance of, the Certified Flight Instructor, Airplane, Rating. (2F)

**435. Digital Communications Technology.** Satellite systems, antennas, telephone systems, and television signals and monitors. (3W)

**436. Data Communications Technology.** Essentials of computer communications with emphasis on types of links: analog, digital, and protocol testing and interfacing computers to networks. (3Sp)

**437. Microprocessors III.** Operating system, application, interfacing, and troubleshooting of microcomputers. (3W)

**438. Computer Networking Technology.** Introduction to computer networks with particular emphasis on LAN characteristics, fundamentals, and architecture as they pertain to IBM PCs. Prerequisite: ITE 436. (3)

**442. Certified Flight Instructor Instrument Ground School.** Advanced airplane instruments, weather, Federal Aviation Regulations, navigation, Air Traffic Control, IFR charts, and preparation for the FAA Instrument Instructor written exam. (3W)

**443. Methods in Industrial Education.** Techniques of teaching as applied to individual and group instruction. Students have opportunity to use these different methods in presenting lessons. Prerequisite: admission to teacher education and SecEd 301. (4F)

**444. Certified Flight Instructor Instrument Certification.** FAA approved flight training program meeting all the requirements for, and issuance of, the Certified Flight Instructor, Airplane, Instrument Rating. (1W)

**447. Multi-Engine Certification.** FAA approved flight training program meeting all the requirements for, and the issuance of, the Multi-Engine Airplane Rating and the Certified Flight Instructor Multi-Engine Airplane Rating. (3Sp)

**450. Secondary Curriculum Seminar.** Focus upon problems arising during student teaching. Includes teaching plans, procedures, adaptive classroom practices, and evaluation. To be taken concurrently with ITE 460 (see SecEd 450). (3W)

**456 (d656). Industrial Robots.** Principles, operation, and application of robots to material handling, assembly, and joining processes. Includes hardware and software applications for industrial technology. Prerequisite: ITE 361 and Math 216. (3)

**458. Occupational Safety and Health Management.** Management practices and principles as applied to safety and health ethics, laws, organizations, programs, and varied functions of the safety and health professional. (2Sp)©

**460. Student Teaching in Secondary Schools.** Candidates assigned to cooperating teachers in the public secondary schools in their major and/or minor subjects. Students will have professional responsibilities associated with teaching (see SecEd 460). (12W)

**464 (d664). Tooling for Automation.** Design and application of jigs, fixtures, and material handling devices for automated manufacturing. Includes clamping, positioning, nesting, locating, supports, part feeding, indexing, and orientation selection and rejection. Prerequisite: ITE 456. (3W)

**470. Student Teaching in Postsecondary Schools.** Planning, presenting, and evaluating instruction for students in postsecondary industrial and technical programs under supervision of experienced teacher. Enrollment by permission only. (1-6F,W,Sp,Su)

**472 (d672). Reliability and Quality Control/Quality Assurance.** Probability and the application of statistical methods to reliability, process control, and acceptance sample. Includes control charts, tolerances, acceptance sample. Prerequisites: ITE 368 and Math 216. (3)

**482 (d682). Industrial Management Science.** Quantitative techniques for industrial management including: computer aided decision support, manufacturing systems analysis, and performance prediction. Prerequisites: ITE 472 or Stat 201. (3)

**493. Independent Study.** Upon application, students may propose and complete work above and beyond regular course work to support or supplement their major. (1-6F,W,Sp,Su)®

**494. Related Industrial Experience.** Provision for enrollment in industry schools conducted on university level. Approval by department upon application for trade competency examination and work experience in industry. (1-18F,W,Sp,Su)®

**504. Production Techniques for Technology Education.** Analysis of industrial organizations, production methods, and exploration of the materials, processes, and services related to today's technology. (3)

**521. Class and Facility Organization and Management.** The process, purpose, and results of a well-planned facility and instructional program with emphasis on safety and efficiency. (3Sp)

**522. Analysis and Course Development.** Principles and practice in analyzing occupations for instructional purposes. Selection and arrangement of instructional materials for industrial education course work. Prerequisites: admission to teacher education, SecEd 301, and ITE 303. (5F)

**523. Technical Training for Innovative Programs.** Preparing prospective and incumbent teachers to implement and conduct contemporary programs. Skill development and the philosophy needed to innovate are included. (1-6F,W,Sp,Su)®

**524. Principles of Technology.** An introduction to the applied technology principles that form the basis for today's society. (2-5Sp,Su)

**568. Applied Aerospace Research.** Development and completion of an approved applied aerospace research project. Prerequisites: ITE 301, 385. Limited to senior students. (3F,W,Sp)

**574. Welding Metallurgy I.** Principles of ferrous and nonferrous metallurgy, including structures, properties and property control, welding base metals, filler metals, and shielding. Prerequisites: ITE 385, Math 216. (3F)

**575. Welding Metallurgy II.** Metallurgy principles are applied to welding and testing of steels, stainless steel, and alloys of aluminum, titanium, nickel, and copper. Prerequisite: ITE 574. (3W)

**576. Weldability of Metals.** Applications of weldability and testing of base and filler metals. Prerequisite: ITE 575. (3Sp)

**580. Seminar.** Prerequisite: senior status. (1-3F,Sp)®

**590. Workshop in Industrial Technology and Education.** Special workshops for education or industry. May be repeated, provided content varies. (1-6F,W,Sp)®

**591. Special Problems in Industrial Education.** (1-6)

### Graduate<sup>2</sup>

**609. Curriculum for Technology Education.** (3Sp,Su)

**610. Issues and Trends in Technical Education.** (1-5Su)®

**619 (d419). Technical Aerodynamics.** (3Sp)

**620 (d420). Composite Manufacturing Processes.** (4W)

**625. Internship.** (1-12F,W,Sp,Su)®

**640. Cooperative Industrial Programs.** (3Su)

**645. Organization of Industrial Education Programs.** (3W,Su)

**651. Administration and Supervision of Technology Education.** (3Sp,Su)

**656 (d456). Industrial Robots.** (3W)

**661. Strategies of Instruction.** (3F,Su)

**664 (d464). Tooling for Automation.** (3Sp)

**672 (d472). Reliability and Quality Control/Quality Assurance.** (3W)

**675. Research in Technology Education.** (3F,Su)

**680. Seminar.** (1-2F,W,Sp,Su)®

**682 (d482). Industrial Management Science.** (3Sp)

**690. Readings and Conference.** (1-3F,W,Sp,Su)®

**691. Experimental Laboratory in Technology Education.** (1-3F,W,Sp,Su)

**693. Independent Study.** (1-6F,W,Sp,Su)®

**697. Thesis Research.** (3-9F,W,Sp,Su)®

**699. Continuing Graduate Advisement.** (1-3F,W,Sp,Su)®

**723. Foundations of Vocational Education.** (3Su)

**746. Vocational Education Finance.** (3Su)

**797. Dissertation Research.** (3-9F,W,Sp,Su)®

**799. Continuing Graduate Advisement.** (1-3F,W,Sp,Su)®

<sup>1</sup>Parenthetical numbers preceded by *d* indicate a dual listing.

<sup>2</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

© This course is also offered by correspondence through the Life Span Learning Independent Study Division.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

## Department of Instructional Technology College of Education

**Head: Professor Don C. Smellie**  
Office in Emma Eccles Jones Education 215

**Professors** Alan M. Hofmeister<sup>1</sup>, M. David Merrill, Ron J. Thorkildsen<sup>2</sup>, R. Kent Wood; **Associate Professors** Brenda Branyan-Broadbent, Byron R. Burnham<sup>3</sup>, Nick Eastmond, J. Steven Soulier; **Assistant Professor** Duane E. Hedin; **Adjunct Assistant Professors** Zhongmin Li, Gary S. Poppleton<sup>4</sup>; **Adjunct Instructors** Deborah Boutwell<sup>5</sup>, Penny Findlay<sup>6</sup>; **Research Instructor** Charles Stoddard; **Research Associate** Mark Jones

**Degrees offered:** Master of Education (MEd) and Master of Science (MS) in Instructional Technology; Educational Specialist (EdS) in

Instructional Technology; Doctorate of Philosophy (PhD) and Doctorate of Education (EdD) in Instructional Technology

**Areas of specialization:** Instructional Development for Training and Education, Information Technology and School Library Media Administration, Master Resource Teacher/Educational Technologist

<sup>1</sup>Professor of Special Education.

<sup>2</sup>Associate Director, Developmental Center for Handicapped Persons.

<sup>3</sup>Staff Development and Evaluation Specialist, University Extension.

<sup>4</sup>Director, Independent Study.

<sup>5</sup>Librarian, Edith Bowen Laboratory School.

<sup>6</sup>Specialist, Developmental Center for Handicapped Persons.



## Objectives

Instructional technology includes aspects of instructional design and development, communications, product development, electronic distance education, and library and information technology. Instructional technology is defined as "a systematic way of designing, carrying out, and evaluating the total process of learning and teaching in terms of specific objectives, based on research in human learning and communication, and employing a combination of human and nonhuman resources to bring about more effective instruction." Each aspect of the field has unique contributions to make to the teaching-learning process. Graduates are currently placed in business and industrial settings, as well as education.

The minors in Instructional Technology, along with the MEd, MS, EdS, EdD, and PhD degrees, provide a wide range of preparation enabling individuals to function at several levels of service in education, industry, and business settings. Admission to the masters program is open to all students regardless of the undergraduate area of preparation. For more specific information regarding these programs, write to the department head.

## Department Admissions Requirements

**Bachelor Degree Minors.** There is no major at the undergraduate level in instructional technology because of the need for those preparing in the field to have especially strong liberal and general education. The minors may emphasize School Library Media management or Instructional Technology. Those persons wishing to certify for positions in the public schools must complete a teaching certificate and the prescribed 24-quarter-credit School Library Media program for the basic professional media endorsement. A 2.5 grade point average is required for admission and certification as an instructional media specialist at the bachelors degree level. Persons not seeking a public school position may elect the 18-credit minor in Instructional Technology in conjunction with a major in other fields. The Instructional Technology minor is especially appropriate for fields which require a great deal of instructional communications, such as business, engineering, natural resources, and others.

Requirements for the Instructional Technology minors are as follows:

**School Library Media Minor.** Ins T 441, 442, 500, 502, 503, 506, 507, 539, and 3-credit Ins T elective course.

**Instructional Technology Minor.** Ins T 500, 544, 616, 635, 678, and 680.

## Graduate Study

The Department of Instructional Technology has been assigned the exclusive role by the Utah State Board of Regents for all postmasters degree and certificate programs in information, library and instructional sciences, and other terms used to designate the components of the field of Instructional Technology. Because of that exclusive assignment, brief descriptions are given for graduate as well as undergraduate programs. Further information may be obtained from the department and/or the graduate catalog.

**Master Degree Programs.** The master degree programs consist of three areas of emphasis: (1) information technology and school library media administration, (2) instructional development for careers in education and industrial training, and (3) the master resource

teacher preparation with an educational technology emphasis. Those persons wishing to certify as professional media specialists in the public schools must hold or complete a teaching certificate and complete the masters program, along with obtaining departmental recommendations for professional media endorsement. In some states this certificate is still called a library certificate (but combines the studies of library science and educational communications and technology). Completion of application forms for the Instructional Technology program requires a 3.0 GPA for the last two years of study, three letters of recommendation, a personal letter expressing personal goals in entering the masters degree program in instructional technology, and satisfactory scores on the Miller Analogies Test (43) or a combined verbal and quantitative score of 1,000 on the Graduate Record Examination. Persons preparing for careers as instructional technology professionals, in college, university, business, and other settings outside public education, are not required to hold a teaching certificate, although this background is often helpful.

Those desiring to meet graduation requirements should matriculate in the Department of Instructional Technology and plan to take the requirements for the area of emphasis selected.

**Educational Specialist Degree Program.** This advanced degree program (EdS) should be of interest to those individuals whose career goals do not require a doctorate, but who have need for preparation beyond the masters level. Persons seeking positions at the district level in public education, junior/community colleges, small four-year colleges, and certain positions in business and industry, should find the EdS degree in Instructional Technology particularly useful. Admissions requirements to the EdS programs include the following:

1. Grade point average of 3.00 in last 45 credits of graduate work.
2. Score of 1,000 on the Graduate Record Examination or 46 on the Miller Analogies Test.
3. A masters degree.
4. Three letters of recommendation.
5. A personal statement regarding educational/training philosophy as related to the desire to complete the EdS degree.

**Doctorate Degree in Instructional Technology.** The doctorate offered through the College of Education provides Instructional Technology students with the opportunity of combining the general areas of research and learning theory with the more specific area of Instructional Development.

Instructional Development has been defined as a set of systematic procedures for designing, developing, and validating instructional products and procedures. It is directed at achieving objectives which are based on research in human learning and communication. Application of these procedures may result in the production of systems of learning which arrange human and nonhuman resources most efficiently to bring about effective learning in educational and training settings. Admission requirements to the EdD or PhD, with emphasis in Instructional Technology, are as follows:

1. Grade point average of 3.0 for last two years of academic work.
2. Score of 1100 on the combined verbal and quantitative Graduate Record Examination.
3. Masters degree.
4. Three letters of recommendation.
5. Personal statement regarding educational philosophy related to the desire to complete the EdD or PhD degree.

The degree is designed for those planning to enter a training/development career in business, industry, college teaching, or instructional media and technology services, and those coordinating or supervising in school district or state offices.

## **Instructional Technology Courses**

**SK 100. Use of Libraries and Learning Resources.** Designed to develop the competencies needed for lifelong pursuit of knowledge through the use of libraries, reference services, and information sources. (3F,W,Sp)©

**440. Fundamentals of Photography for Interpretation and Education.** Introduction to photographic methods and procedures to enable interpreters and teachers to communicate a message visually. (3F,W)

**441. Media Utilization and Production for the Elementary Teacher.** Combines principles of utilization for print and nonprint materials and techniques of production in development of an integral unit of instruction for the elementary teacher. (3F,W,Sp,Su)©

**442. Media Utilization and Production for the Secondary Teacher.** Combines principles of utilization for print and nonprint materials and techniques of production in development of an integrated unit of instruction for the secondary teacher. (3F,W,Sp,Su)©

**491. Undergraduate Research Creative Opportunity.** A cooperative process of discovery, investigation, research, or creativity between faculty and one or more students. (1-3F,W,Sp,Su)

**\*500 (d600).<sup>1</sup> Information Sources.** An introduction to information retrieval and bibliographic techniques for all forms of media. Basic reference and information sources plus state, national, and international information sources. (3F,Su)

**\*\*502 (d602). Evaluation and Selection of Instructional Materials.** Experience in reviewing, evaluating, and selecting instructional materials. Criteria for evaluation of all media. Use of standard evaluation and selection tools and reviewing publications. (3W,Su)©

**\*\*503 (d603). Reading Guidance.** Scope of reading programs in media centers. Special problems, interests, tools, and case studies relating to work with children and young people. (3Sp,Su)

**\*506 (d606). Cataloging and Classification.** Fundamental methods and techniques of cataloging and classification of media materials. (3Su)©

**\*507 (d607). Library Media Center Administration.** Includes the study of organization, personnel, budgets, selection, and evaluation of materials and equipment, providing for a wide variety of media services. Prerequisites: Ins T 500, 502, and 506. (3Sp,Su)

**522. Computer Applications in Education.** Introduction to microcomputer applications in education, including their use for computer-assisted instruction, computer-managed instruction, and computer literacy development. Four-hour lab required. (3F,W,Sp,Su)

**\*524. Teaching and Computers.** A study of instructional strategies and methods utilized to effectively teach computer literacy in the secondary schools. (3F,Su)

**\*527 (d627). Computer-assisted Instruction Programming: Authoring Languages.** Fundamentals of programming computer-based instructional units utilizing the PILOT and other authoring languages. Four- to six-hour weekly lab required. Prerequisite: Ins T 522. (3W,Su)

**539 (d639). Field Work.** Observation and guided practical experience under professional instructional technology personnel. Bridges the gap between classroom theory and practice in the field. Prerequisite: instructor's consent. (1-9F,W,Sp,Su)

**\*543 (d643). Slide/Tape Design and Development.** Training in design and development of a comprehensive slide/tape presentation. Exercises in special effect techniques are included. (3W,Su)

**\*544 (d644). Single Camera Video for Instruction and Training.** Use of single camera video to familiarize students with the properties of the medium to record, edit, and duplicate video programming for education and training applications. (3F,W,Sp,Su)

**\*557 (d657). Multi-image Production.** Theory planning and design of presentations involving more than one image area utilizing multiple pieces of instructional equipment integrated simultaneously and sequentially into a single educational message. (3Sp,Su)

## **Graduate <sup>2</sup>**

**\*600 (d500). Information Sources.** (3F,Su)

**\*\*602 (d502). Evaluation and Selection of Instructional Materials.** (3W,Su)

**\*\*603 (d503). Reading Guidance.** (3Sp,Su)

**\*606 (d506). Cataloging and Classification.** (3Su)

**\*607 (d507). Library Media Center Administration.** (3Sp,Su)

**\*\*615. Using Media Center in Education.** Taught off campus only. (3)

**\*\*616. Computers in Instructional Technology.** (3F,Sp,Su)

**617 (f622). Design and Development of Microcomputer-based Instructional Software.** (3W)

**623 (f523). Computers in Education for Inservice Teachers.** Taught off campus only. (1-3F,W,Sp,Su)©

**625. Graduate Cooperative Work Experience.** (1-15F,W,Sp,Su)©

**\*\*626. LOGO Writer: AI Based Educational Graphics and Word Processing.** (3Su)

**\*627 (d527). Computer-assisted Instruction Programming: Authoring Languages.** (3W,Su)

**630. On-campus Internship.** (1-3F,W,Sp,Su)©

**632. Off-campus Internship.** (3-9F,W,Sp,Su)©

**\*634. Instructional Development in Education.** (3Su)

**\*635. Instructional Development.** (3F)

**\*636 (f536). Foundations of Instructional Technology.** (1-3F,W,Sp,Su)©

**\*\*637. Videodisc Design and Production.** (3W)

**638. Interactive Videodisc Courseware Design.** (3Sp)

**639 (d539). Field Work.** (1-9F,W,Sp,Su)

**\*643 (d543). Slide/Tape Design and Development.** (3W,Su)

**\*644 (d544). Single Camera Video for Instruction and Training.** (3F,W,Sp,Su)

**\*645. Instructional Technology Theory and the Learning Process.** (3F,Su)

**\*\*\*656. Practicum in the Improvement of Instruction.** (1-6)©

**\*657 (d557). Multi-image Production.** (3Sp,Su)

**\*661 (f561). Instructional Technology Communication Theory.** (3Sp,Su)

**662. Instructional Technology Communication Theory for International Students.** (1Sp,Su)

**\*\*\*670. Instructional Technology Programs.** (1-3)©

**672 (f570). Instructional Technology in Education and Training.** (3)©

**673 (f571). Instructional Technology Workshop.** (1-5Su)©

**676. Instructional Project Management.** (3Sp)

**677 (f735). Instructional Design.** (3W)

**\*\*678. Instructional Product Development.** (3Sp,Su)

**679. Instructional Product Evaluation.** (3W)

**\*\*680. Implementation and Management of Instruction and Training.** (3Sp,Su)

**681. Research Seminar.** (1F,W,Sp,Su)©

**682. CDL: Analysis and Design.** (3-9F,W,Sp,Su)©

**683. CDL: Production and Documentation.** (3-9F,W,Sp,Su)©

**684. CDL: Implementation and Evaluation.** (3-9F,W,Sp,Su)©

**690. Independent Study.** (1-9F,W,Sp,Su)©

**691. Independent Research.** (1-6F,W,Sp,Su)©

**696. Creative Project.** (3F,W,Sp,Su)©

**697. Thesis.** (1-9F,W,Sp,Su)©

699. Continuing Graduate Advisement. (1-12F,W,Sp,Su)

705. Internship in Program Evaluation. (1-6)®

706. Internship in Research. (1-6)®

738. Current Issues Seminar. (3F,W,Sp,Su)®

744. Instructional Technology Research and Development. (3Sp)

745. Theories of Communication Technologies in Instruction and Training. (3W)

781. Research Seminar. (1-6F,W,Sp,Su)

782. LESIN: Research Review. (3-9F,W,Sp,Su)®

783. LESIN: Instructional Product Development. (3-9F,W,Sp,Su)®

784. LESIN: Professional Writing and Publications. (3-9F,W,Sp,Su)®

790. Independent Study. (1-5F,W,Sp,Su)®

791. Independent Research. (1-3F,W,Sp,Su)®

792. College Teaching Seminar. (1-3F)

796. Practicum. (1-12F,W,Sp,Su)®

797. Dissertation. Individual work on research problems in the EdD program. (1-18F,W,Sp,Su)®

799. Continuing Graduate Advisement. (1-12F,W,Sp,Su)

<sup>1</sup> Parenthetical numbers preceded by *d* indicate a *dual* listing; parenthetical numbers preceded by an *f* are the *former* course numbers.

<sup>2</sup> Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

\* Summers of 1990 and 1992.

\*\* Summer of 1991.

\*\*\* Taught on demand.

© This course is also offered by correspondence through the Life Span Learning Independent Study Division.

# Intensive English Language Institute

## College of Humanities, Arts and Social Sciences

**Director: Principal Lecturer Susan Carkin**  
Office in Main 202

**Assistant Director: Principal Lecturer Lee Ann Rawley**  
Office in Main 202

**Principal Lecturer Franklin I. Bacheller; Senior Lecturers Barbara W. Buchanan, Glenda R. Cole; Lecturers James E. Bame, James R. Rogers, II, Thomas J. Schroeder; Staff Assistant II Karen Curtis; Part-time Secretary Melanie Huntington**

### Objectives

The Intensive English Language Institute (IELI) is a program in the College of Humanities, Arts and Social Sciences. It is designed to help international students attain the English language proficiency necessary for university study. Undergraduate students who apply to USU without a TOEFL score of 500 or a Michigan score of 80 and graduate students without a 550 TOEFL score must take the IELI Placement Exam given just prior to the beginning of each quarter (January, March, June, and September). Based on the exam results, students will be recommended for study in the IELI or exempted from further study and permitted to enter the University.

### Curriculum

Four levels of study in IELI are offered each quarter, elementary through advanced. Students take classes in Communications, Reading, Writing, Conversation, and American Culture. Upon successful completion of the advanced level (4), students are permitted to register for full-time university classes. Students enrolled in the advanced level may take university classes in addition to their IELI

classes with permission of their advisers. Graduate students need the additional approval of the Dean of the School of Graduate Studies. Students at any level may audit university classes, with permission from the classroom instructor and by paying the appropriate fee. The university classes **cannot** conflict with the schedule of the IELI classes.

**Credit for Intensive English Study.** Classes in IELI carry academic credit. There are five classes for each level, each class carrying four credits. Full-time students at each level receive 20 hours of university elective credit at the 100- and 200-levels, and are in class 25 hours a week. A student who begins IELI in Level 1 and progresses to Level 4 may earn a total of 80 undergraduate elective credits. While all the credits appear on the student's transcript; a maximum of 25 can be counted toward graduation. The number and kind of elective credits accepted for graduation vary by department; students must therefore meet with their departmental advisers to determine the role of IELI credits in their graduation requirements.

### Services

New students in IELI take the Placement Evaluation and attend an orientation meeting prior to the beginning of each quarter. All students are assigned an adviser in IELI who helps them with problems they may encounter on campus and in Logan. In addition, IELI students are entitled to all the services and privileges offered to USU students on campus, including health care services, recreational opportunities, and numerous special programs for international students.

### Intensive English Language Institute Courses

**111. Intensive English Language Institute Reading 1.** Helps students begin developing strategies for reading academic material and other material they encounter outside the classroom. (4F,W,Sp,Su)

**112. Intensive English Language Institute Composition 1.** Basic English sentence structure and mechanics of descriptive and chronological paragraph development. (4F,W,Sp,Su)

**113, 114. Intensive English Language Institute Communication 1.** Integrates listening, speaking, reading, and writing with an emphasis on communication. (4F,W,Sp,Su) (4F,W,Sp,Su)

**115. Intensive English Language Institute Language Lab 1.** Provides international students with orientation activities and language skills which begin to integrate them into university and community life. (4F,W,Sp,Su)

**151. Intensive English Language Institute Reading 2.** A low-intermediate reading course designed to introduce students to predicting, reading for main and supporting ideas, distinguishing between fact and opinion, and skimming for general ideas. Content is relevant to daily life in Logan and the USA. (4F,W,Sp,Su)

**152. Intensive English Language Institute Composition 2.** Development of syntactic fluency in writing sentences, paragraphs, and short essays. (4F,W,Sp,Su)

**153, 154. Intensive English Language Institute Communication 2.** Designed to develop speaking and listening skills necessary for social and academic interaction. Emphasis on appropriate responses to varying cultural situations; discrete skills involved in listening and pronunciation. (4F,W,Sp,Su) (4F,W,Sp,Su)

**155. Intensive English Language Institute Conversation 2.** Oral communication class emphasizing interactional speaking and listening with attention to nonverbal behaviors which influence the communication process. Small discussion groups with American students. (4F,W,Sp,Su)

**201. Intensive English Language Institute Reading 3.** Introduces the reading of authentic texts. Focus on strategies such as recognizing main ideas and transitional devices, identifying antecedents, making inferences, and separating fact from opinion. (4F,W,Sp,Su)

**202. Intensive English Language Institute Composition 3.** Students develop sentences and compositions using formal definitions, classifications, expressions of purpose, comparatives, and connectives. (4F,W,Sp,Su)

**203, 204. Intensive English Language Institute Communication 3.** High-intermediate level class emphasizing the development of oral skills, both communicative and grammatical, needed for academic and social functions. Also listening strategies for understanding authentic materials (radio and television broadcasts). (4F,W,Sp,Su) (4F,W,Sp,Su)

**205. Intensive English Language Institute Conversation 3.** Oral communication class emphasizing comprehensibility, expressions of opinion, agreement and disagreement, and summarizing spoken information. Small discussion groups with American students. (4F,W,Sp,Su)

**251. Intensive English Language Institute Reading 4.** Advanced reading strategies designed to prepare students to read university materials. Emphasizes improvement of reading speed and comprehension, as well as word formation, vocabulary development, context clues, and transitions. (4F,W,Sp,Su)

**252. Intensive English Language Institute Composition 4.** Focuses on the development of thesis statements, and paragraphs leading to effective compositions and essays. (4F,W,Sp,Su)

**253, 254. Intensive English Language Institute Communication 4.** Listening and speaking with emphasis on skills needed for participation in the university community. (4F,W,Sp,Su) (4F,W,Sp,Su)

**256. Intensive English Language Institute American Studies.** A cross-cultural perspective on the American value system and institutions. (4F,W,Sp,Su)

**299. Individual Study.** Limited to international students. Instructor's permission required. (1-5F,W,Sp,Su)

#### *Graduate*

**792. College Teaching Seminar.** A workshop designed for international students who will hold teaching assistantships at the University. Students must take a qualifying language test to be accepted into the workshop. (1-3F)

#### *Department of*

# *Landscape Architecture and Environmental Planning*

## *College of Humanities, Arts and Social Sciences*

**Head: Professor Richard E. Toth**  
Office in Fine Arts Visual 230

**Professors** Jerry W. Fuhrman, Craig W. Johnson; **Associate Professors** Vern J. Budge, John K. Nicholson; **Adjunct Associate Professor** Paul Larry Wegkamp; **Assistant Professors** John C. Ellsworth, Susan K. Nordstrom (temporary); **Adjunct Instructor** Scott R. George

**Degrees offered:** Bachelor of Landscape Architecture (BLA)<sup>1</sup> and Master of Landscape Architecture (MLA)<sup>1</sup> in Landscape Architecture; Master of Science (MS) in Town and Regional Planning

#### *Objectives*

The objectives of the department are to (1) provide an educational and technical program that is responsive to current needs and demands for the resolution of problems related to environmental planning and design, (2) maintain a balance in the student's professional education so that he or she may be made fully aware of future professional opportunities in the broadest sense and not just one oriented to technical service, (3) continue the development of the program within the context of interdisciplinary coordination with the Colleges of Natural Resources, Engineering, Agriculture, and Humanities, Arts and Social Sciences, and (4) research, develop, and test new theories, methods, and tools needed to assist landscape architects in a clearer and deeper understanding of man's relationship to the environment.

#### *Admission and Graduation Requirements*

The requirements for admission and graduation are commensurate with those established in the first part of this bulletin titled Graduation Requirements. The only additions to the University

<sup>1</sup> Fully accredited by the American Society of Landscape Architects.

requirements which the department maintains is with regard to matriculation into the upper division (junior and senior years) and the certificate program in Liberal Arts and Sciences.

During the eighth week of spring quarter, the faculty of the department reviews those students having sophomore status in the department. Courses required for sophomore status are LAEP 120, 135, 136, 220, 230, 231, 260, 265, 270, 271, and 272; and PISci 238. The purpose of this review is to determine which students will be allowed to matriculate into the upper division (junior and senior years). The primary reasons for this review are (1) to maintain a high quality educational experience for the student in the upper division, and (2) to establish a reasonable faculty/student ratio to maintain the status of full accreditation by the American Society of Landscape Architects.

The entire sophomore class is placed in order according to each student's university GPA. From this list, the top 25 students are selected for admission into the upper division. However, all students with a 3.0 GPA are automatically matriculated into upper division courses; this holds true even if this number exceeds 25.

After students are admitted into the upper division, their academic requirements are commensurate with those set out by the University Undergraduate Catalog. The only exceptions to this are the department's requirement for 9 credits of written communication and the completion of the certificate program in Liberal Arts and Sciences.

High school students planning to major in landscape architecture and environmental planning may obtain the necessary background with courses in art, natural sciences, social sciences, and math through trigonometry.

**BLA Degree.** The Bachelor of Landscape Architecture (BLA) degree is a four-year program consisting of courses relating to theory, design, history, and the various technical areas of the profession. This degree is fully accredited by the American Society of Landscape Architects. The degree provides a substantial basis for a professional career as well as an excellent foundation for advanced graduate studies. In addition to the courses required for sophomore status, the following LAEP courses are required for the junior and senior year: LAEP 304, 305, 306, 350, 361, 362, 370, 404, 405, 406, and 495. The following non-LAEP courses are also required: Phil 101; Math 106; and one of CS 150, 170, 171, or BIS 140. Students will also complete the Learning Skills requirements, American Institutions requirement, and the Liberal Arts and Sciences Area Studies Certificate. For more detailed information on requirements, see major requirement sheet available from the department.

**Liberal Arts and Sciences Area Studies Certificate.** The LAEP Department requires that entering freshmen complete the Certificate Program in the Liberal Arts and Sciences. Additionally, transfer students (four-year program) with less than 90 credits earned are also required to complete the LAS Certificate Program.

The Liberal Arts and Sciences Program offers a broad and challenging course of study in the humanities, sciences, arts, and social sciences. Through a multidisciplinary but coherent approach to learning, the program meets the needs both of students majoring in professional fields and those desiring a general background for any employment. By directly engaging in different modes of inquiry, the Liberal Arts and Sciences student develops the desire and capacity for independent thought, self-integration, self-discovery, and lifelong learning.

For more information, students should contact their adviser or an LASP adviser in the College of HASS office, Main 131.

**Specialized Service Courses.** LAEP 103, 120, 135, 230, and 370 are available for majors in other fields who may wish to gain an

exposure to the different aspects of landscape architecture and environmental planning. A minor is not given in LAEP; however, these service courses are available, without prerequisites, for those requesting them.

## Graduate Study

The Department of Landscape Architecture and Environmental Planning offers two graduate degrees: Master of Landscape Architecture (MLA), which is fully accredited by the American Society of Landscape Architects, and Master of Science in Town and Regional Planning. See the graduate catalog for further information.

## Landscape Architecture and Environmental Planning Courses

**HU 103. Introduction to Landscape Architecture.** Environment as a basis for land use and design decisions. Topics discussed include environmental awareness, the planning process, and design related to home, community, and the region. Three one-hour lectures per week. (3F,W,Sp,Su)©

**120. Basic Graphics.** Graphic techniques for landscape architectural drawings including plans, elevations, isometrics, perspective, rendering, and model construction. Two three-hour studios per week. (3F)

**135. Theory of Design.** Basic elements of design with emphasis upon their relationship to landscape architecture. Form and spatial relationships are stressed through student development of two- and three-dimensional design models. Two three-hour studios per week. (4W)

**136. Applied Theory of Design in Landscape Architecture.** Design theory applied to the materials of landform, vegetation, water, and architecture. Two three-hour studios per week. Prerequisite: LAEP 135. (4Sp)

**220. Graphics.** Emphasis upon techniques and approaches to freehand sketching and rendering. Various media will be explored for preparing drawings and sketches for presentation. Two three-hour studios per week. Prerequisite: LAEP 120. (4W)

**225. Internship and Cooperative Education Program.** Course credit for professional experience outside the classroom prior to graduation. A statement of professional goals and a summary report following the experience are required. (1-5)

**230. History of Landscape Architecture.** Physical planning as it relates to human experience from prehistory through the Renaissance. Emphasis placed on human dynamics and the application of historic thought to current and future design. Three one-hour lectures per week. (3F)

**231. History of Landscape Architecture.** Exposure to the history of the profession as it developed from medieval England to current day planning practices. Three one-hour lectures per week. (3W)

**260. Landscape Construction.** An introduction to site engineering, grading, cut and fill calculation, layout and dimensioning, and an introduction to roadway alignment. Two three-hour studios per week. Prerequisite: LAEP 120. (4F)

**265. Architectural Design.** The exploration of architectural form and structure in exterior environments. The emphasis will be placed on space created by architectural forms and their relationship to the surrounding environment. Two three-hour studios per week. Prerequisite: LAEP 136. (4Sp)

**270. Site Analysis Methods.** Includes site survey, analysis, and design synthesis. Student teams survey and analyze a site's landscape and cultural resources. Three three-hour studios per week. Prerequisite: LAEP 136. (5F)

**271. Behavioral Dimensions in Site Planning.** Focuses on human behavior as a design consideration as expressed in land uses; circulation; use relationships; and physical form. Three three-hour studios per week. Prerequisite: LAEP 270. (5W)

**272. Site Planning and Design.** Synthesizes the subject matter covered in LAEP 270 and 271. Investigates the problem solving processes in various disciplines and relates them to the profession of landscape architecture. Three three-hour studios per week. Prerequisite: LAEP 271. (5Sp)

**304. Computer Applications in Landscape Architecture.** Emphasizes the major analytical and technical components of large-scale resource planning and design.

Computer techniques are used in the studio. Two three-hour studios per week. Prerequisite: LAEP 272 or instructor's permission. (5F)

**305. Recreational Landscape Design.** Focuses on recreation project scale design. Includes design seminars and guest lectures. Three three-hour studios per week. Prerequisite: LAEP 304. (5W)

**306. Residential Planning and Design.** A study of housing, planning approaches, concepts, and innovations, including climate and energy considerations. Each student prepares design solutions for various scales of housing developments. Three three-hour studios per week. Prerequisite: LAEP 305. (5Sp)

**350. Planting Design.** The exposure to specific aspects of planting design including climate control, circulation definition, screening, and aesthetic considerations. Two three-hour studios per week. Prerequisite: PISci 238. (4F)

**361. Landscape Construction.** An introduction to construction materials, wood construction, retaining walls, pavements, drainage, and utility systems. Individual reports on construction materials. Two three-hour studios per week. Prerequisite: LAEP 260. (4W)

**362. Landscape Construction.** Aesthetic, technical, and theory of roadway alignment. Vertical/horizontal curves, stationing, and grading. Introduction to the theory and design of sprinkler irrigation. Two three-hour studios per week. Prerequisite: LAEP 361. (4Sp)

**370. City and Regional Planning.** An introduction to the procedures and methods of city and regional planning. Legislative, administrative, and effectuation of the general comprehensive plan. Three one-hour lectures per week. (3W)

**404. Project Design.** An in-depth study of proposed site design projects from proposal preparation to final design recommendations. Three three-hour studios per week. Prerequisites: LAEP 304, 305, 306. (5F)

**405. Construction Document Preparation.** A continuation of the LAEP 404 design project through detail design development and completion of the working drawings and specifications. Three three-hour studios per week. Prerequisite: LAEP 404. (5W)

**406. Emerging Areas in Landscape Architecture.** An exploration of new and emerging areas in the profession of landscape architecture such as land reclamation and visual resource management. Three three-hour studios per week. Prerequisite: LAEP 405. (5Sp)

**425. Internship and Cooperative Education Program.** Course credit for professional experience outside the classroom prior to graduation. A statement of professional goals and a summary report following the experience are required. (1-5)

**426. Environmental Field Service.** Offers credit for participation in Environmental Field Service projects. Registration by permission only. (1-5F,W,Sp,Su)®

**435. Travel Course.** A major field trip to examine a variety of projects in planning and design. Should be taken between winter and spring quarters. (1-3)

**481. Tutorial.** Directed readings and discussions of landscape issues. Prerequisite: Instructor's consent. (1-2F,W,Sp,Su)®

**490. Special Problems.** Hours arranged. Selected problems to meet individual needs in completing the professional training. Registration by permission only. (1-6)®

**492. Professional Practicum.** Offers students an opportunity to study areas of practical professional interest. (1-2F,W,Sp)®

**495. Seminar.** Readings and reports on current topics and trends in professional practice. Also covers contracts, specifications, professional ethics, and office practice. One two-hour lecture per week. (2F)

### *Graduate<sup>2</sup>*

**610. Regional Planning Theory and Inventories.** (5F)

**611. Regional Planning Analysis.** (5W)

**612. Regional Planning Policy and Implementation.** (5Sp)

**616. Professional Practice.** (2F)

**625. Internship and Cooperative Education Program.** (1-5)

**674. Planning Methods.** (3W)

**675. Implementation and Regulatory Techniques in Planning.** (3W)

**686, 687, 688. Seminar.** (1F) (1W) (1Sp)

**690. Special Problems.** (1-6)®

**691. Readings in Landscape Perception.** (1F)

**692. Readings in Creativity and Design Process.** (1W)

**693. Readings in Landscape Design and the Context of Culture.** (1Sp)

**697. Thesis Research.** (1-10)

**699. Continuing Graduate Advisement.** (1-3)®

<sup>2</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through the Life Span Learning Independent Study Division.

## *Department of*

# *Languages and Philosophy*

## *College of Humanities, Arts and Social Sciences*

**Head:** Professor Kent E. Robson  
Office in Main 204

**Professors** Lynn R. Eliason, John E. Lackstrom, Hans K. Mussler, Richard Sherlock, Alfred N. Smith, Jr.; **Professor Emeritus** L. Grant Reese; **Associate Professors** Jerry L. Benbow, M. Isela Chiu-Olivares, Lynne H. Goodhart, Charles W. Johnson, Harold J. Kinzer, Mark D. Larsen, Norman R. Savoie; **Associate Professors Emeritus** John M. Beyers, Gordon E. Porter; **Assistant Professors** Ilona Jappinen, Gordon R. Steinhoff, Janet C. Stock, Valentine Suprunowicz, Frances Titchener; **Instructors** Shelley Blakeley, Kevin L. Krogh (temporary); **Principal Lecturer** Viva L. Lynn

**Degrees offered:** Bachelor of Arts (BA) in French; BA in German; BA in Spanish; BA and BS in Philosophy

### *Objectives*

The department offers a program in philosophy which leads to the Bachelor of Arts degree or which can substantially support undergraduate or graduate programs in other fields. Philosophy is, for example, an excellent prelaw major.

The Bachelor of Arts degree is also offered in French, German, and Spanish and is designed to prepare students for admission to advanced degree programs in languages, for secondary school teaching certification, or for business and government careers in the USA or abroad. Skill classes beyond the two-year program are available in Russian and Portuguese. In the modern languages, emphasis is placed equally on the four basic language skills: speaking, listening, reading, and writing. The language laboratory permits the student to do as much individual work in speaking and listening as desired.

Other special language offerings include courses in general linguistics and two-year programs in Italian, Japanese, Mandarin Chinese, Latin, Korean, and Arabic combining self-study with tutorial assistance.

### **Requirements for Language Major**

**Departmental Admission Requirements.** Admission requirements for the Department of Languages and Philosophy are the same as those described for the University on pages 8-11. Students in good standing may apply for admission to the department.

**Candidacy.** To become a candidate for a major in a language, the student must have completed two years of lower division work, or the equivalent, in the language. Equivalent preparation acquired through high school study or foreign residence will be determined by means of proficiency tests, administered by the Department of Languages and Philosophy, or by the successful completion of an upper division course in the language.

**Major requirements** include 40 upper division credits in the selected language, plus Linguistics 340. Majors also wishing a secondary teaching credential must include French 304, 305, and 501; German 304, 305, 501, and 503; or Spanish 304, 305, 401, and 402; plus Linguistics 350.

All majors in the Department of Languages and Philosophy must complete nine credits of Written Communication (English Composition). Required courses are English 101 (3 credits), English 200 or 201 (3 credits) and English 301 (3 credits).

Candidates for a secondary teaching credential should take Linguistics 340 and French 501, German 501, or Spanish 401 before the end of their junior year and prior to taking Linguistics 350. They must also complete the other professional education courses required for certification (see College of Education for requirements).

An application for admission to teacher education should ordinarily be completed before the junior year (see College of Education). Approval is a prerequisite to teacher certification candidacy and to enrollment in education and psychology courses.

**Teaching Minor.** For a teaching minor in a foreign language, a student must complete 24 credits of approved upper division work in one language including advanced grammar and applied linguistics. Linguistics 350 is required and may be counted as part of the 24 credits.

Students desiring a minor other than a teaching minor in a foreign language must complete ten credits of intermediate and eight credits of upper division work in the language.

**Proficiency Tests and Placement in Language Courses.** Students who have completed one or more years of language study in high school must take proficiency tests to determine their proper placement in USU's language courses.

**Credit by Special Examination.** Where basic skills in a language have been acquired by means other than college courses, up to 25 lower division credits may be earned by special examination. To qualify for a special examination, a student must complete a course

in that language at a higher level than the credits to be acquired by examination, and the grade in that course must be *B* or better.

Whenever possible the department will help students make arrangements to take examinations for credit in languages not taught at USU.

All credit received by special examination is listed on transcripts as *P* (pass) grade.

**Language Laboratory.** Laboratory practice sessions are required for all lower division language classes and for some upper division classes; three half-hour sessions are the minimum requirement in all lower division classes; a fee is charged for this service.

### **Winter Quarter in Latin America**

USU offers qualified students the opportunity to spend winter quarter in Latin America. Though particularly designed for students interested in Spanish, sociology-anthropology, fine arts, political science, international relations, or history, a student in any field at USU can qualify by being in good academic standing.

### **Summer Quarter Programs in Germany and France**

USU offers summer quarter programs in Germany and France. These programs are for students with some background in German and French.

### **Soviet Union Tour**

The department also conducts an annual travel-study tour to the Soviet Union. Interested students are invited to join this tour.

### **Interdisciplinary Courses**

For Latin American culture, East Asian civilization, and American foreign policy courses, please see the listing of interdisciplinary courses offered by the College of Humanities, Arts and Social Sciences, page 45.

## **Philosophy**

**Philosophy Major** requirements include the following:

A. Forty-five credits in philosophy courses selected in consultation with adviser and acceptable to department.

B. Two years of a foreign language or its equivalent.

A BA in philosophy may be earned if the student completes 45 credit hours and two years of a foreign language. Under some circumstances, a BS in philosophy may be earned if the student completes 45 credits in philosophy courses, especially if the student is a transfer student or is completing a double major.

### **Arabic Courses**

SK 101, 102, 103. Elementary Arabic. Self-study with native speaker tutorial. (5) (5) (5)

201, 202. Intermediate Arabic. Self-study with native speaker tutorial. (5) (5)

### **Mandarin Chinese Courses**

SK 101, 102, 103. Elementary Mandarin Chinese. Self-study with tutorial assistance. (5F,W,Sp) (5F,W,Sp) (5F,W,Sp)

201, 202. Intermediate Mandarin Chinese. Self-study with tutorial assistance. (5F,W,Sp) (5F,W,Sp)



## French Courses

**SK 101. Elementary French.** First beginner's course in a sequential series. Students should plan to continue in L Fr 102. Not open to those with more than one year high school French or equivalent. (5F,W,Sp)

**102. Elementary French.** A beginning course open to students having had French 101 or at least one, but not more than two, years of French in high school. (5F,W,Sp)

**103. Elementary French.** Open to students having completed French 102. (5F,W,Sp)

**201, 202, 203. Intermediate French.** Prerequisite: French 103 or at least two, but not more than three, years of French in high school. (4F,W,Sp) (3F,W,Sp) (3F,W,Sp)

**297. Intermediate French Language.** Designed to be offered only through USU's study program in France, this intermediate course will cover French conversation, grammar, writing, and listening skills. (1-5Su)

**298. Intermediate Reading.** Designed to be offered only through USU's study program in France, this intermediate course will emphasize reading and discussion of readings in French. (1-5Su)

**299. Individual Reading.** Individual study of selected readings in French. Instructor's permission required. (1-5F,W,Sp)@

**\*\*300. Introduction to French Literature.** An analytical study of major genres represented in French literature: poetry, prose, drama. The selections studied are chosen from the major periods of French literature. (5F)

**304. Advanced French Grammar.** A thorough review of French grammar from the more simple to the more complex forms. (3F)

**305. Advanced French Composition.** A thorough review of French syntax designed to help the advanced student master the complexities of written French. (3W)

**306. French Conversation.** A course in free conversation which will develop communicative competence in advanced French students. (2F)

**307. French Conversation.** Conversation becomes the vehicle to develop richness of expression, to increase vocabulary, to learn to express and justify facts, opinions, ideas, and emotions in French. (2)

**320. France Today.** A study of contemporary life in France: The French people, their daily habits, their surroundings. What makes the French *French*. (No prerequisites, taught in English.) (3Sp)

**330. Business French.** Study of vocabulary, idioms, and expressions used in French business communications and an introduction to French business practices. Prerequisite: two years of French. (3)

**381. Special Topics in French.** Introduction to upper division topics in contemporary literature, culture, and language as determined by student need. Occasionally taught in English. Open to majors and nonmajors. (3F,W,Sp,Su)@

**397. Third Year French Language.** Designed to be offered only through USU's study program in France, this course covers French grammar, contemporary language (standard, slang, and business), phonetics, and conversation. (1-5Su)

**398. Topics in French Culture or Literature.** Designed to be offered only through USU's study program in France, this course covers literature on the third year level, or aspects of French culture, including art history. (1-5Su)

**461. Survey of French Literature: Part I.** An overview of French literary movements and transitions from the beginning to 1800. All genres are studied and differences between them are examined thoroughly. (5W)

**462. Survey of French Literature: Part II.** An overview of French literary movements and transitions in the nineteenth and twentieth centuries. All genres are studied and differences between them are examined thoroughly. (5Sp)

**497. Seminar in French Language.** Designed to be offered only through USU's study program in France, this course covers advanced grammar, translation, and special projects relating to French language on the fourth year level. (1-5Su)

**498. La France Contemporaine.** Designed to be offered only through USU's study program in France, this course covers contemporary France, its social, economic, and political history. (1-5Su)

**499. Seminar in French Literature.** Designed to be offered only through USU's study program in France, this course covers modern French literature on an advanced level. (1-5Su)

**501. Applied Linguistics and Phonetics.** Phonological, morphological, and syntactical problems in learning French. (5W)

**515. Information Technologies in the French-speaking World.** Practices, theoretical issues, and policy concerns of information technologies resulting from microcomputers, networking, and videodisk. Use of microcomputer with French programs. (Taught in French). (3F)

**581. Seminar in French Literature.** Course will be determined by student need and interest. Used at least once a year for literature in translation. Open to majors and nonmajors. (3)@

**599. Readings and Conference.** Readings in scientific, technical, or literary French. Instructor's permission required. (1-5F,W,Sp)@

## German Courses

**SK 101. Elementary German.** A beginner's course not open to students having had more than one year of German in high school or the equivalent. (5F,W,Sp)

**102. Elementary German.** A beginning course open to students having had German 101 or at least one but not more than two years of German in high school. (5F,W,Sp)

**103. Elementary German.** Open to students having completed German 102. (5F,W,Sp)

**201. Intermediate German.** This is a second-year German class intended for students who plan to develop their skills in reading and writing German. (3F)

**202. Intermediate German.** This intermediate course is the second in a two-quarter sequence intended for students who plan to develop their skills in reading and writing German. (3W)

**210, 211, 212. Intermediate German Conversation.** This series of courses is designed for students who wish to improve their conversational skills in German. It stresses a workable vocabulary and everyday situations. (2F) (2W) (2Sp)

**299. Individual Reading.** Individual study of selected readings in German. Instructor's permission required. (1-5F,W,Sp)@

**301. Contemporary German.** Reading and discussion of contemporary popular, literary, and scientific materials for students who would like to increase their fluency in German. (2Sp)

**\*302. Techniques in Translating German Texts.** Familiarization with approaches to translation, special grammatical structures, specialized vocabulary, and reference materials and aids. Practical exercises. (3Sp)

**304, 305. Advanced Grammar, Conversation, and Composition.** Detailed presentation of German grammar, class discussions, and work on oral and written assignments. (3F) (3W)

**\*\*310. Readings in the German Novelle.** In this course students will read and discuss selected German novellen. Brief consideration will be given to the theory and history of the novella. (2F)

**\*\*311. Readings in the German Drama.** This course is the second in a three-quarter sequence of introductory literature courses. Students will read and discuss selected German dramas. (2W)

**\*\*312. Readings in German Poetry.** This course is the third in a three-quarter sequence of introductory literature courses. Reading and discussion of German poems, selected from various literary periods. (2Sp)

**\*365. Nobel Prize Winners in German Literature.** Readings in the books of German Nobel Prize winners in literature. (2W)

**399. Individual Study.** Individual study of selected readings in German. (1-5F,W,Sp)@

**412. The Modern German Short Story.** In this course students will read and discuss representative German short stories by twentieth-century writers. (3F)

**\*\*420. Germanic Cultures.** Sociopolitical, historical, economic, literary, and cultural trends in German-speaking countries. (3F)

**\*\*461. Survey of German Literature.** General view of literary periods, movements, and cultural background with representative readings of major writers. (3W)

**\*\*462. Survey of German Literature.** This course is the second in a two-quarter sequence of survey courses designed to give the student an overview of German literature. (3Sp)

**\*501. Applied Linguistics.** Discussion of syntactical and morphological problems of German; theory of language; psychology of language learning. (3W)

**\*503. Phonetics.** Analysis of phonological and phonetic patterns of German. (2W)

**\*540. Lessing: Works and Biography.** Criticism and dramatic works of Lessing; study of his biography. (3W)

**\*541. Schiller: Works and Biography.** Poems and dramatic works of Schiller; study of his biography. (3Sp)

**\*543. Goethe: Works and Biography.** Goethe's works and special emphasis on his lyric contributions; his biography. (3F)

**\*561. Goethe's Faust.** Development of Faust legend; Goethe's treatment of the theme in *Urfaust*; reading and discussion of *Faust I*. (2F)

**\*589. Problems in German Literature.** Senior seminar on selected critical topics in German literature. (3Sp)@

**599. Readings and Conference.** Readings in technical, scientific, and literary German. Instructor's permission required. (1-5F,W,Sp)@

\*Taught 1990-91.

\*\*Taught 1991-92.

## Italian Courses

**SK 101, 102, 103. Elementary Italian.** Self-study with tutorial assistance. (5) (5) (5)

**201, 202. Intermediate Italian.** Self-study with tutorial assistance. (5F,W,Sp) (5F,W,Sp)

## Japanese Courses

**SK 101, 102, 103. Elementary Japanese.** Self-study with tutorial assistance. (5) (5) (5)

**201, 202. Intermediate Japanese.** Self-study with tutorial assistance. (5) (5)

## Korean Courses

**SK 101, 102, 103. Elementary Korean.** A beginning course in Korean based on self-instructional tapes and written materials. Open to students with strong linguistic aptitude and interest. (5F,W,Sp) (5F,W,Sp) (5F,W,Sp)

**201, 202. Intermediate Korean.** An intermediate course in Korean based on self-instructional tapes and written materials. Open to students with strong linguistic aptitude and interest. (5F,W,Sp) (5F,W,Sp)

## Latin Courses

**SK 101. Elementary Latin.** Students will learn basic Latin grammar, syntax, and vocabulary. Emphasis on memorization, formation, and identification of Latin words. (5F)

**103. Intermediate Latin.** Students will build on their basic knowledge and learn to manipulate more advanced constructions. Emphasis on synthesizing knowledge and learning to deduce and predict forms, rather than memorize. (5W)

**202. Advanced Latin.** Students will use their grammatical and inductive skills to translate an unabridged Latin work. Emphasis on translation skills. (5Sp)

## Linguistics Courses

**110. English Composition for Nonnative Speakers.** Freshman-level writing course for nonnative speakers. Emphasizes mechanics and basic sentence and paragraph types used in academic work. (3F,W,Sp)

**IO 340. An Introduction to Linguistics.** Theory of language and survey of current approaches to phonology, morphology, syntax; language differentiation; native language acquisition; second language learning. (5F,Sp)

**350. Teaching Modern Languages.** A methods course for teaching majors or minors in any of the modern languages. Considers the context, effective methods, and significant trends in teaching modern languages. (4Sp)

**390. Analysis of Cross-cultural Difference.** Develops an awareness of what culture is and how it shapes perceptions and attitudes. Students learn to analyze cultural differences through inductive student-centered activities. (3F)

**419 (d619). Laboratory Methodology and Techniques in Foreign Language Instruction.** For students who intend to become teachers of a foreign language. Teaching procedures, administrative and mechanical techniques relating to the language lab and its components. (2W)

**450. Student Teaching Seminar.** Focus upon problems arising during student teaching. Includes teaching plans, procedures, adaptive classroom practices, and evaluation. To be taken concurrently with SecEd 460. (3F,W,Sp)

**453. Language and Society.** The study of language varieties. The growth and emergence of dialects and an examination of their societal implications. (3)

**492. Senior Practicum in Language Teaching.** (1-3F,W,Sp,Su)@

**599. Readings and Conference.** Additional readings or research done beyond the general introduction to linguistics given in Linguistics 340. Instructor's permission required. (1-5F,W,Sp,Su)@

## Graduate

**616. Advanced English Methods.** (See Engl 616). (3)

**617. Modern Composition Theory.** (See Engl 617). (3)

**618. History of Rhetoric to 1900.** (See Engl 618). (3)

**619 (d419). Laboratory Methodology and Techniques in Foreign Language Instruction.** (2Sp)

**651. Syntactic Analysis.** (3W)

**652. English Phonetics and Phonology.** (See Engl 652). (3)

**693. The Teaching of English.** (3)

## Portuguese Courses

NOTE: Elementary and Intermediate Portuguese taught only on sufficient demand.

**SK 101, 102. Elementary Portuguese.** Self-study with tutorial assistance. (5F) (5W)

**103. Elementary Portuguese.** Especially for Spanish speakers. (5Sp)

**201, 202, 203. Intermediate Portuguese.** Self-study with tutorial assistance. (3F) (3W) (3Sp)

**299. Individual Readings.** Individual study of selected readings in Portuguese. Instructor's permission required. (1-5F,W,Sp)@

**304. Advanced Grammar and Readings.** Review of the more complex Portuguese grammatical points and reading and analysis of selected readings. (3F)

**599. Readings and Conference.** Readings in Brazilian and Portuguese literature. Instructor's permission required. (1-5F,W,Sp)@

## Russian Courses

**SK 101, 102, 103. Elementary Russian.** (5F,W,Sp) (5F,W,Sp) (5F,W,Sp)

**201, 202. Intermediate Russian.** (5F,W,Sp) (5F,W,Sp)

**299. Individual Readings.** Individual study of selected readings in Russian. Instructor's permission required. (1-5F,W,Sp)@

**599. Readings and Conference.** Readings in technical, scientific, or literary Russian. Instructor's permission required. (1-5F,W,Sp)@

## Spanish Courses

**SK 101. Elementary Spanish.** A beginner's course not open to students having had more than one year of Spanish in high school or the equivalent. (5F,W,Sp)@

**102. Elementary Spanish.** A beginning course open to students having had Spanish 101 or at least one but not more than two years of Spanish in high school. (5F,W,Sp)@

## 150 Languages and Philosophy

**103. Elementary Spanish.** Open to students having completed Spanish 102. (5F,W,Sp)©

**104. Intensive Elementary Spanish.** Intensive alternative course to Spanish 101, 102, and 103 in one quarter, emphasizing active usage. (15Su)

**201.<sup>2</sup> Intermediate Spanish.** Prerequisite: Spanish 103 or at least two but not more than three years of Spanish in high school. (5)©

**202.<sup>2</sup> Intermediate Spanish.** Prerequisite: Spanish 201. (5)©

**299. Individual Reading.** Individual study of selected readings in Spanish. Instructor's permission required. (1-5F,W,Sp)©

**301. Contemporary Hispanic Themes.** Continued development of skills with emphasis on speaking. Materials based on contemporary Hispanic topics. Not open to students with foreign experience. (3Sp)

**302. Advanced Spanish.** Taught only summer quarter in Costa Rica. (5Su)

**303. Advanced Spanish.** Taught only winter quarter in Mexico. (5W)

**304.<sup>2,3</sup> Advanced Grammar.** (3)©

**305.<sup>2,3</sup> Advanced Grammar.** (3)©

**306. Advanced Conversation and Composition.** (3W)

**\*\*325. Latin American Culture and Civilization.** The historical, social, political, economic, and cultural conditions and institutions of the Latin American countries. (3W)

**\*\*326. Spanish Culture and Civilization.** The historical, social, political, economic, and cultural conditions and institutions of Spain. (3W)

**\*\*360. Survey of Spanish Literature.** Developments and trends in Spanish literature from El Cid through Lope de Vega. (3F)

**\*\*361. Survey of Spanish Literature.** Development and trends in Spanish literature from Calderon through the nineteenth century. (3W)

**\*\*362. Survey of Spanish Literature.** Development and trends in Spanish literature from 1898 to the present. (3Sp)

**\*363. Survey of Spanish American Literature.** Developments and trends in Spanish American literature from the sixteenth century to the Modernist Movement. (3F)

**\*364. Survey of Spanish American Literature.** Developments and trends in Spanish American literature from the Modernist Movement to the present. (3W)

**401. Applied Linguistics.** Analysis of selected morphological and syntactic features of the Spanish language including Spanish-English contrastive analysis. (3W)

**402. Phonetics.** Analysis of phonological and phonetic patterns of Spanish. (2W)

**403. Mexican Culture and Civilization.** A study of the Mexican people, their social, political, and economic institutions. Taught only winter quarter in Mexico. (5W)©

**\*\*418. The Literature of the Siglo de Oro.** A study of writers of the Siglo de Oro: Lope de Vega, Tirso de Molina, Calderon de la Barca, and others. (4Sp)

**\*430. Cervantes, Don Quixote.** (4Sp)

**440.<sup>4</sup> Topics of Spanish Literature.** Variable topics; course may be repeated with permission of instructor. (3F,W,Sp)©

**441.<sup>4</sup> Topics of Latin American Literature.** Variable topics; course may be repeated with permission of instructor. (3)©

**\*480. Hispanic Literature in Translation.** Major hispanic authors in translation. No prior study of Spanish necessary and course may be repeated for credit when course content is different. (3W)©

**499. Readings and Conference.** Readings in scientific, technical, or literary Spanish. Instructor's permission required. (1-5F,W,Sp)©

**HU 111. Ethics.** Judgments concerning what is good or bad, right or wrong, and how these are justified and related to action. Relativism, subjectivism, absolutism, the selfish theory, freedom, and responsibility. (4W)

**209. Practical Logic.** Recognizing arguments; informal fallacies; uses of language; definition; analogical arguments; enthymemes; argumentation in arts, sciences, and law. (5W)

**SK 210. Deductive Logic.** Signs, symbols, and language in human reasoning. Structure of propositions; forms of valid inference; nature of deductive systems; recognition of formal fallacies. (5F,W,Sp)©

**211. Inductive Logic.** Analogical argument; Mill's methods and discovery of causes; framing and testing hypotheses in everyday life and in science; nature of evidence; right and wrong uses of statistics, probability. (3W)

**HU 215. Aesthetics.** An introductory course exploring relations between philosophy and art; the reciprocal effect of aesthetic categories and metaphysical concepts; the nature of genius and creativity. (3F,Sp)

**308. History and Thought of the New Testament.** Historical and intellectual context of the development of the New Testament. Character, ideas, and historical setting of the various documents. (3Sp)

**\*\*310. History of Ancient Philosophy.** Development of philosophical thought in the ancient Greek world. Emphasizes reading from the pre-Socrates, Plato, Aristotle, the Stoics, and Epicureans. (4F)

**\*311. History of Medieval Philosophy.** Neo-Platonism with stress on Plotinus, St. Augustine, and early Christian philosophy. Early medieval thought. St. Thomas Aquinas and rise of scholasticism. Philosophic thought in the Renaissance. (4F)

**\*\*312. History of Early Modern Philosophy.** European thought: Renaissance through eighteenth century. Philosophic ideas in science, religion, logic, ethics, and epistemology of Descartes, Hobbes, Spinoza, Leibnitz, Locke, Berkeley, Hume, and Kant. (4W)

**\*\*313. History of Nineteenth Century Philosophy.** European thought from Kant to Nietzsche. Metaphysics, ethics, logic, and theory of knowledge of such thinkers as Bentham, Mill, Comte, Hegel, Schopenhauer, Marx, and Nietzsche. (3Sp)

**\*315. Twentieth Century Philosophy.** Readings and discussion of major philosophies of the twentieth century, including philosophers from Russell to Austin. (3F)

**325. Medical Ethics.** Key issues in medicine, including consent, confidentiality, competency, abortion, suicide, and euthanasia. Philosophical, legal, and practical perspectives addressed. (3F)

**326. Business Ethics.** Pressing ethical issues in business, including foreign bribery, corporate responsibility, individual good vs. common good, justice, and preferential liking. (3W)

**327. Environmental Ethics.** Key ethical issues in treatment of nature, animals, and the environment. Topics include animal rights, the value of wilderness, ecology and the common good, and environmental aesthetics. (3Sp)

**HU 337. Mind Sets.** To study the contrast between the classical analytical perspective in western culture and the recent synthetic perspective. The contrast will be explored in terms of the philosophy of science from Descartes to Toulmin and corresponding perspectives in literature from the seventeenth century to the postsurrealistic period. (3Sp)

**\*\*350. Philosophy of Religion.** Problems in defining "religion;" the existence of God; problems of evil; the immortality of the soul; religious experience; faith; alternatives to theism; religious language. (3W)

**\*370. Existentialism.** Examination of such writers as Dostoevsky, Kierkegaard, Nietzsche, Kafka, Jaspers, Heidegger, Sartre, and Camus. (3Sp)

**380. Philosophy in Literature.** An examination of philosophical topics as presented and developed in works of literature such as Aristophanes' *The Clouds*, J.P. Sartre's *The Age of Reason*, or H. Hesse's *Siddhartha*. (3W)

**\*\*401. Metaphysics.** Treats systematically the first cause of things. Causality, space and time, idealism versus realism, universals, matter, essence and existence; the mind; the role of God. (3Sp)

**415. Philosophy of Law and Politics.** An examination of theories in law and politics, their purpose in society, and their relation to other practices and institutions. (3Sp)

**422. Symbolic Logic.** Deductive systems; valid and invalid arguments; logical paradoxes; sentential calculus, and predicate calculi. Axiom systems and metatheory. (5Sp)

## Philosophy Courses

**HU 101. Introduction to Problems of Philosophy.** Introduction to philosophical terminology and ideas. Modern-day problems of reality, thought, and value. (5)©

**\*430. Theories of Knowledge.** Problems in the theory of knowledge ranging from induction to the nature of sense data, emphasizing the use of modern techniques in clarifying classical epistemological issues. (3Sp)

**\*431. Concept of Mind.** Various theories of mind, and concepts of action and behavior as they relate to desire, belief, sensation, pain, and perception. The mind/machine issue. (3F)

**444. Ethical Problems.** Ethical principles applied to a variety of carefully developed problems using dramatic videotape panel discussions of issues such as loyalty, privacy, and confidentiality. (3W)

**\*485. Philosophy of Language.** Nature and uses of language. Concepts of meaning, reference, truth, name, syntax, semantics, pragmatics, metaphor, ambiguity, vagueness, definition. Applications in psychology, linguistics, anthropology, and literary criticism. (3Sp)

**488. Special Topics.** Detailed consideration of particular philosopher or particular philosophical problem. Instructor approval required. Course may be repeated when different topic is discussed. (3F,W,Sp)®

**490 (d689). Philosophy of Science.** Foundations of the physical and biological sciences with emphasis on scientific method, models and their uses, theories and explanations, reductionism, and paradigms. (3Sp)

**495. History of Scientific Thought.** Examination of key episodes in the history of science and associated ideas about the nature of scientific knowledge and the ways it may be acquired. (4W)

**499. Readings and Research.** The works of a particular philosopher or school of philosophy. Consent of instructor required. (1-5F,W,Sp)®

### Graduate

**605. Philosophy of History.** (3F)

**609. Philosophy of Social Sciences.** (3F)

**689 (d490). Philosophy of Science.** (3Sp)

**690. Independent Study.** (1-5F,W,Sp)®

### Department of

# Management and Human Resources

## College of Business\*

**Head: Professor John R. Cragun**  
Office in Business 411

**Professors** Leon R. McCarrey, Y. Krishna Shetty, David B. Stephens;  
**Professors Emeritus** Vernon Buehler, Howard M. Carlisle, L. Mark Neuberger, Richard L. Smith; **Associate Professors** Caryn L. Beck-Dudley, David R. Daines, Glenn F. Marston, Glenn M. McEvoy, Robert C. Mecham, Ross E. Robson; **Adjunct Associate Professor** Val R. Christensen; **Assistant Professor** Steven H. Hanks; **Instructor** Stephen M. Beckstead

\* All undergraduate and masters business programs offered by the College of Business are accredited by the American Assembly of Collegiate Schools of Business (AACSB).

### Speech Courses

**105. Public Speaking.** Speaking in formal public communication situations; development of skills in speech preparation, delivery, and audience adaptation. (3F,W,Sp)

**SS 260. Interpersonal Communication.** Communication skills in establishing and maintaining interpersonal relationships; relevant theories, behavioral skills, and role playing applied to communication in a variety of settings. (3F,W,Sp)

**300. Speech Teaching Practicum.** Supervised on-campus speech teaching experience. Must be completed prior to student teaching experience. Repeatable to a maximum of 2 credits. (1-2F,W,Sp,Su)®

**305. Technical and Professional Communication.** Skill development in oral technical reporting, interviewing, and interpersonal communication to meet the unique communication requirements of business, industry, and the professions. (3F,W,Sp)

**325. Organizational Communication.** Study of internal communication requirements of organizations. Identification of communication problems associated with conflict, interpersonal influence, communication barriers, and information flow. Prerequisite: upper division standing. (3W)

**509. Small Group Communication Theory.** Survey and analysis of theories and research in small group communication. Emphasis on decision-making groups. (3W)

**528. Communication Education Theory and Application.** Examination of contemporary theories in the field of communication education. Emphasis on communication apprehension, speech evaluation, classroom climate, teaching methods, and the basic course. (3W)

\*Taught 1990-91.

\*\*Taught 1991-92.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through the Life Span Learning Independent Study Division.

<sup>1</sup> Parenthetical numbers preceded by *d* indicate a *dual* listing.

<sup>2</sup> This course is taught every year, but not every quarter. Check with department for current offerings.

<sup>3</sup> These courses are not open to native speakers, unless they are registered Spanish majors and obtain the permission of the instructor.

<sup>4</sup> This course is not offered every year. Check with department for current offerings.

**Degrees offered:** Bachelor of Science (BS) and Bachelor of Arts (BA) in Management, BS and BA in Personnel/Human Resource Management

### Objectives

The programs in the Department of Management and Human Resources are designed to prepare men and women for administrative positions in business, government, and other institutions. Specialized training is provided in Management and in Personnel/Human Resource Management, as well as training directed at understanding the broader aspects of business as it functions within our free enterprise environment.

**Management** deals with effectively implementing those processes which ensure that organizational objectives are achieved. Examples of these processes include developing mission statements,

defining organizational goals, setting priorities, establishing criteria for organizational effectiveness, utilizing appropriate decision making strategies, understanding the internal and external environments, and appropriate strategies for short- and long-term goal accomplishment.

**Personnel/Human Resource Management** deals with those processes which provide, develop, and maintain a productive workforce. Subject areas include recruiting employees, determining what tasks need to be performed, placing the right person on the right job, determining fair benefits and compensation, evaluating performance, determining current and future employment needs, career pathing, training and development, labor-management relations, planning for retirement, and following legal/ethical practices in employment.

### **Requirements for Majors**

**Departmental Admission Requirements.** Students accepted in good standing by the University are eligible for admission to the College of Business. All transfer students, those transferring within USU, and those from other colleges or universities must have an overall GPA of 2.20 to be accepted. Upon admission, all degree-seeking students will be identified with the College of Business Prespecialization Unit for the purpose of qualifying for advanced standing within their chosen major field. Transfer students and others desiring to be admitted to advanced standing in the Department of Management and Human Resources must meet the prespecialization requirements stated below.

**Prespecialization.** For approximately the first two years, a student will be identified with the College of Business Prespecialization Registration Unit. The basic objective of this portion of the student's studies is to provide a broad and sound educational foundation upon which to build a specialized education relating to business.

All students at the University are required to satisfy the General Education requirements of the University as described in the Undergraduate Requirements section of this catalog. Additional requirements for Management and Human Resources majors during this period consist of two basic components.

**1. College of Business Prespecialization Core.** The following courses are required: Acctg 201, 202; BIS 140<sup>1</sup>, 255; Econ 200<sup>1</sup>, 201<sup>1</sup>; Math 105<sup>1</sup>; MHR 100, 299; CS 150 or 170<sup>1</sup>; Stat 230.

**2. Department of Management and Human Resources Prespecialization Requirement.** The following courses are required for majors in Management and Human Resources: Acctg 203; Math 215; Soc 101 or Psy 101; Spch 305 or BIS 340.

Completion of 30 credit hours of university work with a minimum GPA of 2.2 is necessary before a student is allowed to enroll in BIS 255; Acctg 201, 202, 203, 311; and MHR 299.

Access to 300-level Management and Human Resources courses is restricted. Only those students who have completed a minimum of sixty (60) quarter credits with a minimum GPA of 2.50 will be allowed to enroll in 300-level Management and Human Resources courses.

**Advanced Standing.** The objective of the advanced standing portion of the program is to provide sufficient specialized business training to prepare the student to successfully enter the business world in a chosen field of interest. The program is also directed at

<sup>1</sup>These course credits can be counted toward satisfying the General Education requirements. A minimum of 25 additional credits will be necessary to complete the General Education requirements.

<sup>2</sup>The MHR 489 Business Policy course is a capstone course and should not be taken until near the end of the senior year.

providing the type of business education that develops the attitudes, analytical ability, and the social conscience required for future professional advancement.

The requirements for attaining advanced standing in the Department of Management and Human Resources are as follows:

1. Have completed or currently be registered for a minimum of 85 credits and must have earned an overall grade point average (GPA) of 2.50 for all the hours of study taken up to the time the petition for advanced standing is made. This includes all transfer credits.

2. Have completed or currently be registered for the prespecialization requirements for both the College of Business and the Department of Management and Human Resources as indicated above, and must have earned a GPA of 2.50 or above in these courses. Courses in the prespecialization requirement may be repeated only once to improve a grade.

3. File a request for advanced standing with the College of Business Student Service Center.

It is strongly recommended that each student make the transition from prespecialization in the college to advanced standing in the Department of Management and Human Resources as soon as possible after having met the 85 credit requirement.

During the initial portion of the Management and Human Resources upper division program, all degree seeking students will be required to take the following core classes, which are designed to provide a broad background in the various areas of business: BA 308, 340, 350, 370; MHR 311, 412, 489<sup>2</sup>; Econ 400 or 500; Econ 401 or 501.

During the latter portion of the program, the student working toward a degree in the Department of Management and Human Resources will be devoting his or her efforts toward fulfilling the requirements in one of the two areas of specialization.

**Major in Personnel/Human Resource Management.** In addition to the basic core requirements, students majoring in Personnel/Human Resource Management must complete the following 26 credit hours: MHR 360, 364, 461, 463, 469; Psy 555; Econ 521, Econ 566 or BIS 560.

**Major in Management.** In addition to the basic core requirements, students majoring in Management must complete 25-28 credit hours as follows: MHR 360, 364, 414, 415; and 3 courses from a list of approved electives, most of which are outside the College of Business. One elective will be taken from each of the following general areas: (1) Global and Public Environment; (2) Human Behavior and Society; and (3) Science/Technology/Central Systems. If a student elects to take a minor, he or she is encouraged to select one from outside the College of Business.

### **Requirements for Minors**

A minor in Management and a minor in Personnel/Human Resource Management are available, as outlined below. Any deviation from the programs as outlined must be submitted in writing, with justification for the changes, to the department head for approval. A 2.50 GPA in the minor courses is required.

**Minor in Management.** This minor is for students with majors outside the College of Business who expect to work in an organization where they will assume supervisory or management responsibilities. The Management minor consists of a minimum of 24 credits. The following courses are required: MHR 299, 311, 360. In addition,

four courses must be selected from the following: MHR 364, 414, 415, 461; Econ 520, 521.

**Minor in Personnel/Human Resource Management.** This minor is for students with majors outside the College of Business who want to work in any of the personnel/human resource functions of an organization. The Personnel/Human Resource Management minor consists of a minimum of 24 credits. The following courses are required: MHR 311, 360, 364. In addition, four courses must be selected from the following: MHR 299, 461, 463, 469; Psy 555; Econ 566 or BIS 560; Econ 521.

**Minors for Students with majors within the College of Business.** Students with majors within the College of Business may elect to take a minor in either Management or Personnel/Human Resource Management. In such cases, in consultation with the head of the Department of Management and Human Resources, an appropriate minor will be determined based on the student's career objectives. Students will be expected to complete 18 credits of related course work beyond the College of Business Core. All such minors must be approved by the head of the Department of Management and Human Resources.

## Graduation Requirements

To be recommended by the department for graduation, majors in the Department of Management and Human Resources must have a grade point average of at least 2.50 in their upper division core and specialization courses, as well as an overall GPA of 2.50. This includes transfer credits. Students are required to take at least 40% of their credits in courses offered outside the College of Business.

## Graduate Study

The college offers the Master of Business Administration degree (MBA). It is designed to give the students training of a general management nature aimed at providing a background for advancement into supervisory positions. The MBA degree does not emphasize narrow specialization in any one of the functional fields of business; rather it is a management degree emphasizing broad training obtainable by qualified students regardless of their undergraduate major. See graduate catalog for more information.

## Management and Human Resources Courses

**100. Business Orientation.** Orients freshmen and transfer students to College of Business programs, academic and student services, professional organizations, and career possibilities. (1)

**225. Introductory Internship.** An introductory level experience in a career-related position approved by the cooperative internship office. One credit for every 75 hours of internship experience. Maximum 6 credits. (1-6F,W,Sp,Su)

**235. Small Business Management.** This program of instruction is designed to provide students with a practical overview of management principles and practices as they apply to the small business enterprise. For nonbusiness majors. (3W)©

**299. Fundamentals of the Legal Environment of Business.** This course covers in detail introduction to law, contracts, agency, and business organization. It surveys the legal environment of marketing, personnel, real estate, and finance. Lecture and laboratory. (4F,W,Sp,Su)

**IO 311. Management and Organizations.** Survey of traditional and current management issues (e.g. planning, organizing, controlling, international business) combined with organizational behavior topics (e.g. interpersonal communication, leadership, motivation). Prerequisite: Junior-level standing. (4F,W,Sp,Su)©

**316. Leadership Training/Group Dynamics.** Concepts of self-assessment, goal setting, achievement motivation, leadership, discussion leading, small group functioning, and performance feedback. (1-3F,W,Sp)

**325. Discussions with Business Leaders.** Examines new methods for improving U.S. competitiveness by attending the Partners Program seminar sessions and hosting visiting executives from top U.S. companies. Repeatable to maximum of 6 credits. (1F,W,Sp,Su)©

**360. Human Behavior in Organizations.** Development of managerial competencies in individual, interpersonal, and group processes such as motivation, communication, problem solving, and conflict. Emphasis on experiential learning. Prerequisite: MHR 311. (4F,W,Sp)

**364. Personnel/Human Resource Management.** Overview of the Human Resource Management function from the perspective of a business generalist. Consideration given to key legislation and current issues. Prerequisite: Junior level. (4F,Sp)

**412. Business and Society.** Examines political, legal, conceptual, institutional, and moral foundations of business and its changing role. Assessment of business involvement in urban, community, consumer, and environmental affairs. Prerequisites: MHR 311 and BA 350 or consent of instructor. (3F,W,Sp,Su)

**414. Organization Theory.** Investigates the structure and functioning of organizations through examination of the environment, technology, organizational design, conflict, power and influence relationships, institutional change, and behavioral implications. Prerequisites: MHR 311, 360. (4F)

**415. Management Seminar.** Contemporary topics in management, such as global competition, innovation, technology, productivity, quality, and other emerging issues. Review and development of these and other topics through use of readings, case studies, and executive lectures. Prerequisites: MHR 311, 360. (4W)

**425. Advanced Internship.** An advanced or middle-level experience in a career-related internship position approved by the cooperative internship office. One credit for 75 hours of internship experience. Maximum of 12 credits. (1-12F,W,Sp,Su)

**435. Entrepreneurship of New Venture Management.** Processes, methods, and steps involved in starting a new venture such as a small business. Emphasizes the planning, financing, conception, and management of new firms. Prerequisites: MHR 311, BA 340, 350, 370. (4Sp)©

**461. Human Resource Planning and Performance Appraisal.** Human Resource Planning and its relationship to business strategy, labor market analysis, career planning, performance management, and the legal environment for performance appraisal. Prerequisites: MHR 364, Stat 230. (3F)

**463. Compensation Administration.** Analysis of compensation policies and programs, job evaluation programs, job pricing, wage and salary surveys, administration, and other related problems. Prerequisite: Stat 230. (3W)

**469. Problems and Policies in Personnel.** Application of principles and policies to personnel and human resource problems in organizations. (A capstone, integrative course for majors and minors.) Prerequisites: Senior standing in P/HRM; MHR 461 and 463; Psy 555. (3Sp)

**480. Independent Research and Reading.** (1-5F,W,Sp,Su)©

**489. Business Policy.** A capstone course to develop perspective, judgment, and facility in solving problems in production, distribution, personnel, finance, control, and social aspects of business. Prerequisites: Stat 230, MHR 311, BA 340, 350, 370. (4F,W,Sp,Su)

**564. Selected Topics in Personnel/Human Resource Management.** Selected topics in personnel/human resource management are pursued in depth. Prerequisite: graduate or senior standing. (3)

## Graduate

**600. Survey of Business Law.** (3)

**609. Survey of Management and Organizational Behavior.** (4F)

**662. Human Resources Management.** (3)

**664. Special Topics in Human Resources and Organizational Behavior.** (3)

**665. Interpersonal Effectiveness in Management.** (3)

**666. Organizational Leadership, Influence, and Change.** (3)

**667. Labor Relations.** (3)

- 680. Planning and Control. (3)
- 681. Management and Organizational Behavior. (4)
- 683. Business and Society. (3)
- 684. Special Topics in Management. (3)
- 686. Management of Technology/Innovation. (3)
- 689. Business Strategy. (4)

690. Independent Research and Reading. (1-5)®

696. Professional Paper. (4)

<sup>1</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through the Life Span Learning Independent Study Division.

## *Department of* ***Mathematics and Statistics*** *College of Science*

**Head:** Professor L. Duane Loveland  
Office in Lund Hall 220

**Associate Head:** Associate Professor E. Robert Heal  
Office in Lund Hall 218

**Professors** Ian M. Anderson, Ronald V. Canfield, Lawrence O. Cannon, Jerry Ridenhour, Donald V. Sisson, Homer F. Walker, Michael P. Windham; **Professors Emeritus** Joe Elich, Neville C. Hunsaker, Konrad Suprunowicz, David White; **Associate Professors** LeRoy B. Beasley, Antone H. Bringham, Chris S. Coray, Lance L. Littlejohn, Renate Schaaf, Russell C. Thompson, David L. Turner, E. E. Underwood, Stanley C. Williams; **Associate Professors Emeritus** Robert G. Hammond, Wayne R. Rich, James D. Watson; **Assistant Professors** Kenneth W. Bosworth, Daniel C. Coster, Adele Cutler, D. Richard Cutler, Kevin Hestir, Joseph V. Koebbe, Kathryn Turner; **Temporary Lecturers** David D. Bregenzer, Mary Jo Hansen, Janet R. Olsen, Nancy Petty, Beverly Ridenhour

**Degrees offered:** Bachelor of Science (BS), Bachelor of Arts (BA), and Master of Science (MS) in Mathematics; BS and BA in Mathematics Education; Master of Mathematics (MMath); Doctor of Philosophy (PhD) in Mathematical Sciences; BS, BA, and MS in Statistics

### ***Objectives***

The Department of Mathematics and Statistics offers a variety of courses designed to prepare students for careers in teaching or for positions as mathematicians or statisticians in industry or governmental agencies. The department also provides service courses for many other groups of students.

### ***Placement of New Students***

The ACT score in mathematics is used as a tool in placement. A student who scores 14 or less is advised to register for either Math 001 or 002, or to take a waiver test through the Testing Office. Two elementary calculus sequences are offered—Math 220-222 for students in mathematics, most sciences, and engineering, and Math 215-216 for students in the College of Business or the College of Natural Resources. Students intending to take calculus need to have a strong

background in algebra (Math 101 and 105). In addition, precalculus (Math 106) is required in the Math 220 sequence. Freshmen who have completed three or four years of high school mathematics usually begin in either Math 220 or in Math 215. Students who have taken one year of calculus in high school can sometimes begin in Math 221 or 222.

Transfer students are urged to consult with advisers in the department for proper placement.

### ***Undergraduate Study***

**Departmental Requirements.** Admission requirements for the Department of Mathematics and Statistics are the same as those described for the University on pages 8-11. Students in good standing may apply for admission to the department.

All prerequisite courses must be completed with a grade of C- or better. All grades in courses counting toward graduation in all programs must be no less than C- and must average 2.0 or better.

For those students who enter the University with advanced placement in mathematics and approximately 30 hours of CLEP or AP credit, it is possible to complete a masters degree (MS) in mathematics or statistics within a four to five year period. Interested students should consult the undergraduate adviser.

**College of Science Requirements.** In order to satisfy College of Science requirements, every BS Degree candidate must complete the following course work or its equivalent.

- A. Math 220 and 221.
- B. Either Stat 201 or CS 171.
- C. One of the following sequences: (1) Biol 125 and either Biol 126 or Biol 127; (2) Chem 121, 122, and 124; (3) Geol 111 and 200; (4) Phyx 221 and 222.
- D. English 301 or 305.

In some instances, higher level courses may be substituted for courses listed in the above categories. Approval for any substitutions must be obtained in advance.

**Note:** The above Bachelor of Science requirements are **not** in effect for the Bachelor of Arts degree.

**Bachelor of Science in Mathematics.** The regular major in mathematics has flexible requirements and is designed to prepare



students for careers in industry or to prepare students for graduate study in mathematics (including those who plan to teach mathematics at the college or university level). Math 320, 321, 322, 420, 521, 522, and 523 are required. Students must also elect 27 credits of mathematics courses at the 500 level or above. Students who plan to study mathematics on the graduate level should take at least one of the following sequences: Math 531, 532, and 533; or 551, 552, and 553.

#### **Bachelor of Science in Mathematics (Computational Option).**

A student may choose this option rather than the regular BS described above. The course work is intended to cover a wider range of topics in the area of numerical and computer analysis. Required courses are Math 320, 321, 322, 521, 522, 523, 561, 562, 563; CS 241, 355, 356, 357. Also the student must elect 9 credits from the following list: Engr 270; EE 311, 358; CS 455, 456, 457, 541; and 6 credits from the following list: Math 531, 532, 533, 541, 542, 543, 571, 572, 573. Alternative elective course work may be approved on an individual basis.

**Interdisciplinary majors.** Students who have interests in two or more major areas are encouraged to discuss individually designed degree programs with advisers. Such programs normally entail the completion of essential requirements in two complementary areas. Cooperating departments may agree to waive some requirements in each major to allow a student to obtain such a dual major, but the total number of required courses will often exceed the total required for either major, singly.

At the time of printing this catalog, three interdisciplinary dual majors have been approved: Mathematics-Physics; Mathematics-Statistics; and Mathematics-Electrical Engineering.

The Mathematics-Physics major requires the following courses: Math 220, 221, 222, 320, 321, 322, 420, 521, 522, 523; Phyx 221, 222, 223, 341, 342. Also, students must elect 18 credits from mathematics courses numbered above 400 and 18 credits from physics courses numbered above 400.

The Mathematics-Statistics major requires the following courses: Math 220, 221, 222, 320, 321, 322, 420, 521, 522, 523, 571, 572, 573; Stat 501, 502, 505. Also, students must take 6 credits in Math courses numbered above 500 and 6 credits in Stat courses numbered above 500.

The Mathematics-Electrical Engineering major requires completion of all EE required courses, including Physics 221-223, plus the following mathematics courses: Math 220, 221, 222, 320, 321, 322, 420, 521, 522, 523. Also, the student must elect 18 additional credits from mathematics courses numbered above 400.

**Bachelor of Science in Mathematics Education.** The department offers a degree in Mathematics Education for those who want to teach in the secondary schools. The requirements for this degree are Math 220, 221, 222, 305, 311, 312, 320, 321, 322, 331, 371, 384, 420, 461, and Stat 201. It is recommended that students take CS 170 to fulfill the computer literacy requirement of the professional education component. The prospective secondary school teacher should combine the mathematics course requirements with the requirements for State Certification, which include the completion of an approved teaching minor. The complete Mathematics Education requirements, together with certification requirements and a listing of approved teaching minors, are described in the document *USU Secondary Teacher Education Program Undergraduate Planning Guide*. This publication is available at the University Bookstore.

Students may also satisfy the department's requirements to teach in the secondary schools by completing the regular mathematics major described in a previous section, provided the 27 credits of electives include Math 311, 312, 531, and 571. Again, students

electing this option must meet the requirements for state certification and have a teaching minor.

A teaching minor in mathematics is also available. Required courses are Math 220, 221, 222, 305, 311, 321, 371, and 384.

**Bachelor of Science in Statistics.** Statistics is the branch of science which deals with the development and usage of statistical inference. Statistical inference is the inductive process of generalizing from the particular to the general on the basis of sample evidence. The foundation of statistical inference lies in the theory of probability, which provides a measure of reliability of the conclusions drawn from experimental data.

Statisticians find employment in business, education, the Federal Government, state governments, private research groups, and as actuaries for the insurance industry.

Required courses are Math 320, 321, 322, 571, 572, 573; Stat 501, 502, 505; CS 170, 171, and 241. Students must also elect 9 additional credits from statistics courses numbered above 400 or from Math 576, 577.

**Actuarial Science Option.** A student may elect to pursue the Actuarial Science Option as part of either the major in Mathematics or the major in Statistics. An actuary is a business professional who uses mathematical skills to define, analyze, and solve financial and social problems. Most actuaries are employed by insurance companies, independent consulting firms, and government agencies.

Required courses are Math 320, 321, 322, 571, 572, 573, 557, 558, 559; Stat 501, 502, 505; CS 241; Acctg 201, 202; BA 308, 321, and 340. Degree candidates in this option must successfully complete Exam 100, Calculus and Linear Algebra, which is administered by the Society of Actuaries.

**Bachelor of Arts Degree.** For this degree, students must complete the requirements for a BS degree (above) plus two years' training or equivalent in a foreign language approved by the Languages and Philosophy Department.

**Mathematics Minor.** This department approved minor consists of Math 220, 221, 222 (or equivalent); Math 320, 321, 322; and 6 credits in courses numbered above 400. A grade point average of 2.0 is required, and this average will be calculated using all grades received in the above required courses, including earlier grades in repeated courses.

**Statistics Minor.** Required courses include Stat 501, 502, 505, and 9 credits from Stat courses numbered above 400 or from Math 571, 572, 573, 576, or 577. A grade point average of 2.0 is required, and this average will be calculated using all grades received in the above required courses, including earlier grades in repeated courses.

### **Graduate Study**

The Department of Mathematics and Statistics offers four graduate degrees: PhD in Mathematical Sciences, Master of Science in Mathematics or Statistics, and Master of Mathematics. See the graduate catalog for prerequisites and further information.

### **Mathematics Courses**

**001. Basic Mathematics.** For students who need a review of basic arithmetic skills.<sup>1</sup> (5F)©

**002. Elements of Algebra.** A review of elementary algebra in preparation for Math 101.<sup>1</sup> (5F,W,Sp,Su)©

<sup>1</sup>See introductory paragraph, Placement of New students. This course also requires extra fees.

**SK 101. Introduction to College Algebra.** Designed to develop skills and techniques of elementary algebra. In most cases, students with more than one year of high school algebra should not enroll in Math 101. Prerequisite: Math 002 or one year high school algebra. (5F,W,Sp,Su)©

**105. College Algebra.** Real number system, equations and inequalities, functions, logarithms, polynomials, mathematical induction, binomial theorem, and matrices. Prerequisite: Math 101 or equivalent. (5F,W,Sp,Su)©

**106. Precalculus.** Trigonometric functions, equations, identities, and applications. Arithmetic and geometric sequences, binomial theorem, mathematical induction, permutations and combinations, and conic sections. Prerequisite: Math 105 or equivalent. (5F,W,Sp,Su)©

**SK 201, SK 202, 203. Mathematics for Elementary Teachers.** Sets, logic, foundations of arithmetic and algebra, intuitive geometry, metrics, probability and statistics. Emphasis is on understanding the mathematics necessary to teach at the elementary school level. Prerequisites: ACT math score of 19 or Math 101 is prerequisite to 201; 201 is prerequisite to 202; 202 is prerequisite to 203. (3F,W,Sp,Su) (3F,W,Sp) (3F,W,Sp,Su)©

**215. Calculus Techniques.** Techniques of elementary calculus of functions of one variable, including differentiation and integration, with applications to biological, management, and social sciences. Those wanting a deeper understanding of calculus should enroll in the Math 220, 221, 222 sequence. Prerequisite: Math 105. (3F,W,Sp,Su)©

**216. Calculus Techniques.** Techniques from calculus of several variables including partial differentiation, multiple integration, optimization, and differential equations. Prerequisite: Math 215. (3F,W,Sp)

**220, 221, 222. Calculus.** Analytic geometry, differential and integral calculus, introduction to vectors, infinite series and applications. Those wishing to study upper division mathematics should complete this sequence. Prerequisites: Math 105 and 106 or equivalent. (5F,W,Sp,Su) (4F,W,Sp,Su) (4F,W,Sp,Su)

**225. Introductory Internship/Co-op.** An introductory level educational work experience in mathematics in an internship/cooperative education position approved by the department. (1-6F,W,Sp,Su)

**281, 282, 283. Topics in Mathematics (Topic).** Topics in mathematics at the lower division level. (1-5) (1-5) (1-5)

**305. Foundations of Algebra.** Required of all mathematics teaching majors and minors. Introduction to logic, sets, mathematical induction, relations, and functions, together with a study of topics from abstract algebra. Prerequisite: Math 222. (3F)

**309. Methods of Secondary School Mathematics.** A methods course required of all prospective secondary school mathematics teachers. (4Sp)

**311, 312. Modern Geometry.** A critical review of Euclidean geometry. Introduction to non-Euclidean geometries with emphasis on the historical significance of the parallel postulates. Projective geometry and transformations. Prerequisite: Math 221 or consent of instructor. (3W)(3Sp)

**320. Multivariable Calculus.** Vector functions, partial derivatives, multiple integrals, and line integrals. Prerequisite: Math 222. (4F,W,Sp,Su)

**321. Introductory Linear Algebra.** Topics from linear algebra including matrices, vector spaces, linear dependence and independence, bases, eigenvalues, eigenvectors, orthogonality, least squares, diagonalization, symmetric matrices, and linear transformations. Prerequisite: Math 222 or concurrent registration. (3F,W,Sp,Su)

**322. Elementary Differential Equations.** Techniques used in finding solutions of ordinary differential equations, emphasis on linear problems. Prerequisite: Math 321. (3F,W,Sp,Su)

**331. Introduction to Discrete Mathematics.** Logic and axiomatics, sets, functions, counting methods, recurrence relations, elementary combinatorics, graph theory, Boolean algebra. Prerequisites: Math 222 and CS 150 or equivalent. (3W,Sp)

**341. Engineering Analysis.** Practical application of differential equations, vector analysis, and Fourier series to the analysis of electrical, mechanical, and physical systems in engineering. Prerequisite: Math 322. (3F,W,Su)

**371. Introduction to Probability.** An introductory mathematical treatment of uncertainty. Topics include probability spaces, combinatorics, the binomial and normal random variables, special distributions, independence, expected values, and applications. Prerequisite: Math 221. (3W)

**384. Number Theory and History of Mathematics.** Elementary properties of integers, arithmetical functions, congruences, and simple Diophantine equations; readings in the history of mathematics and an expository paper. Prerequisite: Math 221 or consent of instructor. (3Sp)

**391. Readings and Conference.** For prospective secondary school teachers. Registration requires prior arrangements with instructor. (1-4F,W,Sp,Su)©

**420. Foundations of Analysis.** Fundamental concepts of analysis studied from a rigorous point of view. Emphasis on learning how to develop proofs. Prerequisite: Math 320 or consent of instructor. (3F,Sp)

**425. Advanced Internship/Co-op.** An internship/cooperative work experience which has been determined by the department to be at the 400-level. (1-6F,W,Sp,Su)

**461. Numerical Methods.** Survey of numerical methods. Nonlinear equations, systems of linear equations, polynomial interpolation, numerical integration and differentiation. Prerequisites: Math 322 and a working knowledge of a high level programming language such as FORTRAN, PASCAL, or BASIC. (3W,Sp,Su)

**480. Undergraduate Research.** The student will participate in individual research projects with guidance from the instructor. Prerequisite: consent of instructor. (1-4)©

**491. Readings and Conference.** Registration requires prior arrangements with instructor. (1-4F,W,Sp,Su)©

**521, 522, 523. Advanced Calculus.** One and several variable calculus from an advanced point of view, topology of Euclidean  $n$ -space, sequences of functions. Prerequisite: Math 420 or 551. (3F) (3W) (3Sp)

**\*\*527, 528, 529. Introduction to Complex Variables.** Basic theory and applications of complex variables for mathematics, physics, and engineering students. Analytic functions, contour integrals, conformal mappings, transform theory, special functions. Prerequisites: Math 320, 321, 322. (3W) (3Sp) (3Su)

**531, 532, 533. Linear and Modern Algebra.** Fall quarter: introductory group and ring theory. Winter and spring quarters: topics from vector space and matrix theory. Prerequisites: Math 320, 321, 322. (3F) (3W) (3Sp)

**541, 542, 543. Methods of Applied Mathematics.** Fall quarter: analysis of systems of ordinary differential equations, stability, asymptotic behavior, singular points, phase plane. Winter, spring quarters: boundary value problems, Fourier series, classical partial differential equations. Prerequisites: Math 320, 321, 322. 541 is not a prerequisite for 542 or 543. (3F) (3W) (3Sp)

**\*\*551, 552, 553. Introduction to Topology.** Elementary point set topology with emphasis on linearly ordered and metric spaces. Prerequisite: Math 222. (3F) (3W) (3Sp)

**557, 558, 559. Actuarial Mathematics.** An introduction to the theory of risk and its application to the construction and analysis of models for insurance systems. Prerequisites: Math 573 and consent of the instructor. (3F) (3W) (3Sp)<sup>2</sup>

**561, 562, 563. Introduction to Numerical Analysis.** Solutions of systems of equations, curve fitting, numerical differentiation and integration, numerical solution of differential equations, numerical linear algebra including the determination of eigenvalues and eigenvectors. Prerequisites: Math 320, 321, 322, and a working knowledge of some high level programming language (FORTRAN, BASIC, PASCAL). (3F) (3W) (3Sp)

**\*564, 565, 566. Applied Optimization.** First quarter topics include linear programming and methods of operations research. The second quarter covers topics from unconstrained optimization, and the third quarter covers constrained optimization. Prerequisites: Math 320, 321, and 461 or equivalent. (3F) (3W) (3Sp)

**571. Theory of Probability.** Basic mathematical theory of probability, discrete and continuous random variables. Prerequisites: Math 320, 321. (3F)

**572, 573. Introduction to Mathematical Statistics.** Basic mathematical theory of point estimation, interval estimation, hypothesis testing, and linear models. Prerequisite: Math 571. (3W) (3Sp)

**\*576, 577. Introduction to Stochastic Processes.** Application of stochastic processes to engineering and science. Topics include Markov chains, Poisson processes, renewal theory, and Brownian motion. Prerequisite: Math 571. (3W) (3Sp)<sup>2</sup>

**581, 582, 583. Topics in Mathematics.** Prerequisites: Math 320, 321, and 322. (1-5F) (1-5W) (1-5Sp)<sup>2</sup>©

**585, 586, 587. Topics in Applied Mathematics.** Prerequisites: Math 320, 321, and 322. (1-5F) (1-5W) (1-5Sp)<sup>2</sup>©

**591. Readings and Conference.** Registration requires prior arrangements with instructor. (1-4F,W,Sp,Su)©

### Graduate<sup>3</sup>

600. Graduate Internship/Co-op. (1-6F,W,Sp,Su)
- 611, 612, 613. Differential Geometry. (3) (3) (3)<sup>2</sup>
- 621, 622, 623. Real Analysis. (3) (3) (3)
- 631, 632, 633. Modern Algebra. (3) (3) (3)<sup>2</sup>
- 634, 635, 636. Matrix Theory and Linear Algebra. (3) (3) (3)<sup>2</sup>
- 641, 642, 643. Ordinary Differential Equations. (3) (3) (3)<sup>2</sup>
- \*651, 652, 653. Topology. (3) (3) (3)
- 661, 662, 663. Numerical Analysis. (3) (3) (3)
- 664, 665, 666. Optimization. (3) (3) (3)<sup>2</sup>
- 671, 672, 673. Probability Theory. (3) (3) (3)<sup>2</sup>
680. Seminar. (1-5)®
697. Thesis. (1-9)®
699. Continuing Graduate Advisement. (1-3)®
- 711, 712, 713. Topics in Geometry. (3) (3) (3)<sup>2</sup>®
- 721, 722, 723. Topics in Analysis. (3) (3) (3)<sup>2</sup>®
- 731, 732, 733. Topics in Algebra. (3) (3) (3)<sup>2</sup>®
- 741, 742, 743. Topics in Differential Equations. (3) (3) (3)<sup>2</sup>®
- 751, 752, 753. Topics in Topology. (3) (3) (3)<sup>2</sup>®
- 761, 762, 763. Topics in Numerical Analysis. (3) (3) (3)<sup>2</sup>®
- 764, 765, 766. Topics in Optimization. (3) (3) (3)<sup>2</sup>®
- 771, 772, 773. Topics in Probability and Statistics. (3) (3) (3)<sup>2</sup>®
780. Seminar. (1-3)®
- 781, 782, 783. Topics in Mathematics. (3) (3) (3)<sup>2</sup>®
- 785, 786, 787. Topics in Applied Mathematics. (3) (3) (3)<sup>2</sup>®
791. College Teaching Internship. (3)®
797. Dissertation Research. (1-15)®
799. Continuing Graduate Advisement. (1-3)®

\*Taught 1990-91.

\*\*Taught 1991-92.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through the Life Span Learning Independent Study Division.

<sup>2</sup>Not all courses are offered each year. Check with the department for current offerings.

<sup>3</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog. These courses are not offered every year.

### Statistics Courses

201. Introduction to Statistics. Descriptive and inferential statistical methods are introduced. The emphasis is on conceptual understanding and statistical thinking. Examples from many different areas of interest are given. Prerequisite: Math 105. (4F,W,Sp)

225. Introductory Internship/Co-op. Introductory educational work experience. (1-6F,W,Sp,Su)

230. Business Statistics. Descriptive and inferential statistics, probability, sampling, estimation, tests of hypotheses, linear regression and correlation, chi square, analysis of variance, time series, index numbers. Prerequisite: Math 105. (5F,W,Sp,Su)®

425. Advanced Internship/Co-op. Advanced educational work experience. (1-15F,W,Sp,Su)

491. SPSS Shortcourse. Access to and use of the SPSS statistical analysis program. (1)

492. SAS Shortcourse. Access to and use of the SAS statistical analysis program. (1)

495. Directed Reading. (1-5)

501, 502. Statistical Methods. Statistical methods for students who will be using statistics to analyze research data. Estimation, hypothesis testing, regression, and analysis of variance techniques. Statistical software. Prerequisite: Math 215 or 221 recommended. (3F,W,Sp,Su) (3F,W,Sp,Su)

505 (d605).<sup>1</sup> Linear Regression. Methods for prediction and hypothesis testing in multivariate linear models, including analysis of variance and covariance. Statistical software for regression and ANOVA. Prerequisite: Stat 502 or equivalent, matrix algebra recommended. (3F)

508. Statistical Process Control. Techniques and applications of statistics in modern management of industrial processes. Control charts, acceptance sampling. Design of industrial experiments and analysis of process failures. Prerequisite: Stat 502. (3)

510. Sampling. Random sampling, sampling for proportions, stratified sampling, cluster sampling. Emphasis will be placed on applications. Prerequisite: Stat 501 or equivalent. (3W)

515. Categorical Data Analysis. Analysis of categorical data. Contingency tables; goodness of fit; work of Goodman, Kullback; Markov chains; use of computer programs. Prerequisite: Stat 502 or equivalent. (3W)

520. Design of Experiments. The design, analysis, and interpretation of experiments, especially factorials, split plots, incomplete blocks, confounding, fractional factorials, and nested designs. Prerequisite: Stat 502 or equivalent. (3Sp)

581, 582, 583. Topics in Statistics. Prerequisite: Stat 502. (1-5F) (1-5W) (1-5Sp)<sup>2</sup>®

597. Seminar. Review of current literature and developments in the field of statistics. (1-3)®

### Graduate<sup>3</sup>

601, 602, 603. Mathematical Statistics: Theory and Application. (3F) (3W) (3Sp)

605 (d505). Linear Regression. (3F,Sp)

\*\*615. Nonparametric Statistics. (3F)

\*\*616. Reliability. (3W)

\*\*617. Robust Methods in Statistics. (3Sp)

625. Graduate Internship/Co-op. (1-12)

\*634. Analysis of Unbalanced Data. (3F)

\*635, 636. Linear Statistical Models. (3W)(3Sp)

\*642. Time Series. (3Sp)

\*660, 661. Multivariate Analysis. (3F) (3W)

\*675. Practical Statistical Consulting. (2)<sup>2</sup>

681, 682, 683. Topics in Statistics. (3F) (3W) (3Sp)<sup>2</sup>®

695. Readings and Reports. (3-6)®

697. Thesis and Research. (1-9)®

699. Continuing Graduate Advisement. (1-3)®

\*Taught 1990-91.

\*\*Taught 1991-92.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

<sup>1</sup>Parenthetical numbers preceded by a *d* indicate a dual listing.

<sup>2</sup>Not all courses are offered each year. Check with the department for current offerings.

<sup>3</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

## Department of *Mechanical and Aerospace Engineering* College of Engineering

**Head:** Professor A. P. Moser  
Office in Engineering Laboratory 178

**Professors** J. C. Batty, P. T. Blotter, R. H. Haycock, R. M. Holdredge, W. F. Phillips, F. J. Redd, O. K. Shupe, C. D. Spear, E. W. Vendell; **Professor Emeritus** W. K. Somers; **Adjunct Professors** L. H. Brim, R. H. McEntire, D. G. Norton; **Adjunct Associate Professor** D. G. Ferney; **Assistant Professors** S. C. Bose, S. L. Folkman; **Lecturer** L. D. Myers.

**Degrees offered:** Bachelor of Science (BS), Master of Science (MS), and Doctor of Philosophy (PhD) in Mechanical Engineering

### *Objectives*

Mechanical Engineering is that branch of engineering primarily concerned with energy, including its conversion to more useful forms, its transmission to needed locations, and its utilization. Mechanical engineering graduates pursue careers in such widely diverse industries as aeronautical, aerospace, agricultural equipment, automotive, chemical, computer aided design and manufacturing, defense, electrical utilities, electronics, fluids engineering, food processing, industrial equipment, manufacturing, materials, nuclear, petroleum, robotics, and solar energy. With further training many mechanical engineering graduates pursue interdisciplinary careers in such areas as medicine, environment, law, consulting, and business management.

The first two years of the mechanical engineering curriculum begin with strong emphasis on computer programming, mathematics, physics, and engineering fundamentals together with English composition and economics. The curriculum continues with concentrated courses in the engineering sciences, including manufacturing, solid and fluid mechanics, electrical power systems, electronics, instrumentation, and microcomputer systems and materials.

The final two years of the curriculum allow the student to pursue either a broad-based traditional mechanical engineering program with special emphasis on Computer-aided Design (CAD) or the manufacturing engineering option with emphasis on modern manufacturing techniques such as Computer-aided Manufacturing (CAM), robotics, and microprocessor control of manufacturing. Both programs are concerned with the integration of CAD and CAM, commonly called CAD/CAM. Laboratory classes give the student an opportunity for hands-on experience. The design classes give students a chance to integrate the knowledge gained in basic science, mathematics, engineering science, and other courses as they solve realistic engineering problems. More depth and greater flexibility are provided those continuing on into graduate studies.

A student in Mechanical Engineering may select a program with an aerospace emphasis. Aerospace Engineering is concerned with the mechanics of atmospheric and space flight. Included within its scope are studies in aerodynamics, aircraft flight dynamics, spacecraft orbital motion, spacecraft attitude motion and control, aircraft and spacecraft propulsion systems, space systems design, and the space environment. Aerospace Engineering graduates are prepared to pursue careers in aircraft and/or spacecraft design and development, rocket and turbine propulsion systems, aircraft flight testing, and space trajectory design/analysis.

The Mechanical Engineering curriculum and the Manufacturing Engineering curriculum are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC/ABET).

### *Admission and Graduation Requirements*

The student who is majoring in or planning to major in mechanical engineering needs to be aware of the College of Engineering requirements concerning admission to the college in preprofessional engineering, admission to the professional engineering program, general education, and the other academic requirements. Additional information concerning these items is given in the College of Engineering write-up on pages 40-41. It is the responsibility of the student to be aware of these rules and regulations.

**Placement of New Students.** Freshman and transfer students must satisfy admission policies and entrance requirements of both the University and the College of Engineering. The new student will be assigned an adviser who will help plan the educational program to fulfill the student's professional goals.

Placement of the incoming student will depend upon high school or prior college course work. Those who complete a portion of the General Education requirements by examination (CLEP) and/or by advanced placement (AP) credit may complete the requirements for a Bachelor of Science degree in less than four years.

**Curriculum.** All students in the department follow the preprofessional engineering curriculum for the freshman and sophomore years. Prior to the junior year, the student will apply for admission to the professional program and, in consultation with the faculty adviser, select one of the two programs presented below. A recommended four-year quarterly curriculum schedule may be obtained from the departmental office. Students who are unable to take courses in the quarter indicated on the requirement sheet should check with an adviser for possible alternatives.

A passing grade on the Fundamentals of Engineering Exam, the first step in becoming a licensed professional engineer, is required for graduation. Past experience has shown that the USU mechanical engineering students are well-prepared and have little difficulty in passing this locally administered, national exam.

For additional information on academic requirements, see the College of Engineering and the Undergraduate and Graduation Requirements sections of this catalog.

### *Preprofessional Program*

The following courses are required for the freshman and sophomore years: Engr 103, 200, 202, 203, 204; Chem 121, 122, 124; Econ 200<sup>2,4</sup>; EE 211, 251, 252<sup>3</sup>; Engl 101, 201; Math 220, 221, 222, 320, 321, 322; ME 170, 187, 211, 276; Phyx 221, 222, 223; and 8 credits of General Education<sup>1</sup>.

### *Professional Program in Mechanical Engineering<sup>6</sup>*

Students should take the following courses during the junior and senior years: Engr 330; CEE 305; EE 308; Math 341; ME 331, 334,

335, 354, 355, 375, 415, 470, 471, 472, 487, 488, 489, 502, 504, 524, 525, 571; and 12 credits of General Education<sup>1</sup>.

Students must also take 18 credits of technical electives, chosen from: Group I—ME 501, 503, 508; Group II—ME 475, 520, 521<sup>5</sup>, 523, 576, 595; Group III—EE 252, 352, 358, ME 416, 509, 513, 522, 530, 540, 554, 555, 560, 575, 590. A minimum of five of these courses is required, and must include at least one course from Group I and at least two courses from Group II.

### Professional Program in Manufacturing Engineering<sup>6</sup>

The following courses should be taken during the junior and senior years: Engr 330; Math 341; CEE 305; Econ 200<sup>4</sup>, 201; EE 308, 352; ME 310, 334, 354, 355, 415, 471, 472, 487, 488, 489, 502, 513, 521, 523, 524, 525, 527, 571, 576; and 7 credits of General Education<sup>1</sup>.

Students must also take 6 credits of technical electives, chosen from: Group I—ME 501, 503, 504, 508; Group II—ME 416, 475, 520, 590, EE 358, and BA 370. A minimum of two courses is required, and a minimum of one course is required from Group I.

### Financial Support

In addition to the scholarships, assistantships, grants-in-aid, and work study programs available through the University, the department employs students to assist in engineering research and development. Energy conservation and utilization, bioengineering, buried structures, design of instrumentation and payloads for the upper atmosphere and space, and manufacturing processes and control are some of the research programs that involve students. The department also coordinates cooperative education and industrial employment opportunities for students.

### Graduate Study

The department offers three graduate degrees: Master of Science, Master of Engineering, and Doctor of Philosophy. The department has major research programs in energy conversion and utilization, applied mechanics, space systems engineering, buried structures, and manufacturing processes and control. For further information see the graduate catalog.

<sup>1</sup>See College of Engineering—General Education on pages 25 and 41.

<sup>2</sup>For mechanical students.

<sup>3</sup>For manufacturing students.

<sup>4</sup>Satisfies Americanization requirement as well as 5 credits of General Education.

<sup>5</sup>Requires EE 252.

<sup>6</sup>Elective courses, once selected and undertaken by a student, become part of the required program for that student.

### Mechanical Engineering Courses

**170. Engineering Graphics.** Technical drawing, descriptive geometry, and computer graphics. Computer graphics used to teach engineering drafting, dimensioning and tolerancing, and geometric design. One lecture, two labs. (3F,W,Sp)

**187. Freshman Seminar.** Orientation to the profession of mechanical engineering. Develops competence in the operation of different software packages. (1F,W)

**211. Manufacturing Operations—Fundamentals.** Theory and practice of machining operations. Machine tool requirements, operational procedures, product design implications, quality and precision. Three lectures and two labs. (5F,Sp)

**IO 216. Energy.** A study of energy resources, utilization, conversion, and conservation. Social impacts of energy resource development including public policy and planning. (3)

**276. Computer-assisted Design.** Fundamentals of computer-assisted engineering design and computerized engineering graphics; includes design project. Prerequisites: ME 170; Engr 103, 204; and Math 221. (3F,Sp)

**310. Manufacturing Processes.** Identification, selection, limitations, and application of processes used in industrial production. Material properties as related to processing and product design are considered. (3Sp)

**331. Thermodynamics.** Energy and entropy concepts, irreversibility, availability concepts, ideal mixtures, psychrometrics, general property relations. Prerequisites: Engr 330, ME 276. (3W)

**334. Heat Transfer.** Analytical, numerical, and experimental studies of how energy is transferred by conduction, convection, and radiation. Prerequisites: Engr 330, ME 354, CEE 350 (or concurrent). (3W)

**335. Heat and Mass Transfer.** Analytic, numerical, and experimental studies of how energy is transferred by conduction, convection, and radiation. Prerequisite: ME 334. (3Sp)

**354. Fluid Transport Theory I.** Application of fluid transport theory to inviscid and viscous, incompressible and compressible, external and internal fluid flows, with an emphasis on laminar and turbulent boundary layers. Prerequisite: ME 276 (concurrent). (3F)

**355. Fluid Transport Theory II.** Continuation of ME 354. Prerequisite: ME 354. (3W)

**375. Thermal Systems Design.** Cycles, components, design projects, and combustion. Prerequisites: ME 331 and 335 (or concurrent). (4Sp)

**415. Material Science.** Engineering properties of metals, alloys, ceramics, plastics, and composite materials. Emphasis given to material selection for proper engineering design. Three lectures, one lab. Prerequisites: Phyx 223, Chem 122. (4W)

**416. Material Science.** Solid state physics related to engineering properties of metals, alloys, ceramics, plastics, and composites. Prerequisite: ME 415. (3Sp)

**420. Computer-aided Design and Manufacturing.** CAD/CAM for transfer students and new graduate students with no previous CAD/CAM training. Engineering graphics, finite element modeling, numerical control manufacturing, interface programming. (3)

**470. Thermal Environmental Design.** Air conditioning and heating, solar utilization, thermal environmental control, laboratory exercises, design project. Prerequisites: ME 331 and 335 (concurrent). (3Sp)

**471. Kinematic Design.** Computer-aided engineering design of mechanisms; linkages; cams; gears; gear trains; synthesis of mechanisms. Prerequisites: Engr 203, ME 276. (3Sp)

**472. Design of Machine Elements.** The design and synthesis of machines and mechanisms, mechanical linkages, fasteners, power transmission, gears, bearings, and lubrication. Three lectures, one lab. Prerequisites: CEE 305, ME 471. (4F)

**475. Optimal Systems Design.** Modeling, simulation, optimization techniques, design project. Prerequisites: ME 276 and 335 (concurrent). (3Sp)

**487. Design Project.** Students plan and complete initial stages of the design project(s) which will be completed fall quarter in ME 488. One lab. Prerequisites: CEE 305, 350; EE 308 (or concurrent); ME 335, 415, and 471. (2Sp)

**488. Design Project.** Completion of design project(s). Students must take ME 488 the fall quarter following completion of ME 487. Two labs. Prerequisites: Engr 305; ME 487, 472 (or concurrent). (4F)

**489. Design Project.** Students present their design project(s) and evaluate and critique designs of other students. Prerequisite: ME 488 or permission of instructor. (1W)

**493. Special Problems.** Formulation and solution of practical or theoretical problems. Prerequisite: permission of head of department. (3)@

**497. Honors Studies.** Student-initiated projects under faculty supervision. Prerequisites: satisfactory grade point, instructor recommendation, and approval of the College of Engineering Honors Committee. (1-3)@

**501 (d601).<sup>7</sup> Finite Element Methods in Solid Mechanics.** Introduction to finite element methods and their application to the analysis and design of mechanical engineering systems. Three lectures. Prerequisite: ME 504. (3W)

**502. Mechanical Vibrations.** Free, damped, and forced linear vibrations of discrete systems. Prerequisites: Engr 203, Math 341. (3W)

**503 (d673). Particle Dynamics and Orbital Motion.** Emphasis on advanced particle dynamics; dynamics of a system of particles; linear impulse and momentum; conservation of mechanical energy; collisions; Lagrange's Method; and orbital mechanics. Prerequisites: Engr 203, Math 341. (3F)

**504 (d674). Mechanics of Solids.** Development of theories of failure and stress-strain relationships as they apply to thick-walled cylinders, discs, curved beams, unsymmetrically and eccentrically loaded members, etc. Prerequisites: Math 322, 341, CEE 305. (3F)

**508 (d608). Mechanics of Composite Materials.** Stress-strain relations for non-isotropic composites, such as fiber-reinforced plastic laminates, properties and their use, strength and life determination, and methods for design using composite materials. Prerequisite: ME 504. (3Sp)

**509 (d609). Spacecraft Attitude Dynamics.** Focus will include dynamics of a system of particles; angular momentum and moments; rigid body motion; gyroscopic instruments; spacecraft attitude motion; and spacecraft attitude control. Prerequisites: Math 341, ME 503 and 524. Permission of instructor required for undergraduate students. (3W)

**513. Principles of Numerical Control.** Product design analysis for N/C application. Selection, justification, application, and implementation of N/C equipment. Operational planning, manual, and computer-aided programming for N/C. Two lectures, one lab. Prerequisites: ME 211, 276. (3Sp)

**518 (d618). Composite Structures.** Behavior of composite structures including: Structural applications, manufacturing methods, joining and fastening, macro mechanical behavior, and analysis using computer techniques. Prerequisite: CEE 305. (3W)

**520. Computer-aided Design.** Use and development of advanced computer aided design software for applications such as drafting, solid modeling, and finite element mesh generation. Prerequisite: ME 276. (3W)

**521. Computer-aided Manufacturing.** Computer fundamentals, interface electronics, and microprocessor utilization pertaining to manufacturing engineering. Prerequisites: ME 211 and EE 352. (3W)

**522 (d622). Integrated Manufacturing Systems.** Computer applications in the integration of computer-aided design, computer-aided manufacturing, and manufacturing resource planning. The nonprocess control aspects of CAM will be emphasized. Prerequisites: ME 513 (concurrent), 520, 521. (3F)

**523. Robotics.** Overview of robotics as a manufacturing technology, applications, geometrics and kinematics of five and six axis robots, tooling and assembly operations, programming and control. Prerequisite: ME 471. (3W)

**524. Automation Systems.** Introduction to classical feedback control systems with emphasis on design fundamentals using  $t$ ,  $s$ , and  $w$  domain concepts to determine stability and dynamic response of electromechanical, hydraulic, and pneumatic systems. Prerequisites: Math 341, EE 308, Engr 203. (3F)

**525. Hydraulics and Pneumatics.** Fluid power and controls as applied to machine tools. Two lectures, one lab. Prerequisite: CEE 350. (3Sp)

**527. Quality Control.** Quality control techniques and systems for industry. Prerequisite: ME 211. (3Sp)

**529. Plant Layout Techniques.** Organization and planning techniques for plant layout and material handling studies. (3)

**530 (d630). Thermodynamics.** Applications include statistical thermodynamics, distribution functions, free molecular flow, electron and photon gas modeling, properties of solids, and chemical equilibrium. Prerequisite: ME 331 or instructor's consent. (3Sp)

**540 (d640). Aerodynamics.** Dynamics of an incompressible, inviscid flow field; characteristic airfoil parameters; incompressible flow around two-dimensional airfoils and finite wings; supersonic aerodynamics. Prerequisite: ME 554. (3Sp)

**\*\*545 (d645). Direct Energy Conversion.** Intrinsic and extrinsic semiconductors; thermoelectric, photovoltaic, and thermionic generators; magnetohydrodynamic power generation; fuel cells. Prerequisites: senior engineering status and consent of instructor. (3)

**546. Solar Energy Systems.** Design and analysis of solar systems for collection, storage, heating, and refrigeration. Prerequisites: Engr 330, ME 276. (3)

**547. Internal Combustion Engines.** Thermodynamics of internal combustion engines; idealized cycles, fuels, fuel metering, engine characteristics, pressure measurement, and engine testing. Prerequisite: ME 331. (3Sp)

**554. Gas Dynamics.** Application of conservation of mass, momentum, and energy to the design and analysis of compressible fluid systems. Prerequisites: ME 331, CEE 350. (3W)

**555 (d655). Propulsion Systems.** Aerothermodynamics of gas turbine and rocket propulsion. Prerequisites: Math 341, ME 331, 335, 554, and computer programming. (3)

**560 (d660). Nuclear Engineering.** Engineering principles of nuclear reactor systems. (3)

**571. Instrumentation and Experimentation.** Principles and applications of mechanical instrumentation and experimentation. Sensing elements, signal conditioning, read-out devices, data reliability, and instrumentation system design. Two lectures and one lab. Prerequisites: CEE 305; ME 335, 502 (or concurrent). (3W)

**575 (d675). Dynamic System Modeling.** Introduces modeling of dynamic systems for on-line control of processes using autoregressive and autoregressive moving average models. Prerequisite: ME 524. (3Sp)

**576. Production Tool Design.** Design of special tooling, jigs, and fixtures for economical production. Emphasis placed on predesign analysis, cutting force analysis, locating, positioning, and clamping requirements. Two lectures, one lab. Prerequisites: ME 211 and 276, CEE 305. (3)

**577. Production Die Design.** Design and analysis of special tooling, dies for products fabricated by press working methods. Emphasis placed on cutting, bending, drawing, forging, and extruding dies. Two lectures, one lab. Prerequisites: ME 211 and 276, CEE 305. (3)

**590. Cooperative Practice.** A planned work experience in industry. Detailed program must have prior approval. Written report required. (3-9)@

**595. Space Systems Design.** Students will focus multidisciplinary efforts on design of a major space system. Variable credit for one, two, or three credits, depending upon magnitude of the design. Prerequisite: junior level and instructor's permission. (1-3F,W,Sp)

### Graduate<sup>3</sup>

**601 (d501). Finite Element Methods in Solid Mechanics.** (3)

**602. Mechanical Vibrations.** (3)

**603. Finite Element Methods in Fluid Mechanics.** (3)

**604. Continuum Mechanics.** (3)

**605. Elastic Theory.** (3)

**606. Plasticity Theory.** (3)

**608 (d508). Mechanics of Composite Materials.** (3)

**609 (d509). Spacecraft Attitude Dynamics.** (3)

**610. Manufacturing Processes.** (3)

**611. Metal Machining.** (3)

**614. Material Science.** (3)

**617 (f517). Ceramics and Plastic Materials.** Prerequisite: ME 415. (3)

**618 (d518). Composite Structures.** (3)

**621. Manufacturing Simulation and Optimization.** (3)

**622 (d522). Integrated Manufacturing Systems.** (3)

**623. Robotics.** Prerequisite: ME 523. (3)

**630 (d530), 631. Thermodynamics.** (3) (3)

**635. Transport Phenomena.** (3)

**636. Convective Heat and Mass Transfer.** Prerequisite: ME 335. (3)

**637. Conductive Heat Transfer.** Prerequisite: ME 335. (3)

**638. Radiation Heat Transfer.** Prerequisite: ME 335. (3)

- 640 (d540). Aerodynamics. (3Sp)
- \*\*645 (d545). Direct Energy Conversion. (3)
- 646. Solar Energy Systems. (3)
- 654. Gas Dynamics. (3)
- 655 (d555). Propulsion Systems. (3)
- 660 (d560). Nuclear Engineering. (3)
- 673 (d503). Particle Dynamics and Orbital Motion. (3)
- 674 (d504). Mechanics of Solids. (3)
- 675 (d575). Dynamic System Modeling. (3Sp)
- 680. Seminar. (1)®
- 693. Special Problems. (1-3)®
- 695. Design Project. (3)
- 697. Thesis Research. (1-9)®
- 699. Continuing Graduate Advisement. (1-12F,W,Sp,Su)®
- 702. Mechanical Vibrations. (3)

- 705. Elastic Theory. (3)
- 735. Transport Phenomena. (3)
- 736. Convective Transport. (3)
- 737. Conduction Heat Transfer. (3)
- 738. Radiative Transport. (3)
- 746. Solar Energy Conversion. (3)
- 793. Special Problems. (1-3)®
- 797. Dissertation Research. (1-12)®
- 799. Continuing Graduate Advisement. (1-12F,W,Sp,Su)®

<sup>†</sup> Parenthetical numbers preceded by *d* indicate a *dual* listing; parenthetical numbers preceded by an *f* are the *former* course numbers.

<sup>\*</sup> Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

<sup>\*</sup> Taught 1990-91.

<sup>\*\*</sup> Taught 1991-92.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

## Department of *Military Science* College of Humanities, Arts and Social Sciences

**Head:** Professor LTC Gary L. Tucker  
Office in Military Science 104

**Assistant Professors** MAJ Dan R. Christensen, CPT Walter S. O'Reilly, CPT Timon M. Oujiri, CPT Horace N. Stogner, Jr.

### Objectives

The departmental objective is to commission the future officer leaders of the United States Army, Army Reserve, and Army National Guard concurrently while they obtain baccalaureate degrees.

### Requirements

#### 1. Admission

a. Courses offered by the department are open to all students and do not generally carry prerequisites; students are encouraged to meet with the specific instructor prior to enrollment.

b. Students desiring to officially enroll in the ROTC program (leading to a commission as an Army officer) must meet eligibility requirements specified by Army regulations; interested students should inquire at the Administrative Office, Military Science 104.

#### 2. Leadership Workshop

a. Those students officially enrolled in the ROTC program must participate in the leadership workshop program concurrently with the academic course sequence.

b. A quarterly lab fee of \$10 is required of all students enrolled in the basic program. The quarterly lab fee for cadets in the advanced program is \$10.

**3. Commission Requirements.** To be commissioned in the U.S. Army, a student must:

- a. Qualify for entrance into the advanced program.
- b. Complete the University requirements for at least a baccalaureate degree.
- c. Complete the required on-campus Military Science courses (MS 301, 302, 303, 308, 314, 315, 316, 401, 402, 403, 414, 415, 416).
- d. Successfully complete a **six-week** ROTC Advanced Camp.
- e. Meet current commissioning standards (i.e., physical, medical, academic, etc.).
- f. Successfully complete courses in the following academic subject areas: written communication skills, human behavior skills, military history, Math, and/or Computer Science.

### Special Programs

**1. Two-year Program.** Those students who are unable to fulfill the requirements of the traditional four-year program may be accepted into the third year of military science upon completion of a special six-week basic ROTC summer camp.

**2. Advanced Placement.** Students with prior military service or ROTC training (junior or senior) may be awarded advanced placement at the discretion of the department head.



**3. Compressed Military Science Basic Course.** The two-year basic course may be compressed at the discretion of the student and professor of military science. The minimum requirement for basic course is completion of 90 contact hours with the Military Science Department. Students must have two years remaining at the University to complete the military science advanced course.

**4. Financial Aids.** Army ROTC cadets will receive \$100 per month allowance during their last two years of ROTC. Cadets are also paid approximately \$700 and are provided free room, board, and an airplane ticket to and from advanced camp.

**5. Army ROTC Scholarships.** Full scholarships are available to enrolled cadets through a competitive process stressing academic achievement and motivation for a career in the service. Scholarships pay full tuition, an allocation for books and academic fees, plus up to \$1,000 per school year while the cadet is completing the ROTC program. USU also offers free dormitory rooms to scholarship students.

**6. Delay of Entry on Active Duty.** Graduates of the ROTC program need not enter the service immediately upon being commissioned. Graduates may enter the Army between graduation day and 1 June following graduation and commissioning, depending on the individual's preference and the needs of the service. Those who have been accepted for graduate study may delay their active service pending the completion of advanced degrees.

**7. Duty with Reserve Components.** Graduates of the Army ROTC program may request duty with the Army Reserve or Army National Guard. These requests will be accepted based on the needs of the active Army and the Reserve/National Guard. This option allows the graduate to continue his or her civilian career while serving as a citizen soldier.

**8. Simultaneous Membership Program (SMP).** Students may elect to simultaneously enroll in the Army ROTC and the National Guard or Army Reserve. This will allow the student to maximize the financial benefits, receive a commission prior to completion of degree requirements, and receive leadership experience and benefits of service in the Reserves or National Guard.

**9. Academic Minor in Military Science.** The Military Science Department will offer a minor based on completion of the commissioning requirements listed above. This minor must be coordinated through the student's major college.

### ***Extracurricular Activities***

The following activities are supported by the Military Science Department with a view toward enrichment of the ROTC program:

**1. Rangers.** An organization open to any USU student who has a special interest in field operations. Activities include survival training, mountain climbing, cross-country skiing, and extensive tactical and physical training beyond the scope of the regular ROTC program.

**2. Honor Guard.** An element within the ROTC cadet organization which provides color guards and other forms of official representation of a ceremonial nature for the Military Science Department. Membership is attained through a competitive process stressing appearance, military bearing, marching ability, and willingness to devote time and effort to the unit.

**3. ROTC Rifle/Pistol Team.** The Military Science Department provides instruction in rifle marksmanship and sponsors the ROTC rifle/pistol team. Enrollment is open to any regularly enrolled student, whether or not the student is an ROTC cadet. Once enrolled, any student can be a member of the rifle/pistol team. Activities include postal and invitational match competition.

### ***Military Science Courses***

**101. Introduction to Military Science and Leadership.** History of the Army and ROTC with emphasis on contemporary military skills and leadership principles. (2F,W,Sp,Su)

**110. Rifle Marksmanship.** Instruction and practical application of rifle marksmanship using small bore rifles, range, and rules as a medium. Lab fee: \$10. (1F,W,Sp)®

**111, 112, 113. Rangers.** Instruction and training includes intense physical conditioning, military skills proficiency, tactical field exercises under all weather conditions, and classroom instruction/practical exercise in the conduct of Ranger Tactical Operations. (1-5F) (1-5W) (1-5Sp)

**114. Leadership Workshop.** Practical training in skills useful in military and civilian environment. Emphasis is on outdoor training and related skills. (1F,W,Sp)

**115. Map Reading/Orienteering.** Orienteering is a timed cross country race. Includes use of topographic maps and compass. Opportunity is provided for participation in at least one local meet. (2)®

**201. Fundamentals of Leadership and Management.** Introduction and application of the fundamentals of leadership and the concepts of management. (2F,W,Sp)

**205. Basic Seminar Problems.** A readings and conference approach to world military history. (1-3F,W,Sp,Su)

**206. Basic ROTC Summer Camp.** Training in military skills, leadership experience, physical fitness, and introduction to the U.S. Army. Six weeks of training conducted at an Active Army Post. Completion qualifies the student to enter the Advanced ROTC Program. (6Su)

**210. Advanced Rifle Marksmanship.** A course in advanced techniques and theories of rifle marksmanship and their implementation. Prerequisite: MS 110. Lab fee: \$10. (1F,W,Sp)®

**211, 212, 213. Rangers.** Instruction and training includes intense physical conditioning, military skills proficiency, tactical field exercises under all weather conditions, and classroom instruction/practical exercise in the conduct of Ranger Tactical Operations. (1-5F) (1-5W) (1-5Sp)

**214. Leadership Workshop.** Practical training in skills useful in military and civilian environment. Emphasis is on outdoor training and related skills. (1F,W,Sp)

**301. Fundamentals of Land Navigation and Squad Tactics.** Instruction on reading topographic maps, land navigation, and an introduction to the military use of terrain. (2F)

**302. Principles of Military Operations I.** Includes squad and platoon tactics, operations orders, and patrolling techniques. (3W)

**303. Principles of Military Operations II.** Includes advanced platoon tactics, patrolling, and FM communications. (2Sp)

**305. Advanced ROTC Summer Camp.** Six weeks of advanced training and experience in military skills, leadership and management, physical fitness, and Army job opportunities. Training is conducted at an Active Army Post. (10Su)

**306, 307. Physical Conditioning.** Individualized conditioning program designed to prepare a person to meet or exceed the Army Conditioning Standards and prepare the student for MS 308. (2F,Su) (2W)®

**308. Physical Readiness Training.** Army Physical Readiness Training System including testing, evaluation, planning, leadership, and physical conditioning. Mandatory prior to attendance at Advanced Camp. (2Sp)®

**311, 312, 313. Rangers.** Instruction and training includes intense physical conditioning, military skills proficiency, tactical field exercises under all weather conditions, and classroom instruction/practical exercise in the conduct of Ranger Tactical Operations. (1-5F) (1-5W) (1-5Sp)

**314, 315, 316. Leadership Workshop.** Practical training in advanced military skills taught in a field environment. (1F) (1W) (1Sp)

**401. Leadership and Management.** Functional theories of leadership with realistic practical exercise in counseling, management, and leadership problem solving. (2F)

**402. Armed Forces and Society: Professional Issues.** Military sociology, professionalism and ethics, military manpower and personnel policies, and current politico-military issues. (2W)

**403. Military Law and Service Orientation.** Introduction to military law, personnel management system, and practical orientation to service life. (2Sp)

**405. Advanced Military Science Seminar Problems.** (1-3F,W,Sp,Su)

**411, 412, 413. Rangers.** Instruction and training includes intense physical conditioning, military skills proficiency, tactical field exercises under all weather conditions, and classroom instruction/practical exercise in the conduct of Ranger Tactical Operations. (1-5F) (1-5W) (1-5Sp)

**414, 415, 416. Leadership Workshop.** Practical application in leadership management skills and methods of instruction. (1F) (1W) (1Sp)

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

## Department of *Music\**

### *College of Humanities, Arts and Social Sciences*

**Head: Professor** F. Dean Madsen  
Office in Fine Arts Center 107

**Professors** Gary Amano, Warren L. Burton, Glen A. Fifield, Willard R. Kesling, Larry G. Smith, Alvin Wardle; **Professors Emeritus** Max F. Dalby, Irving Wassermann; **Associate Professors** Michael L. Ballam, Michael K. Christiansen, James M. Drake, Mark A. Emile, Dennis D. Griffin; **Associate Professor Emeritus** Mildred Johnson; **Assistant Professors** Betty Beecher, James McWhorter, Bruce M. Saperston; **Instructor** Edward McCallson; **Applied Music Staff** Betty Hammond, Chiyo Honma, J'Lene Mendenhall, Bonnie Slade, Pat Swasey, Leslie Timmons, Laura Zisette

**Degrees offered:** Bachelor of Arts (BA) in Music; Bachelor of Music (BM) in Music Education, Performance, and Piano Pedagogy; BS and BA in Music Therapy; Master of Education (MEd) in Secondary Education with emphasis in Music

### *Objectives*

The Department of Music provides instruction in music by: (1) offering service courses which contribute to the Liberal Arts and Sciences Program of the Colleges of HASS and Science, and to the General Education program of the University; (2) offering specific sequences of courses leading to professional preparation in music education, music therapy, and performance/pedagogy; and (3) providing public musical service to the University and community.

The specific objectives of the programs in music for the music major are fourfold: (1) to prepare certified music teachers to serve effectively in elementary and secondary schools; (2) to prepare musically talented students for careers as professional performers and/or studio teachers; (3) to prepare registered music therapists to serve in educational and therapeutic settings; (4) to prepare music students for graduate study in their area of specialization.

### *Requirements*

#### **Departmental Requirements**

**Departmental Admission Requirements.** Admission requirements for the Department of Music are the same as those described

for the University on pages 8-11. Students in good standing may apply for admission to the department.

**Recital and Concert Attendance.** Recital and concert attendance is required and will be monitored. To keep track of attendance, students are asked to sign the program of the recital or concert being attended, and to hand the program to a faculty member after the performance. These records will become part of the student's official file.

To graduate, students are required to attend a minimum of nine recitals and nine concerts each school year.

**Musicianship Proficiency.** Every music major is required to pass all sections of the Musicianship Proficiency Examination, which is taken spring quarter of the sophomore year when the student is enrolled in Music 303, Music History and Form III. Transfer students entering at the junior or senior level take the examination during the first two weeks of fall quarter.

The examination consists of the following parts:

**Traditional Harmony.** Part writing, harmonic analysis.

**Skills.** Sight singing, dictation.

**Musical Form.** Sectional analysis, polyphonic analysis, musical terms.

#### **Music History**

**Individual Performance Requirement and Jury Exams.** Every music major is expected to take individual voice or instrumental instruction each quarter and to practice individually on a regular basis. To measure progress in individual performance, jury examinations are held quarterly.

**Recital Participation.** Each music education, performance, and pedagogy major is encouraged to appear in a department-sponsored student recital at least once each quarter and is **required** to perform in at least seven recitals before graduation. The adviser determines whether the student fills the requirement as a soloist, a member of a small ensemble, or as an accompanist.

**Senior Recitals.** All students majoring in performance will present a full-length senior recital while in the last two quarters of residence at the University. This recital will be made up of representative works of various periods and styles. Students majoring in music education and/or pedagogy are also required to participate in a formal senior recital, but such recitals may be shared by two or three music majors with the permission of the adviser.

\*USU's Music Department is accredited by the National Association of Schools of Music.

**Piano Proficiency Requirements.** Music majors must meet a minimum standard of piano proficiency before graduation. The specific requirements are detailed in the Music Department manual.

### Bachelor of Music

Bachelor of Music students may choose an emphasis in **Music Education** (students in this program must also be approved by the Department of Secondary Education), **Performance**, **Piano with Pedagogy Emphasis**, or the **Individualized Program**. The Music Education and Performance programs require selection of a major performing medium, such as piano, organ, a string instrument, voice, guitar, a woodwind or brass instrument, or percussion. Major requirement sheets listing specific courses of study for each area of emphasis are available through the Music Department office, Fine Arts 107.

### Bachelor of Arts Degree in Music

A Bachelor of Arts degree requires two years' training or equivalent in a foreign language approved by the Language Department or one year or equivalent in each of two foreign languages approved by the Language Department. Other requirements include 12 credits of English, 46 credits of General Education, 18 credits of University electives, 42 credits of Liberal Arts electives, 48 credits of musician-ship classes, and 22 credits of musical performance. A list of specific courses required and/or recommended may be obtained from the Music Department office, Fine Arts 107.

### Bachelors Degree in Music Therapy

The Department of Music offers a program of study leading to the Bachelor of Science degree in Music Therapy. Students who successfully complete four years of course work and a six-month internship (generally out-of-town) will have met all requirements for certification by the National Association for Music Therapy (NAMT) as a registered music therapist (RMT). The primary goal of the program is to prepare men and women in skills using music to serve in the education and therapy of the handicapped. Competencies of the music therapist are generally acquired through academic study in music; music education; the biological, behavioral, and social sciences; and special education. Specific courses of study for the music therapy major may be obtained through the Music Department office, Fine Arts 107.

### Two-year Certificate and Diploma Programs

The Music Department offers two programs leading to Certificates of Completion: (1) the Two-year Diploma Program in the areas of piano, organ, church music, or guitar, and (2) Music Certificate in pedagogy of piano, organ, or guitar.

Both of these certificate programs are intended as verification of performance or teaching competence for individuals who intend to teach or perform but do not desire the baccalaureate degree. These programs focus on a practical music education with minimal or no involvement with general university studies.

### Music Minor

The music minor programs place a strong emphasis on performance and allow for increased appeal to nonmusic majors with a broad selection of course work. Students may choose from three minor areas: the Music Minor, the Elementary School Teaching Minor, and the Secondary School Teaching Minor. Interested students should consult with the department regarding requirements for these minors.

## Graduate Study

See the graduate catalog or the Department of Music information manual.

## Music Courses

**HU 101. Enjoying Music.** A nontechnical course planned to develop understanding and enjoyment of music through hearing and studying selected compositions in all musical forms. (3F,W,Sp,Su)©

**HU 102. Fundamentals of Music.** Scales, intervals, keys, rhythms, meters, and terminology for visual and aural perception. Designed primarily for nonmusic majors and elementary school teachers. (3F,W,Sp,Su)©

**103. Orientation to Music as a Profession.** Required of all freshman music education majors. (1-3F)

**104. Traditional Harmony I.** Fundamentals of music, traditional harmony, and four-part harmonizations in vocal style. (2F)

**105. Traditional Harmony II.** Traditional harmony and four-part harmonizations in vocal style continued. Prerequisite: Music 104. (2W)

**106. Traditional Harmony III.** Traditional harmony and four-part harmonizations in vocal style continued. Prerequisite: Music 105. (2Sp)

**107. Music Skills I.** Sight-singing; rhythmic, melodic, and harmonic dictation; keyboard harmony; computer-assisted instruction. (1F)

**108. Music Skills II.** Sight-singing; rhythmic, melodic, and harmonic dictation; keyboard harmony; computer-assisted instruction continued. Prerequisite: Music 107. (1W)

**109. Music Skills III.** Sight-singing; rhythmic, melodic, and harmonic dictation; keyboard harmony; computer-assisted instruction continued. Prerequisite: Music 108. (1Sp)

**110. Introduction to Music Therapy.** Orientation to the field of music therapy through lectures, readings, and field trips to clinical centers. (2F)

**135. Musical Theatre Workshop.** Directing and performance techniques and problems unique to musical theatre. Structured for the singing actor and school musical theatre director. (2F)

**167. Group Guitar Instruction.** Fundamentals of guitar; basic chords, notes, and accompaniments to popular songs; both strumming and finger picking styles. Beginning and intermediate classes. (1F,W,Sp)©

**174, 175, 176. Piano Literature.** Designed to acquaint pianists with the standard keyboard literature from the 14th century to the present day. (2F) (2W) (2Sp)

**177, 178, 179. Piano Literature.** A sequential listening course to present piano music. Covers baroque and rococo, classicism and early romanticism, late romanticism, twentieth century, and American music. (2F) (2W) (2Sp)

**180. Group Piano.** For music majors, music minors, and elementary education majors. Open to a limited number of other students. (1F,W,Sp)©

**181. Group Voice.** To acquaint the nonvocal major with the vocal instrument—its mechanism, terminology, and techniques. (1F,W,Sp)©

**182. Group Woodwinds.** a. Flute (1F); b. Clarinet (1W); c. Saxophone (1Sp); d. Double Reeds (1Sp). For music majors. Designed to give prospective music teachers a basic playing experience and theoretical understanding of the woodwind instruments. (1F) (1W) (1Sp)©

**183. Group Brass.** a. Cornet (1F); b. Trombone (1W); c. Baritone/Bass (1W); d. Horn (1Sp). For music majors. Designed to give prospective music teachers a basic playing experience and theoretical understanding of the basic brass instruments. (1F) (1W) (1Sp)©

**184. Group Strings.** a. Beginning (1F); b. Intermediate (prerequisite) (1W); c. Advanced (prerequisite) (1Sp). For music majors. Designed to give prospective music teachers a basic playing experience and theoretical understanding of the string instruments. (1F) (1W) (1Sp)©

**185. Group Percussion.** For music majors. Designed to give prospective music teachers a basic playing experience and theoretical understanding of the percussion instruments. (1F)©

**186. Group Organ.** For beginning organ students; manual and pedal techniques, registration, hymn playing, transposition, easy preludes and postludes. Provides them firm foundation for continued organ study. (1F,W,Sp)®

**187, 188, 189. Organ Literature.** Course designed to acquaint the student with the history, development, and literature of the organ. (2F) (2W) (2Sp)

**HU 201. Masterpieces of Music.** Designed to foster in-depth understanding and familiarity through concentrated listening and analysis of nine selected masterworks. (3F,W,Sp)

**205. Guitar Styles (Blues/Early Rock).** Students will be taught how to play blues and early rock music stylistically correct. Music which has become "standard" repertoire in these styles will be presented and analyzed. (2F)

**206. Guitar Styles (Bluegrass/Country/Ragtime).** Students will be taught to play bluegrass and country music stylistically correct. Music which has become "standard" to the repertoire of these styles will be presented and analyzed. (2W)

**207. Guitar Styles (Jazz/Classical).** Students will be taught to play jazz and classical music stylistically correct. Music which has become "standard" repertoire in these styles will be presented and analyzed. (2Sp)

**210. Observation and Orientation in Music Therapy.** Students will learn systematic observation and recording methods used in music therapy practice. (1Sp)

**222. Synthesizer Fundamentals.** Students will acquire basic knowledge of the operation of an electronic music synthesizer and compositional techniques using the tape recorder. (3F,Sp)

**230. Fingerboard Theory I (Music Theory for Guitar).** Music theory course in which the students will use the guitar as a tool for learning theoretical concepts of music. (2F)

**231. Fingerboard Theory II (Music Theory for Guitar).** Follow-up to Fingerboard Theory I. Material will include more concepts of music theory and how they can be seen and played on the guitar. (2W)

**232. Fingerboard Theory III.** Students will be taught how to arrange and compose music for the guitar using more advanced principles of music theory. (2Sp)

**HU 240. Music Awareness and Response.** A participatory music class, not requiring previous musical training, performance skills, or theoretical knowledge. Will help students become more aware, perceptive, and responsive to the aesthetic qualities of music. (2W)

**HU 300. History of Jazz and Popular Music.** A course designed to give students an understanding of the development of jazz, popular music, and contemporary idioms, and their contributions to music and culture. (3Sp)

**301. Music History and Form I.** History and literature of music of the Baroque Period, and appropriate musical forms and analysis. (3F)

**302. Music History and Form II.** History and literature of music of the Classic Period, and appropriate musical forms and analysis continued. Prerequisite: Music 301. (3W)

**303. Music History and Form III.** History and literature of music of the Romantic Period, and appropriate musical forms and analysis continued. Prerequisite: Music 302. (3Sp)

**304. Twentieth Century Music I.** Impressionist harmonies and composition techniques; Twentieth century tonal harmony; analysis of twentieth century tonal masterworks; twentieth century music history. (3F)

**305. Twentieth Century Music II.** Twentieth century atonal and serial techniques; electronic music, "chance" music; analysis of atonal, serial, and electronic masterworks; Avant-Garde and past Avant-Garde music; twentieth century history continued. (3W)

**306. Early and Renaissance Music.** Early, Medieval, and Renaissance history, literature, and musical techniques. (3)

**308. Guitar History and Literature.** Includes a study of the development of the guitar from its early ancestors to the present. Compositions and composers for guitar will be reviewed. (3Sp)

**310. Keyboard Skills.** The study of sightreading, transposing, improvising, technique, and accompanying. (2F,W,Sp)®

**311. Music Recreation Techniques.** An activity class involving music as therapy in recreational settings. (4W)

**312, 313. Pedagogy Practicum.** Provides piano students with actual teaching situations for the practical application of principles studied in piano pedagogy. Supervised planning, presentation, and evaluation of lessons. (3F) (3W)

**315, 316, 317. Piano Pedagogy.** Designed to prepare qualified pianists to teach piano effectively and to acquaint them with new materials and techniques. (2F) (2W) (2Sp)

**318. String Literature.** String literature appropriate for elementary, junior high, and high school level orchestra programs. (2Sp)

**320, 321, 322. Psychology of Music.** Research and laboratory course emphasizing physical, perceptual, psychological, and pedagogical bases of music behavior. (3F) (3W) (3Sp)

**325. University Symphony Orchestra.** Experience in performing standard orchestral literature including symphonies and major choral works. (2F,W,Sp)®

**326. Practicum Band.** Provides experience for music majors and minors in rehearsal techniques, literature selection, conducting, and playing minor instruments. (1Sp)®

**327. Symphonic and Marching Band.** Study and performance of symphonic band literature. Staging of formations and drills for football games fall quarter. Admission by audition. (2F,W,Sp)®

**328. Varsity Band.** Preparation of "pops" type music for basketball games. Audition necessary. (1W)®

**329. Jazz Improvisation.** A study of the techniques of jazz improvisation applicable to all instruments. (3F,W)

**330. Jazz Ensemble.** Preparation and performance of big band jazz music. Admission by audition. (1F,W,Sp)®

**333. University Choir.** Performance of vocal works in a large choral organization open to all students without auditions. (1F,W,Sp)®

**334. Vocal Ensemble.** Opportunity for the formation of various combinations of vocal ensembles. (1F,W,Sp)®

**335. Musical Theatre Production.** Participation as cast or crew in a Broadway musical or operatic stage production. Music 135 recommended as a prerequisite. (1-3W,Sp)®

**336. University Chorale.** A select mixed concert chorus performing a wide range of choral literature. Admission by audition. (2F,W,Sp)®

**337. Fundamentals of Baton Technique.** Prerequisite to Music 340 or Music 341. (3F,Sp)

**338, 339, 340. Conducting Choral Literature.** Interpretation and techniques of choral conducting emphasized through study of choral compositions from various historical periods. Special emphasis on compositions appropriate for public school groups. (3F) (3W) (3Sp)

**341. Instrumental Conducting and Rehearsal Techniques.** Interpretation of the instrumental music score and basic rehearsal procedures for realization of musical values. Assigned projects in conducting. Prerequisite: Music 337. (3W)

**342. Piano Ensemble and Accompanying.** Accompanying vocal and instrumental works; ensemble music for two pianos and four hands. Admission by audition. Four students per section. (1-2F,W,Sp)

**343. Instrumental Ensembles.** Offers opportunity for capable instrumentalists to study and perform music written for a variety of small ensemble combinations. (1-2F,W,Sp)®

**344. Guitar Pedagogy (Beginning).** Designed to prepare qualified guitarists to teach guitar effectively and to acquaint them with new materials and techniques. (2F)

**345. Guitar Pedagogy (Intermediate).** Students will be instructed in the teaching of specific guitar styles to the intermediate guitar student. Technique used to play classical and other styles will be developed. (2W)

**346. Guitar Pedagogy (Advanced).** This course will enable future guitar instructors to expand their repertoire of music for guitar to be used in teaching their students. (2Sp)

**347. Percussion Ensemble.** Allows percussionists the opportunity of playing music written specifically for an ensemble consisting entirely of percussion instruments. (1F,W,Sp)

**350. Elementary School Music for the Classroom Teacher.** Problems, methods, and materials in singing, rhythms, creative music, readings, and listening. Variable credit for majors only. (3-5F,W,Sp)

**351. Secondary School Choral Methods and Materials.** (4F)

**353. Secondary School Instrumental Methods and Materials.** (4W)

**354. String Pedagogy.** For qualified string players whose interest is primarily in teaching stringed instruments. Materials and teaching techniques via actual teaching experience. Candidates may be admitted only after personal consultation. (2F,W,Sp)

**357. Vocal Repertory I.** Survey of German Lieder, English Art Song, and French Chanson, including styles, history, and performance practice. (2F)

**358. Vocal Repertory II.** Survey of operatic repertoire from Monteverdi's "Orfeo" to the Twentieth Century, including styles, history, and performance practice. (2W)

**359. Vocal Repertory III.** Survey of Twentieth Century vocal music of American Broadway musicals and operettas, including styles, history, and performance practice, and a survey of modern vocal method books. (2Sp)

**360. Individual Piano Instruction.** (1-2F,W,Sp,Su)®

**361. Individual Viola Instruction.** (1-2F,W,Sp,Su)®

**362. Individual Organ Instruction.** (1-2F,W,Sp,Su)®

**363. Piano Workshop.** An intensive course for advanced piano students and piano teachers. Includes basic harmony, piano techniques, memorization, building repertoire, and teaching materials. (1Su)®

**364. Individual Vocal Instruction.** (1-2F,W,Sp,Su)®

**\*365. Teaching Singing to Children.** Understanding the ranges, capabilities, challenges, and maturation concerns of the young voice. Exploring ways to help children become interested in music and develop musical skills. (3F)

**367. Individual Guitar Instruction.** (1-2F,W,Sp,Su)®

**368. General Music Practicum.** Designed for music education majors and minors. Experience in current materials, methods, and management of the general music education program in the public schools. (4Sp)

**370. Individual Woodwind Instruction.** (1F,W,Sp,Su)®

**372. Individual Brass Instruction.** (1F,W,Sp,Su)®

**373. Individual Percussion Instruction.** (1F,W,Sp,Su)®

**374. Individual Violin Instruction.** (1-2F,W,Sp,Su)®

**375. Individual Cello Instruction.** (1-2F,W,Sp,Su)®

**376. Individual String Bass Instruction.** (1-2F,W,Sp,Su)®

**\*\*377. Organization and Administration of Church Music.** Study of repertoire for church use, including solo vocal, choral, and instrumental music guidelines for organizing, developing, and maintaining church choirs. (2F)

**382. Woodwind Practicum.** Concepts and techniques fundamental to correct playing of woodwind instruments used in school bands and orchestras. Required of all vocal and string candidates in music education. (2F)

**385, 386, 387. Church Music for Organists.** Designed to increase the organist's skill in playing hymns (modulation, transposition, etc.), open score reading, and arranging piano accompaniments of choral music for organ. (2F) (2W) (2Sp)

**390. Brass Practicum.** Concepts and techniques fundamental to correct playing of brass instruments used in school bands and orchestras. Required of all vocal and string candidates in music education. (2W)

**392. Music for Winds and Percussion.** Introduction to significant music written for wind and percussion instruments during past three centuries; survey of band literature appropriate for secondary school bands; listening assignments. (3F)

**393. Conducting Wind Instrument Literature I.** Study of the history of conducting and composition for band. Baton technique and ensemble seating. Analysis and score study of Grade II and III band music. (2W)

**394. Conducting Wind Instrument Literature II.** Study of the history of wind ensembles from Gabrielli to Strauss. Advanced baton technique, analysis, score study of Grade IV and V band music. (2Sp)

**\*395. Diction in Singing: English and Italian.** Study of singing diction in English and Italian, using the International Phonetic Alphabet in spoken, sung, and written drills. (2W)

**\*\*396. Diction in Singing: French and German.** Study of singing diction in French and German, using the International Phonetic Alphabet in spoken, sung, and written drills. (2Sp)

**397. Vocal Pedagogy I.** A theoretical course studying the anatomy and function of the voice, method for teaching technique, respiration, phonation, articulation, and support and health of the voice. (2F)

**398. Vocal Pedagogy II.** Application of vocal theory to the teaching of young, post-pubescent, and mature male and female voices, including the challenges of teaching each particular type. (2W)

**399. Vocal Pedagogy III.** Practicum class in which the student will teach individual vocal lessons under instructor's supervision and receive help and comments on dealing with specific students. (2Sp)

**404. Introduction to Opera.** Survey course tracing the history and style of opera from Peri and Caccini's "Euridice" of 1594 to the contemporary works of John Eaton and Phillip Glass. (2F)

**410. Music Therapy: Influence of Music on Behavior.** The effect of music on both physical and mental health. (4F)

**411. Music Therapy: Methods and Procedures.** The applications of music therapy in all fields of health, corrections, and special education. (4F)

**412. Music Therapy: The Clinical Practicum and Research.** Clinical and research projects in music therapy. (4Sp)

**420, 421. Clinical Internship in Music Therapy.** Six months resident internship in an affiliated, approved, clinical center. Prerequisite: completion of the senior year in music therapy. (2F,W,Sp,Su) (2F,W,Sp,Su)

**487. Individual Recital.** Performance of pieces selected by the student and approved by the instructor to be performed at the end of the senior year. (2-3F,W,Sp)

**495. Readings and Conference.** An undergraduate course designed to provide special interest study. (1-3F,W,Sp,Su)

**496H. Senior Thesis.** Students design and complete a major paper/project as partial fulfillment of Honors Program requirements. Examples of projects include performance, research, composition, and musical analysis. (1-3F,W,Sp,Su)

**498H. Senior Seminar.** A special seminar course for students enrolled in the Honors Program. Content will change from year-to-year as it is taught by different faculty. (3Sp)

**502. Music Therapy Practicum.** Practicum experience in working with handicapped children. Individual work stressed. (1W)

**503. Music Therapy Practicum.** Practicum experience continued in working with handicapped children. Individual and group work stressed. (1Sp)

**504. Music Therapy Practicum.** Practicum experience in working with handicapped adults/aged. Individual and group work stressed. (1W)

**507. Scoring and Arranging.** Theoretical and practical study of scoring for wind, string, and percussion instruments in various combinations ranging from small ensembles to the symphonic band and symphony orchestra. (3W)

**508, 509, 510. Counterpoint.** Writing and analysis of modal, tonal, and twentieth century tonal counterpoint in two, three, and four parts. Prerequisites: Music 104, 105, 106, 304, 305, 306. (2F) (2W) (2Sp)

**512. Orchestration.** Advanced study of scoring techniques for orchestras and bands. Includes practical experiences in creating original orchestrations and analysis of works by master orchestrators. Prerequisite: Music 507. (3Sp)

**515, 516, 517. Advanced Piano Pedagogy.** Continuation of pedagogy 315-317 with analysis, performance, and teaching of basic repertoire at the intermediate to advanced levels. (1-2F) (1-2W) (1-2Sp)

**518. Composition and Analysis.** Analysis of twentieth century masterworks. Instruction in principles of music composition and guidance in completing individual composition projects. Prerequisites: Music 104, 105, 106, 301, 302, 303. (3F,W,Sp)®

**522. Techniques in Electronic Music.** Designed as a continuation of Synthesizer Fundamentals 222. Students will learn to operate large studio synthesizer and associated audio equipment. Prerequisite: Music 222. (2-5Sp)®

**585. Proseminar in Music History.** An intensive review of styles, periods, compositional techniques, and composers of music. A different period is studied each quarter. For the undergraduate as well as master of music candidates. (3F,Su)®

#### *Graduate<sup>1</sup>*

**600 (f500).<sup>2</sup> Introduction to Music Research.** (3)

**605. Independent Study.** (1-3)

**608. Graduate Performance Ensemble.** (1-2)

**610. Advanced Conducting.** (3)

**615. Advanced Rehearsal Techniques.** (3)

**621. Practicum in Choral Performance.** (1-6)

**633. Seminar in Choral Literature.** (3)

**680. Seminar in Music: Philosophy, Aesthetics, and Trends.** (3)

**682. Seminar in Music Theory.** (3)

**686. Graduate Private Instruction.** (1-2)

**687. Individual Recital.** (3-5)

**688. Descriptive and Experimental Research in Music.** (3)

**697. Research and Thesis.** (3-9)®

**699. Continuing Graduate Advisement.** (1-3)®

<sup>1</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

<sup>2</sup>Parenthetical numbers preceded by an *f* are the *former* course numbers.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through the Life Span Learning Independent Study Division.

\*Taught 1990-91.

\*\*Taught 1991-92.

### *Department of*

# *Nutrition and Food Sciences*

## *College of Agriculture and College of Family Life*

**Head: Professor Rodney J. Brown**  
Office in Nutrition and Food Sciences 212

**Distinguished Professor Emeritus R. Gaurth Hansen; Professors Emeritus C. Anthon Ernstrom, Gary H. Richardson, D. K. Salunkhe; Assistant Professor Emeritus Frances G. Taylor; Professors Steven D. Aust, Deloy G. Hendricks, Arthur W. Mahoney, Von T. Mendenhall, Bonita W. Wyse; Associate Professors Charlotte P. Brennand, Daren P. Cornforth, Conly L. Hansen, Georgia C. Lauritzen, Carol T. Windham; Assistant Professors Charles E. Carpenter, Donald J. McMahon, Paul A. Savello; Clinical Instructors Janet B. Anderson, Nedra Christensen, Noreen B. Schvaneveldt**

**Degrees offered:** Bachelor of Science (BS), Master of Science (MS), and Doctor of Philosophy (PhD) in Nutrition and Food Sciences

**Areas of specialization:** BS degree in Nutrition and Food Sciences has programs of emphasis in Food Science, Consumer Food Science, Business Food Science, Dietetics, and Nutrition Science

### *Objectives*

The Department of Nutrition and Food Sciences prepares students for careers in either food science or human nutrition. Graduates in the food science options are prepared to work in food product development, processing, preservation, packaging, distribution, and consumer oriented areas of the food industry or to continue on to graduate degrees. Through the business option students are prepared for management positions in food processing or food service establishments. Dietetics graduates are employed as clinical dietitians in hospitals, clinics, community health programs, and as consultants in

homes for the aged and other service institutions. Nutrition science students are educated in human nutrition and are well prepared for graduate school.

**Food Science.** Students receive excellent background in chemistry, engineering, and microbiology. The program is approved by the Institute of Food Technologists. Graduates are in demand by industry for positions in research, quality control, product development, and production and are sought by government laboratories. They are also qualified to enter graduate school.

**Consumer Food Science.** Graduates are in demand for product development work in test kitchens, or may work as sensory specialists, home economists, food editors, or consumer consultants.

**Business Food Science.** Graduates of the business option are prepared to enter management training programs of food processing companies. They also find excellent employment opportunities in sales and marketing in the food industry and in allied businesses such as food industry supply firms. They are also in demand by government regulatory agencies.

**Dietetics.** The dietetics option prepares students to become professional dietitians (clinical nutrition specialists). The program is accredited by the American Dietetic Association as a Coordinated Undergraduate Program in Dietetics (CUP). Upon completion, graduates are eligible for entry-level positions in hospitals, community or government agencies involved in nutrition care programs, and outpatient clinics. Students spend sixteen weeks in Salt Lake City during the senior year gaining experience in medical facilities. Students must complete prerequisite courses and apply for enrollment in the dietetics program by May 1 of the sophomore year. Application forms can be obtained from the department.

**Nutrition Science.** This option is for students who want a solid background in human nutrition. It provides a thorough scientific base as preparation for graduate or professional study in nutrition, medicine, veterinary medicine, or dentistry or for careers in research laboratories of universities, government agencies, or food industries.

**Minor in Nutrition and Food Sciences.** Students from other majors may graduate with a minor in Nutrition and Food Sciences.

## Requirements

**Department Admission Requirements.** Admission requirements for the Department of Nutrition and Food Sciences are the same as those described for the University on pages 8-11. Students in good standing may apply for admission to the department. Students planning to major in Nutrition and Food Sciences should take algebra, chemistry, and biology in high school.

**Graduation Requirements.** Students graduating in the Department of Nutrition and Food Sciences graduate in the College of Agriculture and the College of Family Life. All graduates from the department must have completed one of the five options in the department and meet the following minimum requirements:

1. Grade point average (GPA) must be 2.5 or higher in all courses required for the major.
2. A grade of C or better must be received in all courses required for the major.
3. Courses required for the major may be repeated only once to improve a grade.
4. Courses required for the major may not be taken as *Pass-D-Fail* credits.

## Bachelor of Science Requirements

Specific requirements for each option are listed below. Requirements change periodically, and sequence of courses is important. Current course requirements and the order in which they should be taken can be obtained from the Department of Nutrition and Food Sciences.

**Food Science Curriculum.** Ag Ed 305; Biol 125; Chem 121, 122, 123, 124, 160, 331, 332, 334, 335, 370, 371; CS 150; Econ 200; Engl 101, 201; FL 110; Math 105, 106, 220, 221; Micrb 301, 510, 511, 512, 513; NFS 101, 122, 202, 306, 310, 340, 407, 440, 444, 499, 502, 503, 506, 550, 556, 557; Phyx 221, 222, 223; Stat 501, 502.

**Consumer Food Science Curriculum.** Ag Ed 305; Biol 125; BIS 140; Chem 121, 122, 123, 124, 160, 331, 332, 334, 335, 370, 371; Comm 121; Econ 200; Engl 101, 201; FL 110; HECE 255; Math 105; MHR 311; Micrb 111, 112, 510, 511, 512, 513; NFS 101, 122, 123, 202, 225, 306, 310, 340, 408, 440, 471, 490, 499, 502, 503, 506, 550, 556, 557; Physl 130; Phyx 120; Psy 101, 345; Spch 105; Stat 501, 502.

**Business Food Science Curriculum.** Acctg 201, 202, 203; Ag Ed 305; BA 308; Biol 125; Chem 121, 122, 123, 124, 331, 332, 370; CS 150; Econ 200, 201; Engl 101, 201; FL 110; Math 105, 106, 215, 216; MHR 299, 311; Micrb 111, 112, 510, 511; NFS 101, 122, 202, 306, 310, 340, 407, 440, 499, 502, 503, 506, 550, 556, 557; Phyx 111, 112; Stat 230.

**Dietetics Curriculum.** Ag Ed 305; Chem 121, 122, 123, 124, 331, 332, 370, 371; CS 150; Econ 200; Engl 101, 201; FL 110; Math 105; MHR 311; Micrb 111, 112; NFS 101, 122, 222, 301, 303, 322,

405, 407, 408, 440, 442, 443, 448, 449, 450, 455, 456, 457, 458, 466, 471, 472, 475, 476, 478, 499, 530, 575; Physl 130; Soc 101; Stat 201.

**Nutrition Science Curriculum.** ADVS 549; Ag Ed 305; Biol 125, 126, 127; Chem 121, 122, 123, 124, 160, 331, 332, 334, 335, 370, 371; CS 150; Econ 200; Engl 101, 102; FL 110; Math 105, 106, 215, 216; Micrb 111, 112; Med T 101; NFS 101, 122, 202, 301, 306, 322, 407, 408, 440, 442, 443, 448, 499, 530, 531, 543, 550; Phyx 111, 112, 505; Physl 103, 130, 501, 502, 505; Psy 121; Stat 501, 502.

## Financial Support

The Department of Nutrition and Food Sciences, the College of Agriculture, and the College of Family Life award scholarships in addition to those available through the University Financial Aid Office. Information and application forms may be obtained from the department office. Students may also contact the department for assistance in finding employment that will enhance their academic studies. Many students are employed by the department and by private firms near the University.

## Graduate Study

The Department of Nutrition and Food Sciences offers programs which lead to the Master of Science (MS) and Doctor of Philosophy (PhD) degrees in Nutrition and Food Sciences. All graduate students in Nutrition and Food Sciences must complete a Plan A (thesis) program. Admission requirements and a detailed description of degree requirements may be found in the Graduate Catalog and in the publication *Information for Graduate Students*, which may be obtained from the department office.

## Nutrition and Food Sciences Courses

**IO 101. Food Fascinations and Fallacy.** What is food? Food spoilage; preserving nutrients and quality; basic processing operations; regulations, packaging, and labeling; food safety; choosing a career. Three lectures. (3F,W,Sp)

**LS 122. Nutrition for People.** The relation of food to health; factors influencing nutritive requirements. Relationships between state of nutrition and social, mental, and physical well-being. (3F,W,Sp)©

**123. Food Preparation.** Emphasizes kind and proportion of ingredients, manipulation, and methods of cooking to obtain high quality products—either American or foreign. Two lectures, one lab. (3F)

**165. Sanitation in the Meat Industry.** Cleaning and sanitizing meat equipment and facilities. Function and properties of detergents and sanitizers. Meat spoilage agents. Personal sanitation. (2)

**193. Occupational Experiences in Food Science.** On-the-job training in the food industry. Prerequisite: completion of on-campus courses. (6F,W,Sp,Su)

**202. Biotechnology in Agriculture.** Classroom instruction will be used to introduce the student to the basic principles and concepts of biotechnology in agriculture. Topics will include: plant, food and nutrition, animal, and medical aspects of agricultural biotechnology. Three lectures. Prerequisite: Biol 125. (3W)

**222. Nutrition in the Life Cycle.** Application of nutrition principles to the human life cycle: nutrient functions, needs, sources, and alterations during pregnancy, lactation, growth, development, maturation, and aging. Prerequisites: Physl 130 and NFS 122. (4Sp)

**225. Meal Management for the Family.** Planning, preparing, and serving family meals with consideration of the nutritional needs and time, energy, and money resources of the family. One lecture, two labs. Prerequisite: NFS 123. (3F)



**235. Issues in Nutrition and Food Sciences.** A lecture series based on current concerns about diets and health of people, processing, safety, and regulations in the food industry. Each lecturer teaches his/her favorite issue. (2Sp)

**301. Perspectives of Dietetics.** Introduction to profession of dietetics, assessment of nutritional status, provision of nutritional care. Clinical experience in health care facilities. Prerequisite: acceptance into Medical Dietetics Program. (4F)

**302. Nutrient-drug Interactions.** Introduction to pharmacology and role of nutrition in drug therapy. Taught concurrently with NFS 455. Prerequisites: NFS 301, Chem 370. (1W)

**303. Nutrient-drug Interactions.** Introduction to pharmacology and role of nutrition in drug therapy. Taught concurrently with NFS 456. Prerequisites: NFS 301, Chem 370. (1Sp)

**306. Food Quality Assurance.** History, importance, and examples of food regulations and inspections. Principles of quality assurance and control of critical points. Preparation and use of control charts. (2Sp)

**307. Food Quality Assurance.** Responsibilities and organization of the quality control department, scrupling techniques, establishing standards, recording, and reporting. (3)

**310. Sensory Evaluation of Foods.** Physiological methods and practice in the sensory evaluation of foods. Testing methods, statistical analysis, and taste panel experience. Two lectures, two labs. Prerequisites: Stat 501 and 502. (4Sp)

**322. Nutrition Related to Fitness and Sport.** Includes information on macro/micronutrient metabolism during exercise, specific problems experienced by athletes or highly active persons, myths, ergogenic aids, and current interests. Prerequisite: NFS 122. (3F)

**323. Nutritional Considerations for Women.** A study of nutrition and health issues which are unique to females. Topics for consideration include pregnancy, lactation, premenstrual syndrome, anemia, obesity, diabetes, cancer, and osteoporosis. Prerequisite: NFS 122. (3Sp)

**340. Milk Technology.** Modern sanitary methods of producing, processing, and marketing milk, cream, and related products. Four lectures, one lab. (5W)

**345. Meat Technology.** Muscle structure, composition, grading, meat quality, pricing, sanitation, and nutritive value. Lab, taught independently, covers slaughter, processing, identification, and merchandising of beef, pork, and lamb cuts. Lab fee. (5Sp)

**350. Introduction to Food Microbiology.** Food poisoning, fermentations, spoilage, sanitation, and basic microbiology as it applies to foods, particularly meat products. This course does not fill the microbiology requirement for a major in the Nutrition and Food Sciences Department. (5)

**351. Introduction to Meat and Poultry Plant Engineering.** Equipment function, plant layout, construction, capacity, water, sewer, and heating and cooling systems in meat and poultry plants. (5)

**352. Food Chemistry.** Food composition, chemistry, effects of processing, colors, food additives, packaging, and dietary considerations. This course does not fill the chemistry requirement for a major in the Nutrition and Food Sciences Department. (5)

**353. Food Law.** History and key provisions in the Meat and Poultry Inspection acts, labeling and effects on industry and the consumer. (3)

**354. Meat Science.** Meat animal carcass anatomy, muscle chemical composition, microscopic structure related to meat quality. Fresh, cured meat processing, equipment, additives, quality control, labelling, computer, and least cost formulation. (4)

**355. Basics of Food Analysis.** A survey of methods of sampling, analysis, and instrumentation used in the food industry. Problem solving, validity, and reliability will be stressed. (4)

**405. Education in Clinical Dietetics.** Principles of education, counseling, and communication as applied to the field of nutrition education and clinical dietetics practice. One lecture, one lab. (2F)

**407, 408. Science in Food Preparation.** Science principles underlying modern food theory and practice. Relation of physical and chemical properties of food components and their systems to food preparation. Two lectures, one lab. Prerequisites: Chem 141 or 331, NFS 123. (3W) (3Sp)

**440. Human Nutrition and Metabolism.** Structures, properties, and metabolism of protein, lipids, carbohydrates, vitamins, and minerals, emphasizing digestion, absorption, hormonal control, cellular biochemistry, metabolic interrelationships, excretion, requirements, energy needs, and effects of deficiency or excess. (5F)

**442, 443. Clinical Nutrition Methodology.** Development of experimental design, data collection in laboratory or clinical setting, statistical analysis, interpretation, and integration of results. (1W) (1Sp)

**444. Food Engineering.** Basic engineering concepts and their application. Definitions, nomenclature, conservation of mass, first and second laws of thermodynamics, psychrometrics, simple power, and refrigeration cycles. Prerequisites: Phyx 112 or 222. (3F)

**448. Community Nutrition.** Nutritional surveys and the practice of dietetics in community health related agencies. Two lectures, one lab. (3F)

**449, 450. Community Nutrition.** Clinical experiences in various health related organizations and with families. Prerequisite: NFS 448. (1W) (1Sp)

**455, 456. Clinical Dietetics.** Biochemical and physiological abnormalities in disease. Role of nutrition and therapy. Prerequisites: NFS 301, 440, Chem 370. (4W) (4Sp)

**457. Clinical Dietetic Experiences.** Practical experience with patients in hospitals and other health care facilities. Integrating and applying lecture material of NFS 455. To be taken concurrently with NFS 455. (3W)

**458. Clinical Dietetic Experiences.** Continuation of NFS 457. (3Sp)

**466. Medical Dietetics.** An in-depth study of nutrition relationships in disease development and treatment with clinical experience in medical facilities in Salt Lake City. Prerequisites: NFS 457, 458. (12F)

**471. Quantity Food Preparation.** Principles of food preparation applied to large quantity production, menu planning, food selection, storage, and equipment. Three lectures, two labs. Prerequisites: NFS 407, 408, or consent of instructor. (5W)

**472. Institutional Organization and Management.** Principles of organization, management theory, financial controls, human and labor relations, employee training, layout, and sanitation. Three lectures, one lab. Prerequisite: NFS 471. (4Sp)

**475, 476. Management of Clinical Dietetics.** Principles of management of clinical dietetics, quality assurance, public relations, computer applications, and nutrition legislation. Prerequisite: NFS 466. (2W) (2Sp)

**478. Maternal and Child Nutrition.** Nutritional requirements of the gravid woman, infant, and preschool child. To be taken in Salt Lake City in conjunction with NFS 466. (6F)

**490. Special Problems.** Individual problems and research problems for upper division students in Nutrition and Food Sciences. (1-4F,W,Sp,Su)®

**499. Nutrition and Food Science Seminar.** Student reports on current topics in Nutrition and Food Science. (1Sp)®

**502 (d602).<sup>1</sup> Meat Processing.** Processing meat into fine and coarse ground sausages, cured meats, and restructured meats. Quality standards. Curing, cooking, smoking, rendering, fermenting, packaging and nutritional quality, and spoilage of meat products. Computer least cost formulation. Three lectures, one lab. Prerequisites: NFS 506, 544, Chem 370. (5W)

**503 (d603). Dairy Processing.** Processing milk into cheese, ice cream, yogurt, concentrated milks, and spray-dried powders. Identity standards of regulated dairy products. Physical, chemical, and biochemical changes that occur during manufacture and storage. Bacteriological, chemical, and physical deterioration and control. Four lectures, one lab. (5F)

**506 (d606). Principles of Food Processing.** Standardization and compounding food products; food preservation through application of heat, refrigeration, concentration, and dehydration. Basic unit operations in the food industry. Quality control of raw and finished products. Four lectures, one lab. Prerequisite: NFS 544. (5Sp)

**\*\*522 (d622). Sports Nutrition.** Macronutrient and selected micronutrient depletion during exercise, restoration after feeding, diet studies of several sports, and dietary ergogenic aids will be discussed. Prerequisites: NFS 122, Physl 130, Chem 370. (3Sp)

**530 (d630). Human Nutrition—Vitamins, Minerals, and World Food Supply.** An overview of world food production and consumption trends as they relate to nutritional status of individuals. Metabolism of vitamins and minerals as applied to nutritional requirements and food supplies of people. Prerequisites: NFS 440, Chem 370. (4Sp)

**531 (d631). Human Nutrition—Dietary Carbohydrates, Proteins, and Lipids.** Metabolism of carbohydrates, proteins, and lipids as related to nutritional requirements and food supplies of people. Critical analysis of methods used in assessing human nutritional status. Prerequisites: NFS 440, Chem 370. (4W)

**540. Human Nutrition—An Integrated Approach.** An Independent Study Division course (3)®

**\*\*543 (d643). Human Nutrition from Preconception through Early Childhood.** Relation of nutrition to growth from the prenatal period to old age. (3F)

**544 (d644). Food Engineering.** Introductory concepts in fluid mechanics and heat transfer. Engineering measurement techniques presented in the laboratory. Prerequisite: NFS 444. (3W)

**550 (d650). Food Analysis.** Application of quantitative and qualitative techniques to the determination of composition and quality of food products. Prerequisites: NFS 556, 557, statistics. (5Sp)

**556 (d656). Chemistry of Food Constituents.** Chemical structure, properties, and reactions of the important chemical constituents of food. Three lectures, one lab. Prerequisites: Chem 331, 332, 370. (4F)

**557 (d657). Chemistry of Food Systems.** Chemical relationship among constituents in liquid and tissue food systems. Their reactions and interactions during food processing. Three lectures, one lab. Prerequisite: NFS 556. (4W)

**575 (d675). Dietetics Clinical Practicum.** Advanced practical experience in dietetics within community and/or health care facilities. Prerequisite: NFS 466 or RD. (1-10W,Sp)

### Graduate<sup>2</sup>

**\*601. Nutritional Toxicology.** (3F)

**602 (d502). Meat Processing.** (5W)

**603 (d503). Dairy Processing.** (5F)

**606 (d506). Principles of Food Processing.** (5Sp)

**610. Sensory Evaluation of Foods.** (4Sp)

**\*614. Biotechnology of Lactic Starter Cultures.** (4Sp)

**621. Dietary Guidance in Family and Societal Contexts: Issues and Applications.** (3Sp)

**\*\*622 (d522). Sports Nutrition.** (3Sp)

**\*623. Women's Nutritional Issues.** (3W)

**630 (d530). Human Nutrition—Vitamins, Minerals, and World Food Supply.** (4Sp)

**631 (d531). Human Nutrition—Dietary Carbohydrates, Proteins, and Lipids.** (4W)

**\*\*643 (d543). Human Nutrition from Preconception through Early Childhood.** (3F)

**644 (d544). Food Engineering.** (3W)

**\*\*645. Meat Science.** (4W)

**650 (d550). Food Analysis.** (5Sp)

**656 (d556). Chemistry of Food Constituents.** (4F)

**657 (d557). Chemistry of Food Systems.** (4W)

**\*\*660. Food Proteins and Enzymes.** (4W)

**\*670. Dairy Chemistry.** (3W)

**675 (d575). Dietetics Clinical Practicum.** (1-10W,Sp)

**690. Special Problems.** (1-4F,W,Sp,Su)@

**697. Thesis Research.** (1-12F,W,Sp,Su)@

**699. Continuing Graduate Advisement.** (1-12F,W,Sp,Su)@

**780. Seminar.** (1F,W,Sp)@

**797. Dissertation Research.** (1-12F,W,Sp,Su)@

**799. Continuing Graduate Advisement.** (1-12F,W,Sp,Su)@

<sup>1</sup>Parenthetical numbers preceded by *d* indicate a *dual* listing.

<sup>2</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

@ Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through the Life Span Learning Independent Study Division.

\*Taught 1990-91.

\*\*Taught 1991-92.

## Department of *Physics* College of Science

**Head: Professor W. John Raitt**  
Office in Science Engineering Research 250A

**Assistant Head: Associate Professor O. Harry Otteson**

**Professors** Kay D. Baker, W. Farrell Edwards, Bela Fejer, Wilford N. Hansen, Don L. Lind, V. Gordon Lind, William R. Pendleton, Robert W. Schunk, Jan Sojka, Vincent B. Wickwar; **Research Professors** Gene W. Adams, Kent L. Miller; **Adjunct Professor** R. Gilbert Moore; **Professors Emeritus** Jack E. Chatelain, Eastman N. Hatch, L. Rex Megill, John K. Wood; **Associate Professor** Wolfgang Schmickler; **Associate Professors Emeritus** Jay O. Jensen, Robert E. McAdams, Akeley Miller; **Research Associate** Friedhelm Schreiber; **Research Associate Professors** F. Tom Berkey, Ching-Yan Pan; **Assistant Professors** J. R. Dennison, James T. Wheeler; **Research Assistant Professors** Abdallah R. Barakat, Howard G.

Demars, Patrick Espy; **Adjunct Professors** Helmut Baer, Peter M. Banks, William E. Bell, Yeaton H. Clifton, Max Dresden, John C. Foster, Ulrich Hauser, Peter Havas, Peter Herczeg, Alan H. Peterson, Robert G. Roper; **Adjunct Associate Professors** Stephen E. Bialkowski, Steven G. Oberg, Donald R. Pettit, Jan M. Wouters; **Adjunct Assistant Professor** Wedad Abdou

**Degrees offered:** Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), and Doctor of Philosophy (PhD) in Physics

### Objectives

The Department of Physics offers programs which are designed to prepare the physics major for a career in industry or teaching, or to continue his or her education by entering graduate school for an advanced degree.

## Requirements

**Departmental Admission Requirements.** Admission requirements for the Department of Physics are the same as those described for the University on pages 8-11. Students admitted to USU in good standing may apply for admission to the department.

**Bachelor of Science in Physics.** The BS degree in physics is awarded to students who demonstrate a proficiency in understanding the subject matters offered in the undergraduate physics curriculum. At least the core upper division physics courses are required. This core set of courses consists of Physics 333, 341, 342, 411, 412, 451, 452, 453, 461, 462, 463, 471, 472, and 473; a total of 45 credit hours. An additional 6 credit hours of upper division laboratory (Physics 387, 388, and 389) and 3 credit hours of senior project (Physics 398) are required. Contact the Department of Physics for sample course selections and core course syllabi.

**Minor.** Students majoring in other departments may earn a physics minor by taking at least 18 credits (at least 12 must be upper division) in a program determined by consultation with this department. A minor is not required for a student majoring in physics.

**Specialization in Biophysics.** Students wishing to pursue an undergraduate program in preparation for graduate work in biophysics should enroll as physics majors and should consult with the department head or assistant department head on this program.

In general, such students should fulfill all requirements for a physics major and should, in addition, take as much biology and chemistry as they can manage. Consultation with members of the Biology Department faculties will be sought in their advisement. A program will be worked out between the student and advisers to meet the student's individual needs.

**Interdisciplinary Majors.** Those students interested in physics and a complimentary area (for example: computer science, electrical engineering, and mathematics) are encouraged to discuss individually designed degree programs with advisers. The total number of required courses for such a dual major is often greater than for a single major, but less than the combined requirements of the two majors. A dual major which has been approved by the faculties of both departments is the physics/mathematics major as follows: Phyx 221, 222, 223, 341, 342; Math 220, 221, 222, 320, 321, 322; any 18 credits in Physics from courses numbered 400 and above; any 12 credits in Mathematics from courses numbered 400 and above.

**Teaching Major.** The following courses are required for a teaching major in physics: Phyx 221, 222, 223, 341, 342, 387, 388, and 389. Six credits in upper division electives are selected from: Phyx 374, 411, 412, 451, 452, 461, 462, 471, and 472. Four credits of general electives are selected from: Phyx 100 or 108 or 318, 333, 391, 392, 393, 398, 413, 453, 473, and 505; Mathematics through Math 322; Stat 201; and Sci 430. Physics teaching majors plan their own programs with two advisers: one from the Physics Department and one from the Department of Secondary Education.

**Teaching Minor.** The following courses are required for a teaching minor in physics: Phyx 111, 112, 113 or Phyx 221, 222, 223; and Phyx 100 or 108. In addition, a minimum of 9 credits are selected from the following: Phyx 118, 216, 318, 333, 387, 388, 389, 505, and Sci 430. If the student's teaching major is not in the College of Science, Sci 430 is required. Physics teaching minors plan their programs with two advisers: one from the Physics Department and one from the Department of Secondary Education.

## Graduate Study

The Physics Department offers advanced studies leading to the Master of Science degree (MS) and the Doctor of Philosophy degree (PhD). For further information see the graduate catalog.

## Physics Courses

**PS 100. The Solar System.** A study of the planets, the asteroids, meteors, comets, satellites of planets, artificial satellites, and space probes. Kepler's laws of motion and planetary composition. (3W)

**PS 101. Introductory Physics.** A descriptive course requiring only elementary mathematics dealing with the relationship of physical principles evident in the everyday world around us. A course designed especially for the liberal arts student and other nonscience majors. (5F,W,Sp)

**PS 108. Stars and Galaxies.** Modern theories concerning the sun, stars, and galaxies, their physical properties, structure, evolution, and recent discoveries such as pulsars, quasars, and developments in cosmology are discussed. (3F)

**PS 111, PS 112, PS 113. General Physics.** A study of the laws, phenomena, and theories of the physical world, including mechanics, heat, light, sound, electricity, and magnetism. Emphasis is given to the understanding of everyday experiences. Recitation and laboratory. Taken in sequence except with the permission of the instructor. Prerequisites: Math 105, 106. (5F,Su) (5W,Su) (5Sp,Su)

**118. Sound and Music.** The physical basis of the production and audition of sounds and the relationship to musical and percussion instruments, room acoustics, and sound reproduction. (3F)

**PS 120. General Physics Survey.** A survey course in physics, with a laboratory. Designed for Elementary Education, Liberal Arts, and other nonscience majors requiring a laboratory course. (5F,W,Sp)

**PS 200. Astronomy.** Astronomy for the student with some science and math background. The solar system; the creation, evolution, and death of stars; galaxies; and cosmology. Prerequisites: Math 106, Phyx 120. (3F)

**IO 216. Energy.** A study of energy resources, utilization, conversion, and conservation. Social impacts of energy resource development including public policy and planning. (3F)

**PS 221, PS 222, PS 223. General Physics—Science.** A study of the phenomena, laws, and theories of the inanimate world, including mechanics, oscillations, wave motion, electricity and magnetism, and optics. Emphasis is given to the understanding of physical phenomena and to problem solving. For science majors and engineers. Prerequisites: Math 220 and recommended concurrent enrollment in Math 221. Taken in sequence except with the permission of the instructor. Recitation and lab. (5F,Sp,Su) (5F,W,Su) (5W,Sp,Su)

**224, 225, 226H. Physics Pro Seminar.** Honors course. To be taken concurrently with Phyx 221, 222, and 223. (1F) (1W) (1Sp)

**IO 318. Intelligent Life in the Universe.** A study of the universe—its origin, structure, size, and composition as related to the possibility of extraterrestrial intelligent life. The feasibility of detecting other intelligent life and consequences thereof. (3Sp)

**333. Introduction to the Theory of Special Relativity.** The formulation of Einstein's special relativity, including the transformation properties of four vectors and other quantities of interest in the various fields of physics. Prerequisite: Phyx 342 or permission of the instructor. (4Sp)

**341, 342. Analytical Mechanics.** Newtonian mechanics, single particle motion, central forces, systems of particles, rigid bodies, Lagrangian mechanics, and Hamiltonian mechanics. Prerequisites: Phyx 221, 222, 223, and differential equations or permission of the instructor. (4F) (4W)

**374. Modern Physics for Applied Science.** Concise coverage of modern physics at the intermediate level. Includes special relativity, wave and particle properties of matter and photons, introductory quantum mechanics, and the fundamentals of atomic and molecular, nuclear and particle, and solid state physics. Prerequisites: Phyx 221, 222, and 223. (3Sp)

**380. Great Lectures in Physics.** Lectures on film and videotape by outstanding physicists. Some of the concepts and ideas involved in the modern development of physics will be discussed. (3W)

**387, 388, 389. Laboratory.** Students perform experiments which complement upper division courses in mechanics, electromagnetism, thermodynamics, optics, electronics,

and atomic, nuclear, and solid state physics, including some having historical significance. Emphasizes experience with modern experimental techniques, data and error analysis, experimental design, and communication skills. Prerequisites: Phyx 221, 222, 223. (2F) (2W) (2Sp)

**391, 392, 393. Selected Reading in Physics.** (1F) (1W) (1Sp)®

**398. Special Problems in Physics.** A course of research or individual study pursued under the direction of a staff member. The student must make previous arrangements with the staff member. (1-3F,W,Sp)®

**401, 402. Astrophysics.** Application of physical principles to selected topics in astrophysics. Physics of planetary and stellar systems, including celestial mechanics, planetary atmospheres, stellar atmospheres and interiors, galactic structure and evolution, astronomical instruments and their principles of operation. Prerequisites: Phyx 221, 222, 223. (3W) (3Sp)

**411, 412, 413. Wave Theory and Optics.** Wave motion, geometrical optics, diffraction phenomena, aberrations, interference, polarization, and sundry topics in contemporary optics. (3F) (3W) (3Sp)

**451, 452, 453. Thermal Physics.** A rigorous treatment of the laws of thermodynamics. Work, temperature, heat, energy, and entropy are defined. Discussion of reversible, irreversible, and equilibrium systems. (3F) (3W) (3Sp)

**461, 462, 463. Electricity and Magnetism.** An intermediate-level course in electromagnetism for advanced undergraduates. Covers electrostatics, magnetostatics, time-varying electromagnetic fields, Maxwell's equations, plane waves and their propagation, fields in bounded regions, radiation, and selected elements of circuit theory. Prerequisites: Phyx 223 and Math 322. (3F) (3W) (3Sp)

**471, 472, 473. Modern Physics.** Application of elementary quantum mechanics and special relativity to problems of atomic, solid-state, nuclear, and particle physics. Prerequisites: Phyx 223 and first-year calculus; Phyx 333 or 463. (3F) (3W) (3Sp)

**505. Radiological Health and Safety.** Required for authorization to utilize radioactive materials at USU, this course introduces the concepts of fundamental radioactivity, radiation detection, radiology, and practical health physics. Prerequisites: Phyx 113 and Biol 125. (3F,Sp)

**533. Relativity.** Einstein's special and general theories of relativity and gravitation using four-vector and tensor formulation. Prerequisite: a knowledge of Maxwell's equations and Lagrangian and Hamiltonian mechanics. (3Sp)

**534, 535, 536. Methods of Theoretical Physics.** Mathematical techniques useful in physics graduate courses: boundary problems, linear operators, complex variable applications, perturbation, variational calculus, and group representations. (3F) (3W) (3Sp)

**571, 572, 573. Introductory Quantum Mechanics.** A study of the Bohr atomic theory. Heisenberg and Schroedinger theories, De Broglie waves and their applications to central fields, harmonic oscillator, hydrogen atom, and spin one-half particles. Prerequisites: Phyx 341, 342. (3F) (3W) (3Sp)

**581, 582, 583. Physics Colloquium.** A series of invited lectures on specialized topics in physics and related subjects. (1F) (1W) (1Sp)®

### *Graduate<sup>1</sup>*

**601. Introduction to Solar Terrestrial Physics.** (3F)

**602. Upper Atmospheric Physics.** (3W)

**603. Upper Atmospheric Physics Continued.** (3Sp)

**614. Atomic Spectra.** (3F)

**615. Molecular Spectra.** (3W)

**616. Spectroscopic Measurements.** (3Sp)

**621, 622, 623. Advanced Relativity.** (3F) (3W) (3Sp)

**631, 632. Space Science and Engineering.** (3F) (3W)

**641, 642. Theoretical Mechanics.** (3F) (3W)

**651, 652, 653. Statistical Mechanics.** (3F) (3W) (3Sp)

**657, 658, 659. Applied Plasmadynamics.** (3F) (3W) (3Sp)

**661, 662, 663. Theoretical Electricity and Magnetism.** (3F) (3W) (3Sp)

**664, 665, 666. Solid State Physics.** (3F) (3W) (3Sp)

**667, 668, 669. Physics of Materials.** (3F) (3W) (3Sp)

**671, 672, 673. Quantum Mechanics.** (3F) (3W) (3Sp)

**697. Thesis Research.** (1-15)®

**699. Continuing Graduate Advisement.** (1-3)®

**701, 702, 703. Aeronomy.** (3F) (3W) (3Sp)

**704. Ionospheric Physics.** (3F)

**Chem 705. Atmospheric Chemistry and Photochemistry.** (3)

**706. Circulation of the High Atmosphere.** (3Sp)

**711, 712. Electro-optics.** (3F) (3W)

**721, 722, 723. Nuclear Physics.** (3F) (3W) (3Sp)

**724. Elementary Particle Physics.** (3)

**771, 772, 773. Quantum Field Theory.** (3F) (3W) (3Sp)

**781, 782, 783. Seminar.** (1-3) (1-3) (1-3)®

**797. Dissertation Research.** (1-15)®

**799. Continuing Graduate Advisement.** (1-3)®

<sup>1</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

## Department of

# Plants, Soils, and Biometeorology

## College of Agriculture

**Head: Professor H. Grant Vest**  
Office in Agricultural Science 322-C

**Assistant Head: Professor V. Philip Rasmussen**  
Office in Agricultural Science 108

**Professors** Rulon S. Albrechtsen, J. LaMar Anderson, William F. Campbell, John O. Evans, R. John Hanks, Anthony H. Hatch, David W. James, Jerome J. Jurinak, Raymond W. Miller, Frank B. Salisbury, Schuyler D. Seeley, David R. Walker; **Adjunct Professors** Kay H. Asay, Ray W. Brown, Douglas R. Dewey, Gerald D. Griffin, Charles W. Robbins, Melvin D. Rumbaugh, Dale R. Westerman; **Research Professor** David L. Carter; **Associate Professors** Gaylen L. Ashcroft, John G. Carman, Steven A. Dewey, Lawrence E. Hipps, Larry A. Rupp, James H. Thomas, Ralph E. Whitesides; **Research Associate Professors** Gail E. Bingham, Henry F. Mayland, James L. Wright, Stanford A. Young; **Adjunct Associate Professor** Michael C. Amacher; **Adjunct Research Associate Professor** Prem P. Jauhar; **Assistant Professors** Bruce G. Bugbee, Lynn M. Dudley; **Research Assistant Professor** Raymond L. Cartee; **Adjunct Assistant Professor** Kevin B. Jensen; **Lecturer** D. Craig Aston; **Research Associates** James T. Belliston, Roland G. Murdock, Robert L. Newhall, William A. Varga

**Degrees Offered:** BS in Agronomy, Horticulture, Plant and Soil Science; MS and PhD in Biometeorology, Plant Science, Soil Science, Ecology (plant and physical)

**Areas of Specialization:** Soil and Water Conservation, Soils and Irrigation, Environmental Science, Ecology, Field Crops, Fruit and Vegetable Production, Ornamental Horticulture, Landscape Maintenance and Construction, Crop Physiology, Plant Breeding, Tissue Culture, and Weed Science

**Certificate, Diploma, and Associate Degree Program:** Ornamental Horticulture

### Objectives

Courses offered in the department provide information related to the basic environmental sciences, including air, water and soil, and economic crops that are grown, with or without irrigation, in an arid region. The department also conducts research in these areas and disseminates information to maximize the quantity and quality of crop production.

### Requirements

**Departmental Admission Requirements.** Admission requirements for the department are the same as those described for the University on pages 8-11. Students in good standing may apply for admission to the department.

**Requirements for the Major.** All courses listed as major subject courses must be taken on an A-B-C-D-F basis. Major subject courses passed with less than a C grade must be repeated. Transfer students

are required to take at least 20 credits of major subject courses in residence at USU.

**Requirements for a Minor.** A minimum of 20 upper division credits in agronomy or horticulture are required, with not more than 3 credits of special problems and seminars. PISci 555 or 565 must be included.

A minor in soil science requires a minimum of 23 credits of soils courses including the following: Soils 358, 513, 530, 555, 565, and 4 credits selected from Soils 359, 400, 470, 505, 527, 556, 566.

All courses must be taken on an A-B-C-D-F basis and passed with a C grade.

**Federal Classification Requirements.** For graduates to be eligible for inclusion on the federal government classification lists as Soil Conservationists or Soils Scientists, they must meet the following requirements: *Soil Conservation:* 45 credits in natural resources or agricultural fields including 4.5 credits in soils; *Soil Science:* 45 credits in biological, physical, and earth sciences with a minimum of 22.5 credits in soils.

**The Applied Ornamental Horticulture Program** provides practical training in greenhouse and nursery management, turf production, floral design, and maintenance of home and commercial grounds. Course work encompasses pest control, plant identification, construction of landscapes, management of small business, and the operation and maintenance of equipment, including small engines. As an integral part of their training, students are provided with on-the-job experience in a greenhouse, nursery, garden store, or florist shop. Students may work toward a one-year certificate, a two-year diploma, or an Associate of Applied Science Degree.

**Bachelor of Science Degree.** The department offers the Bachelor of Science Degree in two broad areas, namely: (1) agronomy (field crop production, and soil management); and (2) horticulture (fruit and vegetable production and management, and ornamental horticulture). In addition to these two degree areas, a third major, Plant and Soil Science, is offered. This is the science degree in Horticulture or Agronomy.

**The Agronomy Major** prepares students for practical work such as owning and managing farm-related businesses, crop production, and soil management. Thus, the core includes a study of: botany and biology; some chemistry; soil management and fertility; various field crops and their management; insect disease and weed control; and personal computers as farm management tools. The **Business Option** adds course work in accounting, economics, and in farm, ranch, and personnel management. In the **Production Option**, the student studies applied production techniques such as plant nutrition, breeding, irrigation, and crop management systems. The **Soil Conservation Option** offers additional work in soil management, conservation, nutrition, irrigation, and watershed management.

**The Horticulture Major** prepares students for production of fruits, vegetables, or ornamentals and for landscape construction and maintenance. Courses include biology, some chemistry, and control

of insects, diseases, and weeds. The **Fruit and Vegetable Option** adds courses in production, management techniques such as pruning and spraying, plant materials, landscaping, and business. The **Ornamental Horticulture Option** incorporates courses in landscaping (materials, design, and maintenance), greenhouse operation, and small business operation (including accounting and personnel management). In the **Landscape Maintenance and Construction Option**, additional study includes plant materials, landscape design, and botany.

The **Plant and Soil Science Major** has a core that is rich in basic physical and biological sciences such as chemistry, physics, mathematics, biology, and plant and soil sciences. Such training prepares students for entrance into graduate school or for employment as a laboratory technician. Selection of the **Environmental Science Option** includes additional course work in earth, water, and atmospheric sciences and environmental studies. The **Field Crops Option** offers course work in plant physiology, anatomy, taxonomy, and nutrition, along with basic theory on irrigation, and control of weeds, insects, and diseases. Students who elect the **Horticulture Option** study plant taxonomy, anatomy, physiology, genetics, and control of weeds, diseases, and insects. Training in the **Soil Science Option** includes additional mathematics, soils, biometeorology, and irrigation courses.

## Course Requirements

### Agronomy Major

**Core Courses (93 credits).** Biol 125, 126; Bot 420, 440, 560, 561; Chem 111, 121, 141; CS 150; Ent 539; Math 105; PISci 100, 105, 202, 220, 428, 430, 432, 489, 555, 565; Soils 358, 359, 555, 556.

**Business Option.** Acctg 201<sup>1</sup>, 202, 203; Ag Ec 210, 331, 410, 411; MHR 299<sup>1</sup>, 311<sup>1</sup>, 360.

**Production Option.** Biol 319<sup>1</sup>; Bimet 550; Bot 510; Geol 111; Micrb 111, 112; PISci 250, 520, 521, 540, 570<sup>1</sup>; Soils 470, 513<sup>1</sup>, 556.

**Soil Conservation Option.** AE 308<sup>1</sup>, 310<sup>1</sup>; Bimet 530, 550; Geol 560; PISci 430; Soils 400<sup>1</sup>, 556, 565<sup>1</sup>, 566<sup>1</sup>; WS 300.

<sup>1</sup> These courses are required within the option.

### Horticulture Major

**Core Courses (78-82 credits).** PISci 100, 105, 202, 220, 225, 316, 489, 555; Soils 358, 359, 555; Biol 125, 126; Bot 440, 560, 562; Ent 539; Math 105; Chem 111, 121, 141; BIS 140; CS 150.

**Fruit and Vegetable Production Option.** Bot 420; Chem 142, 144; Ag Ed 170; PISci 350, 440, 445, 450, 565.

**Landscape Maintenance and Construction Option.** Acctg 201; BA 350; MHR 235, 360, 364; Math 106; PISci 110, 224, 236, 237, 238, 350, 420; LAEP 103, 120, 135, 136, 260, 350, 361, 362, 495.

**Ornamental Horticulture Option.** MHR 235; Ag Ed 170; Micrb 111, 112; Bot 420, 510; Biol 319; Chem 142, 144; PISci 110, 224, 236, 237, 238, 239, 305, 310, 350, 420, 520, 521.

### Plant and Soil Science Major

**Core Courses (95-96 credits).** Chem 121, 122, 123, 124, 141, 331, 360; Phyx 111, 120, 221; Math 105, 106; Biol 125, 126; Micrb 111, 112, 301; Bot 440; PISci 100, 105, 202, 489; Soils 358, 359, 555; BIS 140; CS 150.

**Environmental Science Option.** Geol 111; Math 220; WS 300; Chem 360, 361; Bimet 200, 530; Soils 505, 513, 530; CEE 561. Take 3 of the following courses: Chem 301; Geog 171; Soils 200, 400, 556, 565, 566, 562; WS 475; PISci 476.

**Field Crops Option.** Chem 142, 370; Soils 470, 556; Biol 319; Bot 420, 560, 561; Ent 539; PISci 316, 428, 430, 432, 520, 521, 555, 570. Take 3 of the following courses: Bot 422, 510; PISci 476, 540, 565; Soils 565, 566.

**Horticulture Option.** Chem 142, 370; Biol 319; Bot 420, 510, 560, 562; Ent 539; PISci 316, 476, 520, 521, 540, 555, 565.

**Soils and Irrigation Option.** AE 543, 545, 546, 547, 548; PISci 520, 521; Soils 400, 470, 513, 530, 565, 566.

**Soil Science Option.** Math 220; Chem 360, 361; AE 310; Bimet 200, 530; Soils 400, 470, 505, 513, 530, 556, 565, 566.

### Applied Ornamental Horticulture Program

**One-Year Certificate (60 credits required).** Courses include 6 credits chosen from PISci 236, 237, 238; 28-31 credits selected from other Plant Science classes emphasizing either Floriculture or Landscape Horticulture; and 3-6 credits of approved electives.

**Two-Year Diploma (80 credits required).** Students must complete 63 credits in core classes and 17 credits of approved electives and General Education.

**Associate of Applied Science Degree (96 credits required).** Students must complete 63 credits in core classes, 17 credits of electives, and 16 credits of additional General Education.

**Applied Ornamental Horticulture Core Classes.** PISci 100, 105, 110, 190, 220, 224, 225, 236, 237, 238, 239, 240, 305, 310, 316, 350, 420; Ag Ed 170; Engl 105; BIS 140.

**Approved Electives and General Education.** PISci 290, 301, 440, 445, 450; MHR 235; Acctg 105; Math 101; Biol 125; LAEP 103; Chem 111; Engl 101; Soils 200.

### Graduate Study

**Master of Science and Doctor of Philosophy Degrees** are offered as follows: (1) **Plant Science** with specialization in plant breeding, plant nutrition, crop physiology, crop production and management, ecology, weed control, and plant nutrition; (2) **Soil Science** with specialization in soil physics, soil and water chemistry, soil fertility and plant nutrition, and soils and irrigation; (3) **Biometeorology** with specialization in agricultural meteorology, micrometeorology, air pollution, climatology, atmospheric radiation, and remote sensing; (4) **Ecology** with specialization in plant and physical ecology.

### Plant Science Courses

**LS 100. Introduction to Agricultural Plant Science.** A survey course which includes a discussion of world crops, soil, water, agricultural chemicals, and structure and function of plants. (4F)©

**105. Plant Science Orientation.** Orientation to the teaching, research, and extension programs of the department and the opportunities in the field. (1F)

**110. Ornamental Horticulture Seminar.** Leaders from industry will speak on opportunities and problems associated with ornamental horticulture. One lecture per week. (1F)

**185. Turf Management.** Establishment and maintenance of grass for lawns, golf courses, and athletic fields. One lecture, one lab per week. (2Sp—applied only)

**190. Garden Center Management.** Merchandising, selling techniques, advertising, and general management of a garden center. (3Sp—applied students or instructor's consent)

**202. Biotechnology in Agriculture.** Classroom instruction will be used to introduce the student to the basic principles and concepts of biotechnology in agriculture. Topics will include: plant, food and nutrition, animal, and medical aspects of agricultural biotechnology. Three lectures. Prerequisite: Biol 125. (3W)

**209. Professional Experience Seminar.** Students will give oral and written reports on training and experience they received during their occupational internship. (1F—applied only)

**220. Weed and Pest Control.** Cultural and chemical methods for controlling weeds, insects, and diseases on horticultural crops. Two lectures, one lab. (3W)

**224. Landscape Maintenance.** Maintenance of trees, shrubs, bushes, and vines in the landscape. Prerequisites: PISci 220, 236. Three lectures, one lab. (4F)

**225. Occupational Experience in Agronomy and Horticulture.** Students will spend full time during the quarter for on-the-job training in agronomic or horticultural industries. (1-6F,W,Sp,Su)

**236. Herbaceous Plants.** Identification and culture of bulbs, annuals, perennials, herbs, and vegetables. Two lectures, one lab. (3F)

**237. Indoor Plants and Interiorscaping.** Identification, culture, installation, and maintenance of indoor foliage and flowering plants used in the interior plantscaping industry. Two lectures, one lab. (3W)

**238. Woody Plant Materials.** Identification, culture, and landscape value of woody ornamentals. Emphasis is placed on horticulturally important species and families. Two lectures, one lab. (3Sp)

**239. Residential Landscapes.** Functional and aesthetic relationships of plants and structures in the landscape and their installation. Prerequisites: PISci 236, 238. Two lectures, two labs. (4W)

**240. Home Horticulture.** The planting and care of fruits, vegetables, lawn, flowers, trees, and shrubs for the home environment. (3W)

**241. Home Horticulture Laboratory.** Practical experience dealing with applied gardening problems. (1Sp,Su)

**250. World Crops.** Understanding and appreciating the task of producing the crops to feed the world. Food production centers as related to climate, latitude, altitude, and soils. Man's influence through breeding, irrigation, fertilizers, and pesticides. (3W)

**290. Special Problems in Ornamental Horticulture.** Practical problems of managing a nursery or greenhouse. (1-5F,W,Sp,Su—applied only)@

**301. Flower Arranging for the Home.** Principles of design, care, and use of floral materials in arrangements and corsages. House plant care. Lab fee required. (3F)

**305. Greenhouse Design and Management.** Principles of greenhouse and controlled environment operation; including structure types, methods of environmental control, handling of materials, and crop programming. Two lectures, one lab. (3F)

**310. Greenhouse Crop Production.** Principles and practices used in growing commercial greenhouse crops. (4W)

**315. Nursery Management.** Principles and practices of nursery management involving annual and perennial horticultural plants. Two lectures, one lab per week. Prerequisite: PISci 316. (3Sp)

**316. Plant Propagation.** Covers the propagation of horticultural plants, including tissue culture, budding, grafting, cuttings, bulb division, and direct seeding. Two lectures, one lab per week. (3W)

**350. Pruning Horticultural Plants.** A practical course dealing with the pruning of fruit trees and ornamental plants. Two lectures, one lab per week. (3W)

**420. Turfgrass Science and Culture.** Characteristics and culture of grasses for different regions and uses. Two lectures, one lab per week. (3Sp)

**428. Field Crops.** Classification, cultural methods of commercial production and market grades of cereal, root, and oil seed crops. (4F)

**430. Crop Management Systems.** Field and forage crop management on irrigated and nonirrigated land. No-till and minimal till concepts along with computer modeling of crop production. Field instrumentation discussed in laboratory. Two lectures, one lab. (3W)

**432. Forage Crops.** Legumes, grasses, and other forages; classification, production, harvesting, storage, rotations, pasture management, and soil conservation. Three lectures, one lab per week. (4Sp)

**440. Vegetable Production.** Principles and practices underlying production of vegetable crops, including varieties, fertilizers, pest control, harvesting, storage, and processing. Emphasis will be placed upon culture of the major vegetable crops. (3W)

**\*445. Small Fruit Culture.** Principles and practices for managing small fruit plantings with emphasis on strawberries, cane berries, and grapes. Two lectures, one lab per week. Prerequisite: Biol 126. (3W)

**450. Fruit Production.** Cultivars, physiology, anatomy, propagation, sites, soils, climate, culture, irrigation, fertilizers, insect and disease control, harvesting, storage, marketing, economics. Three lectures, one lab per week. Prerequisite: Biol 126. (4F)@

**460. Seed Physiology and Production.** Methods, problems, and commercial production of field, vegetable, and flower seeds in the intermountain west. Three lectures, one lab. Prerequisite: Biol 126 or instructor's consent. (4F)

**476. Crop Ecology.** Interactions between crop plants and environment, integrating concepts of plant physiology, genetics, climatology, geology, and soil science. Two lectures. Prerequisite: Bot 440 or instructor's consent. (3W)

**489. Seminar.** Review and discussion of current plant and soil science problems, practices, and available employment. Required of all seniors in the department. One lecture. (1F,W,Sp)@

**490. Special Problems.** Conferences or laboratory investigations. Subject must receive prior approval. (1-3F,W,Sp)@

**520 (d620).<sup>2</sup> Crop Physiology.** The relationship between physiological processes and yield of crops. Carbon assimilation, light interception and canopy geometry, partitioning, and source-sink relationships will be discussed. Prerequisite: Bot 440. Three lectures, one lab. (3Sp)

**521 (d621). Crop Physiology Laboratory.** Analysis of plant physiological processes which result in plant growth and crop production. Prerequisite: PISci 520 or 620 prior to or concurrently, and instructor's consent. (2Sp)

**\*\*540 (d635). Plant Tissue Culture: Principles and Applications.** Plant tissue culture techniques used in commercial propagation, genetic improvement of crop and ornamental plants, and biosynthesis of secondary compounds. Two lectures, two labs. Prerequisite: Bot 440. (4W)

**555 (d650). Weed Science.** Identification of weeds, weed problems in agriculture, and methods of control. Three lectures, one lab per week. (4Sp)

**565 (d665). Agricultural Sprays and Dusts.** Preparation, properties, and uses of fungicides, insecticides, herbicides, and growth regulators. Operation and care of application equipment. Four lectures, one lab per week. Prerequisites: Bot 560, Ent 539, or special permission. (5Sp)

**570. Plant Breeding.** Principles, techniques, and practices in breeding improved varieties of crop plants. Prerequisite: Biol 319. (5W)

### Graduate<sup>3</sup>

**620 (d520). Crop Physiology.** (3Sp)

**621 (d521). Crop Physiology Laboratory.** (2Sp)

**625. Current Topics in Plant Science.** (2-3F,W,Sp)

**635 (d540). Plant Tissue Culture: Principles and Applications.** (4W)

**650 (d555). Weed Science.** (4Sp)

**\*655. Biochemical Basis of Herbicidal Action.** (3W)



\*660. Principles of Cytogenetics. Prerequisite: Biol 319. (4W)

665 (d565). Agricultural Sprays and Dusts. (5Sp)

\*\*670. Plant Breeding. (5)

\*\*675. Control of Reproduction in Plants. (3)

\*\*680. Methods in Plant Science Research. (4W)

689. Seminar. (1)

690. Special Problems. (1-3)@

697. Research and Thesis. (1-18)@

699. Continuing Graduate Advisement. (1-12)@

797. Research and Thesis. (1-18)@

799. Continuing Graduate Advisement. (1-12)@

### *Soil Science Courses*

**PS 200. Soils, Waters, and the Environment: An Introduction.** A survey of soils and waters for food and fiber production, for engineering uses, as sinks for wastes, and for recreational uses. Environment oriented. (3F,W)@

**358. General Soils.** An introduction to soil formation, physical and chemical properties, fertility, and management. Suggested background: course in chemistry and geology. (4F,Sp)@

**359. General Soils Laboratory.** Practice in analysis of soils and water, including demonstrations and/or field trips. Prerequisites: Soils 358 or equivalent previously or concurrently; course in chemistry or instructor's consent. (2F,Sp)

**IO 400. Soil and Water Conservation.** A holistic approach to managing agronomy systems (soil-water-plant-atmosphere continuum) in a way that will optimize soil and water conservation while maintaining production. (5F)

**470. Irrigated Soils.** Soil salinity, soil-moisture-plant relationships, water supply and quality, irrigation water measurements, soil moisture movement, irrigation methods. Prerequisite: an introductory course in soil science or instructor's consent. (4W)

**490. Special Problems.** Conferences or laboratory investigations. Subject and credit arranged. Must be approved by the department. (1-5F,W,Sp,Su)@

**492. Field Practicum.** Practical, on-the-farm field experience in crops and soils for students who do not have a farming background. (2-6F,W,Sp,Su)

**505 (d605).<sup>2</sup> Principles of Environmental Soil Chemistry.** Chemistry of the soil matrix-soil solution interaction as related to environmental processes, emphasizing the surface chemistry and ionic equilibrium relationship. Prerequisite: Soils 358, Chem 121, or equivalent. (3W)

**513 (d613). Soil Identification and Interpretation.** Identification and classification of soils, field exercises, and use of soil reports with emphasis on interpretations for use and management. (5Sp)

**527 (d628). Properties and Management of Wildland Soils.** Biological, chemical, and physical properties of wildland soils; site productivity and classification of wildlands; techniques for managing wildland soils and the consequences of management. (3F)

**530 (d630). Soil Microbiology.** Activities and ecology of microorganisms related to soil environment, soil fertility, soil organic matter, rhizosphere, and soil amendments. Prerequisites: general biology, organic chemistry. (3F)

**531 (d631). Soil Microbiology Laboratory.** Application of soil microbiological techniques. (2F)

**555 (d655). Soil and Plant Nutrition.** The soil, chemical, and environmental factors that affect the mineral nutrition of plants; nutrient availability, absorption, toxicity, fertilizer management, soil amendments, and water quality. Prerequisite: Soils 358. (3W)

**556 (d656). Soil and Plant Nutrition Laboratory.** Procedures used in determining fertility status of soils and identifying problems affecting plant growth. Prerequisite: Soils 555 prior to or concurrently, or with instructor's consent. (2W)

**\*562 (d672). Chemistry of Aquatic Systems.** Emphasis on the chemical processes occurring in natural environments. Principles of physical chemistry applied to problems involving the composition of natural waters. Prerequisite: Chem 301. (3Sp)

**565 (d665). Applied Soil Physics.** Physical relations of soils to water and climatic factors. The relation of soil water content and potential to plant growth, soil water flow, heat flow, and aeration are emphasized. (3F)

**566 (d666). Applied Soil Physics Laboratory.** Methods of analysis. Prerequisite: Soils 565 prior to or concurrently, or instructor's consent. (2F)

**581 (d681). Teaching Practicum.** Supervised teaching experience in soil science. Arrangements need to be made several quarters in advance. (2-6F,W,Sp,Su)

### *Graduate<sup>3</sup>*

**605 (d505). Principles of Environmental Soil Chemistry.** (3W)

**613 (d513). Soil Identification and Interpretation.** (5Sp)

**\*\*614. Soil Physics Models.** (3F)

**\*\*615. Physical Chemistry of Soils.** (3F)

**619. Salt-affected Soils.** (2W)

**\*\*621. Genesis, Morphology, and Mineralogy of Soils.** (3Sp)

**622. Microcomputer Applications in Agronomic Research.** (3Sp)

**\*\*624. Soil Fertility.** (3Sp)

**\*627. Soil Solute Processes.** (3F)

**628 (d527). Properties and Management of Wildland Soils.** (3F)

**630 (d530). Soil Microbiology.** (3F)

**631 (d531). Soil Microbiology Laboratory.** (2F)

**\*\*635. Soil and Environmental Biogeochemistry.** (3Sp)

**655 (d555). Soil and Plant Nutrition.** (3W)

**656 (d556). Soil and Plant Nutrition Laboratory.** (2W)

**665 (d565). Applied Soil Physics.** (3F)

**666 (d566). Applied Soil Physics Laboratory.** (2F)

**\*672 (d562). Chemistry of Aquatic Systems.** (3Sp)

**681 (d581). Teaching Practicum.** (2-6F,W,Sp,Su)

**687. Ecology Seminar.** (1F)@

**690. Special Problems in Soil Physics.** (1-5F,W,Sp,Su)@

**691. Special Problems in Soils and Irrigation.** (1-5F,W,Sp,Su)@

**692. Special Problems in Soil Classification and Genesis.** (1-5F,W,Sp,Su)@

**693. Special Problems in Soil and Water Chemistry.** (1-5F,W,Sp,Su)@

**694. Special Problems in Soil Fertility and Plant Nutrition.** (1-5F,W,Sp,Su)@

**695. Special Problems in Physical Ecology.** (1-5F,W,Sp,Su)@

**696. Special Problems in Agronomic Applications with Microcomputers.** (1-5F,W,Sp,Su)@

**697. Thesis Research.** (1-15F,W,Sp,Su)@

**698. Special Problems in Soil Management and Farming Systems.** (1-5F,W,Sp,Su)@

**699. Continuing Graduate Advisement.** (1-12F,W,Sp,Su)@

**780. Seminar.** (1-3W,Sp)@

**790. Special Problems.** (1-8F,W,Sp,Su)@

**797. Dissertation Research, PhD.** (1-15F,W,Sp,Su)@

**799. Continuing Graduate Advisement.** (1-12F,W,Sp,Su)@

## Biometeorology Courses

**PS 200. Introduction to Weather.** Introduction to the basic processes of weather including temperature, wind, clouds, precipitation, storms, air masses, atmospheric circulation, and their impact on human activities. (3F,Sp)

**PS 382. Regional Climatology.** Descriptive treatment of regional and world climates with emphasis on the geographical features and the associated physical mechanisms that produce different climatic regions. (3W)

**500. Introduction to Aeronomy.** A survey of the properties and processes in the atmosphere. Atmospheric structure, magnetospheric phenomena, the ionosphere, solar terrestrial relationships, aurora and airglow, and atmospheric reactions. (3Sp)

**530 (d630).<sup>2</sup> Introduction to Meteorology.** Introduction to principles of meteorology for students with science background. Treatment of the nature of storms, winds, clouds, precipitation, and atmospheric circulation. (4W)

**550 (d650). Microclimate and Biophysics of Plant Canopies.** An examination of the soil-plant-atmosphere interactions which shape the microclimate of vegetated surfaces. Emphasis is directed towards understanding the fundamental principles, and nonlinear feedbacks. (3Sp)

**590. Special Problems.** Student selects a problem, reviews literature, conducts experiments, and writes a report. Must be approved by department. (1-5F,W,Sp,Su)

## Graduate<sup>3</sup>

**630 (d530). Introduction to Meteorology.** (4W)

**\*635. Physical Climatology.** (3Sp)

**\*640. Climate Modeling.** (3W)

**650 (d550). Microclimate and Biophysics of Plant Canopies.** (3Sp)

**652. Introduction to Biometeorological Instrumentation.** (3W)

**653. Biometeorological Instruments Laboratory.** (3Sp)

**655. Micrometeorology.** (3W)

**680. Seminar.** (1W,Sp)@

**690. Special Problems in Aeronomy.** (1-5F,W,Sp,Su)@

**691. Special Problems in Agroclimatology.** (1-5F,W,Sp,Su)@

**692. Special Problems in Radiative Exchange.** (1-5F,W,Sp,Su)@

**693. Special Problems in Biometeorological Instruments.** (1-5F,W,Sp,Su)

**694. Special Problems in Applied Climatology.** (1-5F,W,Sp,Su)@

**695. Special Problems in Physical Ecology.** (1-5F,W,Sp,Su)@

**696. Special Problems in Air Pollution Meteorology.** (1-5F,W,Sp,Su)@

**697. Thesis Research.** (1-15F,W,Sp,Su)@

**698. Special Problems in Mountain Meteorology.** (1-5F,W,Sp,Su)@

**699. Continuing Graduate Advisement.** (1-12F,W,Sp,Su)@

**701, 702, 703. Aeronomy.** (3F) (3W) (3Sp)

**704. Ionospheric Physics** (3F)

**\*706. Circulation of the High Atmosphere.** (3F)

**707. Atmospheric Turbulence.** (3W)

**708. Atmospheric Diffusion.** (3W)

**780. Seminar.** (1-3W,Sp)@

**797. Dissertation Research.** (1-15F,W,Sp,Su)@

**799. Continuing Graduate Advisement.** (1-12F,W,Sp,Su)

<sup>2</sup>Parenthetical numbers preceded by *d* indicate a *dual* listing.

<sup>3</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

@Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

©This course is also offered by correspondence through the Life Span Learning Independent Study Division.

\*Taught 1990-91.

\*\*Taught 1991-92.

## Department of Political Science College of Humanities, Arts and Social Sciences

**Head: Professor William L. Furlong**  
Office in Main 256

**Professors** Robert A. Hoover, H. Preston Thomas; **Professor Emeritus** Claude J. Burtenshaw; **Associate Professors** Peter F. Galderisi, David B. Goetze, Calvin W. Hiebner, Amal Kavar, Randy T. Simmons; **Associate Professor Emeritus** Philip S. Spoerry; **Assistant Professors** Michael S. Lyons, Carolyn Rhodes, Veronica Ward; **Temporary Instructor** Rosanne London

**Degrees offered:** Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), and Master of Arts (MA) in Political Science; BS and BA in Prelaw; Master of Social Science (MSS)

## Objectives

The Department of Political Science offers a flexible program to accomplish the following objectives:

1. to provide majors with a broad, liberal arts education as a foundation for careers in government, law, politics, and business;
2. to prepare students for graduate study in political science, public administration, and law;
3. to serve nonmajors with a variety of courses that provide understanding of the political process.

## Requirements

### Departmental Admission Requirements

Admission requirements for the Department of Political Science are the same as those described for the University on pages 8-11. Students in good standing may apply for admission to the department.

### Graduation Requirements

**Political Science Majors.** Students must have at least 48 credits in the field. They must include PolSc 101, 110, and 230, and they must choose either PolSc 210 or 220. A 2.5 GPA in political science courses and a 2.0 overall GPA are required.

**Prelaw Majors.** Students must have at least 48 credits in the field. They must include PolSc 101, 110, 120, 464, 471, and 472. A 3.0 GPA in political science courses and a 3.0 overall GPA are required.

**Minor.** Students can obtain a minor in political science by completing a total of 24 credits in the field. These need to include PolSc 101 and 110. A 2.5 grade point average is also required in these 24 credits.

**Teaching Major.** In addition to the regular requirements for a political science major, the teaching major must select 48 credits from a specific list available from the department and in the *USU Secondary Teacher Education Program Undergraduate Planning Guide* available at the USU Bookstore. The student needs a total of 52 credit hours to complete this major.

**Teaching Minor.** Students must take 27 total credits in political science, including PolSc 101, 110, and 18 additional credits from a list of specific courses available from the department and in the *USU Secondary Teacher Education Program Undergraduate Planning Guide* available at the USU Bookstore.

### Certificates

Certificates are intensive programs of study similar to majors, but involving courses in more than one academic discipline. For example, political science, economics, and business may be combined. The Political Science Department participates in the following three certificate programs:

**Public Administration.** Trains students for work in administration in government agencies, in private organizations, and in business firms.

**International Relations.** Designed for students entering graduate programs in international relations or those planning careers in international business or diplomacy.

**Political Communication.** Prepares students for work in political public relations, lobbying, and political campaigns.

Pamphlets explaining the requirements for each of these certificates are available from the Political Science Department, Main 256.

### Internships

The department places approximately 35 students in government internships each year. Most of these interns work with a member of the Utah delegation to the U.S. Congress in Washington D.C., a

member of the Utah State Legislature in Salt Lake City, a political campaign, a state or local administrative agency, or a national lobbying group. Interns serve from 6 to 13 weeks, receive 3 to 15 credits, and generally earn stipends ranging from \$200 to \$2,000. Students in any major, of at least sophomore class standing with at least a 3.0 GPA, are eligible for the Government Internship Program. Application forms and a brochure explaining the program in detail are available from the department.

### The USU Institute of Political Economy

The Institute of Political Economy (IPE) is a Utah State University research institute based in the Department of Political Science. IPE has a threefold mission: conduct basic policy research in political economy; disseminate research results through books, periodicals, classes, seminars, and conferences; and provide increased opportunities to students interested in the study of local, state, and national political and economic processes.

### Pi Sigma Alpha

Pi Sigma Alpha is the national honorary political science society. A member must have at least 15 credits of political science with a 3.3 average and a 3.0 average in other subjects. Carolyn Rhodes is the adviser.

### Graduate Study

**Master of Science and Master of Arts in Political Science.** The programs of study for the Master of Science and Master of Arts degrees in political science require 45 credits in Political Science and are described in the graduate catalog. Students interested in the programs should also consult with the Political Science department head.

**Master of Social Science.** This is an interdisciplinary program with an emphasis in public administration. The program requires 48 credits, with a minimum of 25 credits in Political Science. For details, see the graduate catalog. Interested students should consult with the Political Science department head.

### Political Science Courses

**SS 101. Government and the Individual.** Introduction to political science. Origin and justification of government. How and why people get involved in politics. Different forms of government. Government and public policy. Emphasizes basic ideas and theories. (4)

**105. Current Politics.** Background and analysis of current political events. Basic political concepts are illustrated through an analysis of current issues and problems. (2F,W,Sp)

**SS 110. United States Government and Politics.** U.S. Constitution, political parties and elections, pressure groups, Congress, president, bureaucracy, courts, civil rights and liberties, and foreign affairs. This course meets the Americanization requirement. (5F,W,Sp)©

**111. American State and Local Government and Politics.** State constitutions, legislature, governors, courts, counties, municipalities, special districts, and intergovernmental relations. (4)

**120. Introduction to Law.** Courts in both their legal and political roles. (5F,Sp)

**131. Orientation and Library Research.** Introduction to use of library resources for political science, government, and prelaw. Includes orientation concerning careers and advanced training. (2W)

**205. Clash of Cultures.** An interdisciplinary course to develop an appreciation of other societies, their values, institutions, and behavioral patterns. (5)

**SS 210. Introduction to International Politics.** Analysis of the national-state system as well as interdependence of the global community. (5W)

**SS 220. Comparative Politics.** Comparisons of differences in political culture, institutions, and processes, including authoritarian to democratic systems, violence and corruption, political development, and public policy. (5F)

**227. Introduction to Latin America.** Political institutions of nations of Latin America. (4)

**230. Introduction to Political Research.** The methodology, methods, and approaches used to study and analyze political events and relationships. (3)

**260. Introduction to Public Administration.** Presents basic theories, concepts, approaches, and analysis of current practices and problems in governmental administration. (4F,Sp)

**305. Politics in Films.** Ways in which politics have been depicted in major motion pictures and use of film to raise political consciousness. (3)

**311. Parties and Elections.** Political parties, campaigns, and elections. (5F)

**312. Public Opinion and Political Behavior.** Approaches to the study of political behavior, analysis of public opinion, and survey research. (4W)

**313. U.S. Legislative Politics.** A simulation of the legislative process in the U.S. Congress. (5Sp)

**314. The Presidency.** The systematic study of the American Presidency. The presidential role, character, and powers are investigated, as are the presidential transactions with selected publics. (3)

**316. Regulation in a Federal System.** How federalism constrains the manner in which regulation is and can be undertaken in the U.S., as well as the relative advantages of alternatives. (3)

**319. Sex Roles and Politics.** Explores women's status in the political system, including topics such as: women and the law, public policy, political thought, and women—political attitudes and behavior. (3)

**321. Western European Government and Politics.** Britain, France, Germany, Italy, and Scandinavia. (5)

**322. Political Violence and Revolution.** Study and analysis of political violence from state coercion, terrorism, and coup d'etat to revolution. (4)

**323. Middle Eastern Government and Politics.** (3W)

**327. Latin American Government and Politics.** General overview of Latin American politics and utilization of case studies from specific countries. (4)

**331. American Political Thought.** The history of American political thought from its European antecedents to the present. (5)

**332. Asian Political Thought.** Political philosophies and historical thought of the Asian region. (4F)

**343. Political Geography.** The relationship between earth and state. World political phenomena studied from a geographic point of view, including international boundaries, territorial seas, and landlocked states. (3W)

**346. Politics and War.** Causes and implications of war will be examined. Wars from general to limited will be studied, including specific case studies such as the Vietnam War. (3)

**380. Introduction to Public Policy.** Examines different approaches to the study of public policy and different value dimensions in the design of policies. (3)

**410 (d610).<sup>1</sup> Politics and Public Policy.** Explains public policies as rational expressions of political self-interest and explores the relationship between self-interest and values such as "equity" and "efficiency" in policy. (3)

**411 (d611). Comparative Public Policy.** Involves the application of economic methods to the study of politics and public policy. (4)

**413. Lobbying in the Legislative Process.** A lobbying simulation offered in conjunction with congressional simulation course, "Legislative Politics." Prerequisite: PolSc 313. (3Sp)

**416. Metro-urban Politics.** (3)

**418 (d618). Natural Resources and Environmental Policy: Political Economy of Environmental Quality.** Causes of environmental and natural resources problems and evaluation of political and private responses to them. Study of economics and politics applied to the environment. Production, protection, and allocation of scarce resources by markets and political systems. (4)

**422. Soviet and Eastern European Government and Politics.** (4F)

**423. Modern Soviet Politics.** Soviet political attitudes, the distribution of power, institutions and performance, democracy and dissent, and prospects for reform. (3W)

**424. Japanese Government and Politics.** (4)

**425. Chinese Government and Politics.** (5W)

**426. Southeast Asian Government and Politics.** (4Sp)

**427 (d627). Authoritarian Political Systems.** Examines the structure and performance of "authoritarian" political systems, including centralized "socialist" systems and traditional dictatorships. (4F)

**428 (d628). Politics of Development.** Political development, including changes in institutions, attitudes, level of participation, basis of legitimacy, and increased centralized power and government capabilities. (4)

**432. History of Political Thought I.** Plato, Aristotle, the Stoics, Augustine, Aquinas, Marsilio and William, Machiavelli. (4F)

**433. History of Political Thought II.** Machiavelli, Luther, Calvin, Hobbes, Locke, Montesquieu, Rousseau, Hume, Burke. (4W)

**434. History of Political Thought III.** From Hagel through nineteenth and twentieth centuries: Utilitarianism, Socialism, Marxism, Leninism, Stalinism, Maoism, and Fascism, Liberalism, and Democracy. (4Sp)

**435. Evolution, Choice, and Social Cooperation.** Focuses on the theme of human social cooperation. Constraining influence of evolution and environment on ability of the human species to form social communities and to achieve socially desirable cooperation. (3Sp)

**440. United States Foreign Policy.** Formulation, execution, and impact. (5Sp)

**\*442. Nuclear Strategy and Global Politics.** Focus on the history and analysis of nuclear doctrine as a mechanism for the management and control of conflict in the international arena. (3Sp)

**443. National Security Policy.** Decision-making options in U.S. defense programs. (3)

**444. International Law and Organizations.** Analysis of the function of international law and international organizations. (3)

**445. Latin American Foreign Policy.** A study and analysis of the foreign relations of the Latin American nations among themselves and with the rest of the world. (3)

**447. American Foreign Policy in the Pacific.** An analysis of the contemporary foreign policies of the major countries surrounding the North Pacific. (5F)

**448 (d648). United States Trade Policy.** Examines U.S. trade policy in the twentieth century with particular attention paid to the GATT cooperative framework and dispute settlement. (4W)

**\*\*450 (d650). Political Analysis.** Political data, quantitative and analytical techniques. (4)

**451. Survey Research.** Constructing questionnaires, sampling, interviewing, analysis. Prerequisite: permission of instructors. (4)

**452. American Military History.** History of the development of the American military establishment and its relationship to the changing American and global environment. (3)

**\*\*454 (d654). Election Campaigns.** Introduction to the many components of organizing, conducting, and financing a campaign, including campaign strategy, candidate recruitment, polling, advertising, and press releases. (4Sp)

**462 (d662). Public Personnel Administration.** Recruitment, training, and evaluation. (3W)

**463 (d663). Public Finance Administration.** Budgetary processes and policies. (3Sp)

**464 (d664). Administrative Law.** Legal control of administrative agencies. (3Sp)

**465 (d665). Administration in Developing Areas.** Role of public administration in developing societies. (3)

**468 (d668). Space Policy and Administration.** Past, present, and future of space program and NASA, the principal agency administering the program, to draw lessons about the behavior of public agencies and the making of public policy. (4)

**471. American Constitutional Law I.** Governmental powers, separation of powers, checks and balances, federalism, and due process of law. (4F)

**472. American Constitutional Law II.** Equality and Bill of Rights protections. (4W)

**473. Supreme Court Simulation.** Simulation of Supreme Court. Instructor approval required. (5W)

**478. United States and Europe Since 1789.** The study of diplomatic relations between Europe and the U.S. from the American War of Independence to the present. (3W)

**489. Special Topics in Political Science.** Credit arranged. Prerequisite: instructor's consent. (1-5F,W,Sp)®

**490. Senior Seminar.** Comprehensive perspective of political science as a discipline. (3-5)®

**491. Readings and Conference.** Individually directed study in subjects of special interest to students. Permission of instructor required. (1-5)® ©

**516. Political Economy of the USSR and Eastern Europe.** Description and analysis of the contemporary economic systems of the USSR and Eastern Europe, with emphasis on problems of economic policy and central planning. (3Sp)

**591. Campaign Internship.** A quarter campaign internship. Instructor approval required. (2-15)®

**592. Washington Internship.** A quarter congressional, administrative, or legal internship in Washington, D.C. Instructor approval required. (2-15)

**593. State Government Internship.** A quarter legislative, lobbying, or administrative internship in the state government of Utah or those of any other state government. Instructor approval required. (2-15)

**594. Administrative Internship.** A quarter administrative internship at the local or state level. Instructor approval required. (1-15)

## Graduate<sup>2</sup>

**601. Scope and Methods.** (4F)

**602. Methods in Public Policy.** (4)

**609. Philosophy of the Social Sciences.** (3)

**610 (d410). Politics and Public Policy.** (3)

**611 (d411). Comparative Public Policy.** (4)®

**615. United States Government.** (4)

**618 (d418). Natural Resources and Environmental Policy: Political Economy of Environmental Quality.** (4)

**620. Comparative Politics.** (4)®

**621. Western European Governments and Politics.** (4)

**623. Middle Eastern Politics.** (4)

**624. Problems in Comparative Politics.** (2-5)®

**627 (d427). Authoritarian Political Systems.** (4F)

**628 (d428). Politics of Development.** (4)

**640. International Politics Theory.** (4)

**\*641. American Foreign Policy.** (4)

**642. National Security Policy.** (4)®

**643. Special Topics in National Security.** (4)®

**644. Politics of Global Environmental Problems.** (4)

**648 (d448). United States Trade Policy.** (4W)

**\*\*650 (d450). Political Analysis.** (4)

**\*\*654 (d454). Election Campaigns.** (4Sp)

**660. Public Administration.** (4)

**661 (f561). Organization and Management of Public Administrative Agencies.** (4)

**662 (d462). Public Personnel Administration.** (3W)

**663 (d463). Public Finance Administration.** (3Sp)

**664 (d464). Administrative Law.** (3Sp)

**665 (d465). Administration in Developing Areas.** (3)

**667. Administrative Behavior of Agencies.** (4)

**668 (d468). Space Policy and Administration.** (4)

**681. Seminar.** (1-4)®

**691. Tutorial.** (1-5)®

**692. Internship.** Approval of instructor required. (1-15)®

**697. Thesis Research.** (1-9)®

**699. Continuing Graduate Advisement.** (1-3)®

\*Taught 1990-91.

\*\*Taught 1991-92.

<sup>1</sup>Parenthetical numbers preceded by *d* indicate a *dual* listing; parenthetical numbers preceded by an *f* are the *former* course numbers.

<sup>2</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through the Life Span Learning Independent Study Division.

## Department of **Psychology** College of Education

**Head:** Professor Michael R. Bertoch  
Office in Emma Eccles Jones Education 487E

**Professors** Keith T. Checketts, Carl D. Cheney, John R. Cragun, Richley H. Crapo, Marvin G. Fifield, Cecelia H. Foxley, J. Grayson Osborne, Charles L. Salzberg, Sebastian Striefel, Karl R. White, Blaine R. Worthen; **Professors Emeritus** Arden N. Frandsen, Richard B. Powers, David R. Stone, E. Wayne Wright; **Associate Professors** Frank R. Ascione, Tamara J. Ferguson, Damian A. McShane, Elwin C. Nielsen, Richard N. Roberts, David M. Stein; **Associate Professor Emeritus** William R. Dobson; **Assistant Professors** J. Whorton Allen, Jay R. Skidmore, Lani Marie Van Dusen; **Adjunct and Clinical Faculty** J. Milo Andrus, Richard D. Baer, David Bush, Curtis R. Canning, Glendon W. Casto, Robert Charlton, Phyllis Cole, Rita M. Curl, Margaret M. Dyreson, Jerry E. Edgington, Laura B. Fisher, Marilynne Glatfelter, Bruce R. Johns, Joan Kleinke, Glen H. Maw, Calvin R. Petersen, Thomas R. Schenkenberg; **Adviser** Patricia O. Preston

**Degrees offered:** Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), and Doctor of Philosophy (PhD) in Psychology

**Areas of specialization:** Graduate degrees are offered in School Counseling, School Psychology, Professional-Scientific Psychology (APA approved), and Research and Evaluation Methodology.

### Objectives

One primary focus of the undergraduate major program in psychology is to prepare students for acceptance into graduate programs. A second focus is to prepare students for post-bachelor employment opportunities. Employment opportunities for students with a bachelors degree in psychology are diverse. Although the department does not offer specific formal areas of concentration at the bachelors level, other than the approved teaching major, listings of courses in psychology and related disciplines have been compiled to assist students in taking combinations of courses which can lead naturally to different employment opportunities.

More information on career alternatives and assistance in selecting electives appropriate to a student's career goals can be obtained from the Psychology undergraduate adviser in Emma Eccles Jones Education 487B.

The department also offers undergraduate courses in the study of human and animal behavior and in research methods used by psychologists. These courses are pertinent to the education of students majoring in other areas. The department maintains both human and animal laboratories to supplement didactic course work in the study of behavior.

### Requirements

**Departmental Admission Requirements.** Admission requirements for the Department of Psychology are the same as those described for the University on pages 8-11. Students in good standing

may apply for admission to the department. Additional admission requirements must be met before reaching junior standing. Students should contact the departmental adviser for advanced standing requirements.

**Psychology Major and Psychology Teaching Major.** Requirements for a psychology major consist of a broad preparation of a minimum of 44-45 credits of specified course work, plus at least 6 credits of a culminating experience which allows for integration of course work knowledge (theory) through application, for a total of 50-51 credits. The specific courses required are: Psy 101, 110, 140, 210, 321, 345, 346, 350, 351, 366, 380, 510, and 530. An academic minor or courses in two approved areas of concentration, totaling 18 credits, is required. An overall GPA of 2.2 is required for graduation, with a minimum C or better in all Psychology courses. Students desiring certification for teaching in secondary schools must also meet the requirements of the Secondary Education Department.

**Psychology Minor.** A minor in psychology requires the following classes for a total of 18-19 credits: Psy 101, 110 (5 cr) or 110 (3 cr) and 210 (3 cr), 140, and 510.

**Psychology Teaching Minor.** Requirements for a teaching minor include Psy 101, 110 (3 cr), 140, 210, 321, 350, 351, and 510 for a total of 28 credit hours.

### Graduate Study

The Department of Psychology offers certification for school psychologists and school counselors and the degrees of Master of Science and Doctor of Philosophy. Areas of specialization are Professional-Scientific Psychology and Research and Evaluation Methodology at the PhD level; and School Counseling, School Psychology, and Counseling Psychology at the MS level. See the graduate catalog for further information.

### Psychology Courses

**SS 101. General Psychology.** Principles of behavior of organisms including scientific methodology in psychology, conditioning and learning, perception and thinking, child development, personality, abnormal psychology, and social psychology. (5F,W,Sp,Su)©

**SS 110. Human Development: General.** Introduction to psychological development with emphasis on perceptual, language, cognitive, and social development in children. Prerequisite: Psy 101. (3-5F,W,Sp,Su)©

**SS 121. Psychology of Human Adjustment.** An examination of the life situations that affect human adjustment to everyday living, with emphasis on practical application. (3F,W,Sp)

**122. Career Exploration.** Designed to enable students of all disciplines and levels of educational attainment to explore their career interests and potential. (3F,W,Sp)

**SS 140. Analysis of Behavior: Basic Principles.** A laboratory course about the scientific methods used in the study of animal and human behavior. Prerequisite: Psy 101. (4F,W,Sp,Su)

**173. Personal Study Efficiency.** Designed to (1) increase a student's interest in and knowledge of the University and (2) develop skills in areas such as note taking, listening, test taking, and textbook reading. (1-3F,W,Sp)

**175. College Reading and Listening.** A practical course, highly individualized, designed to aid in improving the efficiency of reading and listening skills. (2W)

**210. Human Development: Adolescence.** Characteristics of adolescents and their psychological, educational, and adjustment problems are discussed in detail. Prerequisite: Psy 101. (3F,W,Sp)

**225. Introductory Cooperative Work Experience.** Educators and employers cooperate to provide opportunities for students to apply classroom theory and principles in job environments, thereby gaining practical experience in their field. Prerequisite: approval of psychology department coop education coordinator. (1-8F,W,Sp,Su)

**300. Child Abuse and Neglect: A Multidisciplinary Approach.** Goal is to equip students with an increased knowledge and awareness of the etiology, identification, reporting, and treatment of abused children and abusive parents. (3)©

**321. Abnormal Psychology.** A descriptive and explanatory study of the varieties of psychoses, psychoneuroses, and minor maladjustments—their causes, methods of treatment, and approaches used in preventing psychological maladjustments. Prerequisite: Psy 101. (3F,Sp)©

**342. Thinking and Verbal Learning.** Stresses mediational processes in thinking, cognition, concept learning, transfer, and hypothesizing as elements of complex learning and problem solving. Prerequisite: Psy 101. (3)

**345. Perception and Psychophysics.** Analysis of sensory-determined behavior and the methods, findings, and principles of sensory communication. Prerequisites: Psy 101. (3Sp)

**346. Physiological Psychology.** Introductory course in anatomy and physiology related to the central nervous system and behavior. Also considered are the neural and biochemical substrates of behavior. Prerequisites: Physl 130, Psy 140. (3F)

**350. Scientific Thinking and Methods in Psychology.** Overview of scientific thinking and research methods used in Psychology and other closely related social sciences. (3W)

**351. Social Psychology.** Study of the individual in society; problems, theories, and methods of social psychology; will relate reading assignments to current social issues. Prerequisite: Psy 101. (3W)

**366. Educational Psychology for Teachers.** Principles and practices for development of conditions for effective learning. Prerequisites: Psy 101, and Psy 110 or 210. (3F,W,Sp,Su)

**372. Behavior Modification.** Approaches to behavior modification in a variety of settings. An individual project is required of the student. Prerequisite: Psy 101. (3W,Sp)

**380. Introduction to Educational and Psychological Statistics.** Elementary study of statistical procedures in handling test scores and other data, and of the concepts needed to read current educational and psychological literature. (3F,W,Sp,Su)

**392. Practicum.** (1-3)

**\*421. Personality Theory.** An explanatory study of various personality theories, their origin, and approaches to the understanding of human behavior. Prerequisite: Psy 101. (3F)

**425. Advanced Cooperative Work Experience.** Cooperative education work experience position; increased level of complexity and a more professional level of experience as student advances toward completion of the program. (1-15F,W,Sp,Su)©

**\*440. Analysis of Behavior: Learning, Motivation, and Emotion.** In-depth examination of the principles introduced in Psy 140. Principles governing more complex human and animal behavior are considered as well as emotional and motivational factors in behavior. Lab included. Prerequisite: Psy 140. (4W)

**480. Mental Aspects of Sports Performance.** This course attempts to provide a current knowledge of sport psychology and the applications this knowledge has for teaching sports and coaching in public schools. (3W)

**491. Undergraduate Research Creative Opportunity.** A cooperative process of discovery, investigation, research, or creativity between faculty and one or more students. Prerequisite: approval of Psychology Department URCO coordinator. (1-3F,W,Sp,Su)©

**505 (d605). Psychological Aspects of Sports Performance.** Psychological theory and principles applied to sports. Includes motivational techniques, psychological evaluation, stress and anxiety in sports, personality and sports performance. (3Sp)

**510 (d610). History and Systems of Psychology.** Theoretical and historical developments in psychology with primary emphasis on nineteenth and twentieth century

developments, although earlier precursors are also considered. Prerequisite: Psy 101. (4Sp)

**515. Psychology of Aging.** To acquaint students with the psychological process changes in the elderly, the coping mechanisms used by the elderly, and the research related to the above. (4)

**\*\*520. Introduction to Counseling and Guidance.** An introduction to the fundamental counseling and guidance principles and theories that are applicable in various settings in which they are practiced. Prerequisite: Psy 101. (3F)

**524. Workshop in Guidance.** Designed for undergraduate or graduate level students. Serves as an overview of the varied skills needed by counselors in different settings. (1-6)©

**530. Psychometrics.** Evaluation, interpretation, and uses of tests of intelligence, aptitudes, interest, personality, and adjustment. Prerequisites: Psy 101, 380. (5F,Su)

**555. Personnel Psychology.** Methods and principles of psychology as applied to the personnel problems of job analysis, recruitment, affirmative action, selection and staffing, turnover, and legal environment for selection. Prerequisites: MHR 364, Psy 101 and 380, or equivalent. (3F)

**590. Independent Study.** Individual discussion and intensive study of a particular problem or area. Prerequisite: instructor's consent. (1-3F,W,Sp,Su)©

**591. Independent Research.** Experiments and demonstration projects are conducted and reported. Prerequisite: instructor's consent. (1-3F,W,Sp,Su)©

**593. Instructional Apprenticeship.** Training and practical experience in applying the techniques of contingency management to teaching. Prerequisite: instructor's consent. (1-3F,W,Sp,Su)©

## Graduate<sup>2</sup>

**601. Introduction to Evaluation: Evaluation Models and Practical Guidelines.** (3F,Su)

**605 (d505). Psychological Aspects of Sports Performance.** (3Sp)

**606. Human Development: Adult.** (3)

**610 (d510). History and Systems of Psychology.** (4Sp)

**\*\*615. Behavioral Assessment and Single-subject Analysis.** (3)

**\*616. Behavioral Treatment of Childhood Psychological Disorders.** (3)

**620. Principles of Counseling and Psychotherapy.** Prerequisite: BS degree in psychology or related field and instructor's consent. (3F,Su)<sup>3</sup>

**621. Vocational Guidance Workshop.** (1)

**\*\*622. Group Counseling and Psychotherapy: Theory and Practice.** Prerequisites: Psy 620 and 635. (3)<sup>3</sup>

**\*\*623. Theories of Personality and Psychotherapy.** (3)

**624. Workshop in Guidance.** (1-6)©

**625. Graduate Cooperative Work Experience.** (1-15F,W,Sp,Su)©

**\*\*626. Career Development: Theory and Practice.** (3W)

**627. Psychopathology I.** Prerequisite: instructor's consent. (3W)<sup>3</sup>

**628. Psychopathology II.** Prerequisite: instructor's consent. (3Sp)<sup>3</sup>

**\*629. Nonstereotypic Approaches to Counseling.** Prerequisites: Psy 530, 620, 635 or consent of instructor. (3)<sup>3</sup>

**630. Group Testing.** Prerequisite: Psy 530 and instructor's consent. (3)<sup>3</sup>

**631. Individual Intelligence Testing.** Prerequisite: Psy 530 and instructor's consent. (3)<sup>3</sup>

**632. Projective Techniques: Introductory.** Prerequisites: Psy 530, 630, 631 and instructor's consent. (3)<sup>3</sup>

**\*634. Psychological Consultation.** (3)<sup>3</sup>



635, 636, 637. **Practicum in Counseling and Psychotherapy.** Prerequisite: Psy 635 must be taken concurrently with Psy 620 unless the student has had a previous course in principles and techniques of counseling. Instructor's consent required for 635. (3) (3) (3)@<sup>3</sup>

**\*\*641. Individual Intelligence Testing II.** (3)

650. **Interdisciplinary Workshop.** (1-3)@

654. **Moral Development in the Family.** (3)

660. **Correlation and Regression in Psychology and Education.** Prerequisite: Psy 380. (3W,Su)

661. **Inferential Statistics in Psychology and Education.** Prerequisite: Psy 380. (3F,Sp)

666. **Principles of Learning.** (3)

667. **Introduction to Educational and Psychological Research.** Prerequisite: Psy 380. (3F,W,Sp,Su)

668. **Individual Evaluation of Academic Achievement and Testing Preschool Children.** (3)

670. **Grantsmanship in Education and Psychology.** (3-5W)<sup>3</sup>

681. **Seminar.** (1-3)@

682. **Introduction to Neuropsychological Assessment and Diagnosis.** (3)

685. **Research Seminar.** (2)

688. **Transcultural Assessment and Diagnosis.** (1)

689. **Assessment of Emotional Disturbance in Children and Adolescents.** (3)

690. **Independent Study.** (1-3F,W,Sp,Su)@

691. **Independent Research.** Prerequisite: instructor's consent. (1-3F,W,Sp,Su)@

693. **University Teaching Apprenticeship.** (1-3F,W,Sp,Su)@

695. **School Psychology Internship.** (6F,W,Sp)

697. **Thesis.** (1-6F,W,Sp,Su)@

699. **Continuing Graduate Advisement.** (1-12F,W,Sp,Su)@

702. **Alternative Evaluation Methodologies.** Prerequisite: Psy/Educ 601. (3)

703. **Data Collection Techniques in Evaluation of Programs in Education and Psychology.** Prerequisite: Psy/Educ 601. (3)

705. **Internship in Program Evaluation.** (1-6F,W,Sp,Su)

706. **Internship in Research.** (1-6)

710. **Biological Basis of Behavior: Physiological.** (3F)

711. **Learning, Motivation, Cognition, and Emotion.** (5F)

712. **Developmental Psychology.** (3W)

713. **Social and Organizational Bases of Behavior.** (5Sp)

725. **Professional Ethics and Standards.** (3F)

**\*732. Projective Techniques: Advanced.** Prerequisites: Psy 632, masters degree. (3)<sup>3</sup>

**\*\*733. Psychodiagnosis.** Prerequisite: Psy 732. (3)<sup>3</sup>

**\*\*734. Advanced Personality Theory and Psychotherapy Practice.** (3)

735. **Practicum in School Psychology.** Prerequisite: permission of program chair. (3F,W,Sp,Su)<sup>3</sup>

736. **Practicum in Counseling Psychology.** (3F,W,Sp,Su)<sup>3</sup>

737. **Practicum in Clinical Psychology.** (3F,W,Sp,Su)<sup>3</sup>

738. **Applied Behavior Analysis Internship.** (3-6F,W,Sp,Su)@

747. **Practicum Supervision.** (3F,Sp)<sup>3</sup>

750. **Interdisciplinary Workshop.** (1-3Su)@

767. **Designing Educational and Psychological Research.** Prerequisites: Educ/Psy 660, 661, 667. (3Sp,Su)

781. **Seminar in Professional Psychology.** (1-3)<sup>3</sup>

**\*\*782. Neuropsychological Assessment Workshop.** Prerequisite: Psy 632. (3)<sup>3</sup>

**\*784. Psychopharmacology.** Prerequisite: Psy 632. (2)<sup>3</sup>

790. **Independent Study.** (1-3F,W,Sp,Su)@

791. **Independent Research.** (1-3F,W,Sp,Su)@

795. **Internship.** (1-6F,W,Sp,Su)@<sup>3</sup>

797. **Dissertation.** (1-18F,W,Sp,Su)@

799. **Continuing Graduate Advisement.** (1-12F,W,Sp,Su)@

<sup>1</sup>Parenthetical numbers preceded by *d* indicate a *dual* listing.

<sup>2</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

<sup>3</sup>These courses can be taken only by psychology graduate students.

@ Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through the Life Span Learning Independent Study Division.

\*Taught 1990-91.

\*\*Taught 1991-92.

## Department of Range Science College of Natural Resources

**Head: Professor John C. Malechek**  
Office in Natural Resources 210

**Professors** James E. Bowns, Martyn M. Caldwell, Philip J. Urness, Neil E. West, John P. Workman; **Adjunct Research Professor** N. Jerry Chatterton; **Professors Emeritus** Thadis W. Box, Don D. Dwyer, Karl G. Parker, Arthur D. Smith; **Associate Professors** Brien

E. Norton, Frederick D. Provenza; **Assistant Professors** Roger E. Banner, Christopher A. Call, James P. Dobrowolski, David A. Pyke, George Allen Rasmussen; **Research Assistant Professor** Charles W. Gay (Assistant to the Dean for Administrative Affairs); **Adjunct Assistant Professors** Jere L. Gilles, Patrick G. Hatfield, Douglas A. Johnson, Thomas A. Jones, James A. Pfister, Michael H. Ralphs, John W. Walker; **State Collaborator** Dennis Austin

**Degrees offered:** Bachelor of Science (BS) with opportunity for Honors degree in Range Science, Master of Science (MS), and Doctor of Philosophy (PhD) in Range Science; MS and PhD in Ecology (Range); BS, MS, and PhD in Watershed Science. The Watershed Science curriculum and degree requirements are listed under the Department of Forest Resources.

**Areas of specialization:** BS degree in Range Science has programs of emphasis in Range Management, Range-livestock Production, Forest-range Management, Range Watershed Management, Range Resource Economics, Range-wildlife Relations, Range Rehabilitation, and International Range Management

## Objectives

Courses and curricula in the department provide education and training that prepare students for a variety of careers related to rangeland resource management. These careers are usually with state agencies and the numerous federal land management and advisory agencies in the Departments of Agriculture and the Interior but are increasingly with private industry.

## Requirements

**Departmental Admission Requirements.** Admission requirements for the Department of Range Science are the same as those described for the University on pages 8-11. Students in good standing may apply for admission to the department.

**Bachelor of Science in Range Management.** For the degree, students must complete basic courses in chemistry, mathematics, statistics, computer science, biology, economics, and soils. Other required courses include ecology, taxonomy, plant physiology, animal production and nutrition, forages, and the Natural Resources core. Required Range Science courses include RS 199, 300, 386, 445, 461, 491, 541, 563, 565, and 570. In addition, the student must complete summer camp, consisting of RS 298 and FR 301 and 302, and take FW 300, WS 300, and FR 300. Required, written communication, approved General Education, and elective courses make a total of 16 to 18 credits per quarter. A special internationally oriented curriculum is provided for foreign students.

**Emphasis Area Options.** Approved course work is available to provide additional specialization in the following areas: Forest-Range Management; Range Livestock Management; Range Watershed Management; Range Resource Economics; Range-Wildlife Relations; Range Rehabilitation; and Integrated Resource Management. Students interested in these emphasis areas should consult with their academic adviser.

**International Range Management Option.** This option is designed for students holding two-year certificates from foreign schools. Students may enter this program only with the approval of their advisers and the department head.

**Environmental Studies Option.** The College of Natural Resources administers an interdisciplinary major in environmental studies. See page 114 for further information.

## Graduate Study

The department offers the Master of Science and Doctor of Philosophy degrees with specialization in range management, ecology, watershed science, range economics, game-range management,

and international range management. See the graduate catalog for requirements and further information.

## Range Science Courses

Natural Resources courses 101 through 601 are listed under the College of Natural Resources, pages 46-47.

**199. Range Science Orientation Seminar.** Orientation to the profession of Range Science and Management and the Range Science Department. (1F)

**225. Introductory Internship/Co-op.** An introductory level educational work experience in an internship/cooperative education position approved by the department. (1-6F,W,Sp,Su)

**298. Range Analysis.** Field identification of summer range plants. Methods and techniques of vegetation analysis. Practice in range allotment analysis. (1 Summer Camp)

**300. Principles of Range Management.** Discussion of range science principles as they relate to the management of rangelands. Emphasizes range history, plant physiological ecology, plant synecology, livestock nutrition and feeding behavior, and grazing management. (3F,Sp)

**10 329. Pastoralism.** Worldwide perspective of the interaction between the ecology of pastoral areas and the people who subsist on these grazing lands; the advantages and problems of traditional nomadism. (3)

**385. Field Ecology.** Field studies with reference to plant and animal ecology. Prerequisite: RS 386. (2Su)

**386. General Ecology for Life Science Majors.** Interrelationships among microorganisms, plants, and animals and their environments at the level of individual organisms; species populations and ecosystems with emphasis on the structure and function of the latter two, and human implications. Prerequisites: Biol 125, 126, 127, or permission of instructor. (4F,W)

**425. Advanced Internship/Co-op.** An internship/cooperative education work experience; increased complexity to help student gain a more professional level of experience. (1-15F,W,Sp,Su)

**445. Grassland and Desert Range Plants.** Identification, ecology, and uses of range plants of deserts and grasslands of North America. Lab fee. Prerequisites: RS 300, 386; Bot 420. (3Sp)

**455. Extension in Range Management.** Development and delivery of appropriate information to promote understanding of range ecology, use, and management for both urban and rural audiences. (3F)

**461. Wildland Ecosystems.** Structure, dynamics, and multiple use management of wildland ecosystems with emphasis on those of North America. Prerequisites: RS 300, 386; Soils 358; Bot 420. (5W)

**490. Readings and Conference.** (1-6F,W,Sp,Su)@

**491. Range Issues Seminar.** Supervised discussion and review of range resource topics. Prerequisite: Range Science graduating senior. (2Sp)

**492. Honors Readings.** Assigned readings in philosophy of range science and management strategies with discussion sessions by arrangement with supervising faculty. Prerequisite: enrollment in the Range Science honors program. (1-3F,W,Sp,Su)

**495. Range Problems.** Individual study and research upon selected problems in range science and related subjects. Prerequisite: faculty approval. (1-3F,W,Sp,Su)@

**497. Range Ecology and Management—Field Study.** Extended field trips and studies of the ecology and management of North American rangelands. Special fees and permission of instructor required. (1-5F,W,Sp,Su)@

**500 (d600). Management of Rangelands for Grazing.** Sequel to Principles of Range Management, presenting more detailed treatment of the ecology of range management, with particular emphasis on grazing systems. Prerequisite: RS 300. (4W)

**507 (d607). Range Wildlife Relations.** A senior, graduate course that explores interactions on rangelands between wild and domestic ungulates, as well as other wildlife forms around the world, but with emphasis on western North America. Prerequisite: RS 300. (4W)

**\*\*508. Rehabilitation of Drastically Disturbed Arid Land.** Considers scientific principles, analysis of problems, and application of methods for rehabilitating drastically disturbed lands with an emphasis on the arid West. Prerequisites: RS 300, 386. (3F)

**\*522. Tropical Savanna Ecosystems.** Worldwide survey; influences of fire, grazing, and drought on productivity and structure in relation to utilization by wildlife and domestic livestock; techniques for manipulation or improvement. (3F)

**\*523. Rangeland Improvements in Developing Nations.** Discussions and readings concerned with philosophy and methodology for application of range management techniques for pastoral situations. Prerequisites: RS 529, 563. (2Sp)

**\*524. Range Management Project Planning and Implementation in Developing Nations.** Describes planning processes and surveys range management project activity in LDCs of major world aid donors. Discusses project implementation problems and solutions. Prerequisite: RS 300. (4Sp)

**\*529. Range Management in Pastoral Societies.** Application of range management principles to various climatic zones and biogeographic regions around the world in the context of different cultural systems. Prerequisite: RS 300. (3W)

**541. Range Vegetation Analysis for Livestock and Wildlife.** Methods and analytical procedures for measuring and assessing vegetation used by livestock and wildlife as forage and cover. Lab fee. Prerequisites: RS 300 and 386, Stat 501. (5F)

**563. Range Improvement and Management.** Methods of improving range productivity for multiple-use purposes by grazing management, vegetation manipulation, and other appropriate management practices. Prerequisites: RS 300, 386, and senior standing. (4W)

**565. Range Resource Economics.** Principles of production economics as they apply to problems encountered in the use of natural resources. Emphasis is on the application of economic principles to problems in managing private and public range resources. Prerequisites: Econ 201, RS 300, NR 380. (3F)

**568. Rangeland Appraisal.** The systematic process of determining the fair market (dollar) value of range resources used for livestock, big game, water, recreation, cropping, and development purposes. Prerequisite: prior or concurrent registration in RS 565 or equivalent. (3F)

**570. Range Inventory and Management Planning.** Inventory of soils, vegetation, water, wildlife, and recreation resources of a selected ranch operation and development of a detailed management plan. Techniques apply to management of private and public lands. Prerequisites: RS 563, 565, range science graduating senior. (5Sp)

**585. Range Livestock Production and Management.** Concentrates mainly on how rangeland management and improvement practices may be used to increase livestock production without reducing the capability of rangeland for multiple use. Prerequisites: RS 300, ADVS 351. (3)

**\*\*586. Poisonous Range Plants Affecting Livestock.** Poisonous plants of rangelands and their effects on grazing animals, especially livestock. Management practices to reduce or prevent poisoning. (3W)

## Graduate<sup>2</sup>

**600 (d500). Management of Rangelands for Grazing.** Prerequisite: RS 300. (4W)

**\*\*603. Plant-Herbivore Interactions.** (4W)

**607 (d507) Range Wildlife Relations.** Prerequisite: RS 300. (4W)

**615 (f510). Stress Physiology of Rangeland Plants.** Prerequisite: Bot 440 or equivalent. (4Sp)

**\*630. Population Ecology of Plants.** (3W)

**\*\*642. Vegetation Analysis.** Prerequisites: RS 541 or equivalent, Stat 501 and 502, CS 241. (4Sp)

**655. Synecology.** (3)

**\*665. Range Economic Analysis.** Prerequisite: RS 565. (2W)

**680. Seminar.** (1F,W,Sp)®

**681 (f598). International Range Management Seminar.** (1)®

**687. Ecology Seminar.** (1)®

**690. Readings and Conference.** (1-3F,W,Sp,Su)®

**691. Special Topics in Range Science.** (1-3)®

**692. Special Topics in Ecology.** (1-3)®

**693. Special Topics in Physiological Ecology.** (1-3)®

**694. Special Topics in Range Wildlife Relations.** (1-3)®

**697. Thesis Research.** (1-15)®

**699. Continuing Graduate Advisement.** (1-3)®

**715. (f610). Physiological Ecology of Plants.** (4F)

**721 (f621). Physiological Ecology of Plants Practicum.** (2)

**\*\*742 (f641). Vegetation Classification/Ordination.** (3Sp)

**775 (f675). Range Animal Nutrition.** (3F)

**776. Techniques in Range Animal Nutrition Research.** (2F)

**797. Dissertation Research.** (1-15)®

**799. Continuing Graduate Advisement.** (1-3)®

<sup>1</sup>Parenthetical numbers preceded by *d* indicate a *dual* listing; parenthetical numbers preceded by an *f* are the *former* course numbers.

<sup>2</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

\*Taught 1990-91.

\*\*Taught 1991-92.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

## Department of

# Secondary Education

## College of Education

**Acting Head: Associate Professor Izar A. Martinez**  
Office in Emma Eccles Jones Education 330C

**Professors** Ross R. Allen, James S. Cangelosi, Walter L. Saunders, James P. Shaver, William J. Strong; **Professors Emeritus** Eldon M. Drake, Kenneth C. Farrer; **Associate Professors** Kay Camperell,

Richard S. Knight; **Assistant Professor** Dalphia Pierce; **Lecturer** Ronald K. Drickey

**Degrees offered:** Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), Master of Arts (MA), and Master of Education (MEd) in Secondary Education; Doctorate of Education (EdD) with emphasis in Secondary Education

## Objectives

The function of the Department of Secondary Education is to aid in the preparation of teachers, supervisors, curriculum specialists, and other professional personnel for careers in secondary education.

## Requirements

**Departmental Admission Requirements.** With the exception of GPA (2.5 cumulative required), admission requirements for the Department of Secondary Education are the same as those described for the University on pages 8-11. Students in good standing may apply for admission to the department. See also requirements for admission to teacher education.

**Bachelor of Science in Secondary Education.** For the degree the student must complete: (1) 52 credits of General Education requirements, including the written communications requirement; (2) an approved teaching major and approved teaching minor or an approved composite teaching major (69 credits minimum); (3) the Professional Education component (48 credits); and (4) 8-17 credits of electives. Upon meeting these requirements, the student is also eligible to apply for a teaching certificate in secondary education. This certificate qualifies the candidate to teach at the junior and senior high school levels (grades 7-12).

**Certificate in Secondary Education.** Students who are completing an academic major or have been awarded an undergraduate degree and wish to certify in secondary education must meet requirements 2 and 3 as indicated above.

**Teaching Major and Minor or Composite Major.** Teaching majors, minors, and composite majors are offered in most subject areas in which there are classes taught in the secondary schools of Utah. The following composites, majors, and minors have been approved by the Utah State Board of Education as subject areas in teacher education at USU:

**Composite Teaching Majors—69 credits minimum.** Agricultural Education, Art Education, Biological Science, Business Education, Earth Science, English, Home Economics Education, Industrial Technology and Education, Marketing Education, Mathematics-Computer Science-Statistics, Music Education, Physical Science, Social Studies (option 1, Social Studies; option 2, American Studies), and Speech-Theatre Arts.

**Teaching Majors—45 credits minimum.** Chemistry, Dance, Economics, English, Geography, Health Education, History, Journalism, Mathematics, Modern Languages, Physical Education, Physics, Political Science, Psychology, Sociology, and Theatre Arts.

**Teaching Minors—24 credits minimum.** Biology, Business Computer and Information Systems, Business Education, Chemistry, Computer Education, Dance, Economics, English, Geography, Health Education, History, Instructional Technology, Journalism, Marketing Education, Mathematics, Modern Languages, Music Education, Physical Education, Physical Education—Coaching, Physics, Political Science, Psychology, Sociology, Speech, and Theatre Arts.

For a listing of course requirements for majors, minors, and composites see the *USU Secondary Teacher Education Program Undergraduate Planning Guide* available at the USU Bookstore.

Several departments offering composite or teaching majors require students to graduate from their college and department. These majors are Agricultural Education, Art Education, Business Education, Marketing Education, Home Economics Education, Industrial Technology and Education, Music Education, and Physical and Health Education. Students majoring in other areas may graduate in either the department offering the major or the Department of Secondary Education. Identical requirements must be met in either case.

**Admission to Teacher Education.** Regardless of the department in which the student majors, he or she must apply for and be granted permission to enter the teacher education program by the

College of Education prior to enrolling in most education courses. Criteria for admission include performance on ACT and/or meeting specific General Education requirements, a minimum competency in the teaching subject area, overall grade point average, and successful completion of the orientation course. A speech and hearing test and a writing proficiency test are also required. It is advisable for the student to make the application for admission to teacher education after completion of 90 credits. Applications are available in Emma Eccles Jones Education 103 or 330.

**Professional Education Component.** Students must complete the following courses: SecEd 201, 301, 302, 404, 450, 460, 510; Psy 366; Sp Ed 301; and Ins T 442. In addition, the Computer Literacy requirement must be met by completing one course chosen from Ins T 522; BIS 140, 340; CS 101, 150, 170. Students must also complete Special Teaching Methods courses in the major, as well as in the minor (if different from the major). See adviser for appropriate Teaching Methods information.

The student is advised to complete the Professional Education Component in sequence during the junior and senior years and concurrently with course work in the academic areas. See major requirement sheet, available from the major department or the Secondary Education Department, for proper sequence of courses. The special methods course(s) should be completed just prior to student teaching, as schedules permit. SecEd 450 and 460, the seminar and student teaching experience, are to be taken concurrently during the senior year, preferably during fall or winter quarter.

**Student Teaching.** Each candidate for secondary school teaching is to select the one quarter which best fits his or her sequence of classes during which time he or she will spend all day teaching in a public secondary school.

Applications for student teaching must be submitted to the Field Experiences Office, Emma Eccles Jones Education 105, by the following deadlines: fall quarter, April 15; winter quarter, October 15; and spring quarter, January 15. Credentials will be reevaluated at that time. The student should be financially prepared to stay off campus, if necessary, during the student teaching quarter.

**Application for Teaching Certificate.** In order to receive a Utah Teaching Certificate, the student must apply for the Basic Teaching Certificate at the Teacher Education Office, Emma Eccles Jones Education 103, during the last quarter of the senior year.

**Dual Certification.** To qualify for a secondary certificate, in addition to meeting requirements for the elementary certificate, candidates must: (1) complete the requirements for a composite teaching major or for a teaching major and minor as indicated above, and (2) complete the professional education component in secondary education including special methods courses in the teaching major and teaching minor and student teaching at the secondary school level.

A student desiring to obtain both the elementary and secondary certificate should consult with an adviser in the Secondary Education Department early in his or her program.

## Graduate Study

The Department of Secondary Education, as an integral part of the College of Education, assists in the preparation of graduate students seeking the MEd, MA, and MS degrees, and the PhD degree. Students desiring information concerning the various graduate programs should consult with the department head and write to the School of Graduate Studies for a graduate catalog which contains the details on the various graduate programs. Application for admission to a graduate program is made through the School of Graduate Studies.

## Secondary Education Courses

**201. Orientation to Teaching.** Provides initial, objective information about the teaching profession, including opportunities for self assessment and career exploration. A field experience is an integral part of the course. (3F,W,Sp)

**301. Teaching Skills.** Students acquire introductory level teaching skills through role play, simulation, discussion, teaching episodes, and mini lessons. (3F,W,Sp,Su)

**302. Foundations of Education.** Introductory studies of the historical, philosophical, psychological, and social foundations of secondary education with attention given to roles and responsibilities of contemporary teachers. (3F,W,Sp)

**303. Field-based Experiences for Pre-service Teachers in Secondary Schools.** Field-based experiences in middle, junior, and senior high schools designed to acquaint pre-service teachers with managerial, clerical, instructional, and/or tutoring tasks. (1-3F,W,Sp,Su)

**306. Writing and Teaching.** A writing course for prospective teachers about subjects related to teaching. For upper division students who have completed a 200-level writing course or its equivalent. (3)

**309. Methods of Secondary School Mathematics.** A methods course required of all prospective secondary school mathematics teachers. Prerequisites: SecEd 301 and Psy 366. (4Sp)

**310. Teaching Social Studies.** A methods course for secondary school teachers with teaching majors or minors in any of the social sciences. Prerequisites: SecEd 301 and Psy 366. (4F,Sp)

**320. Teaching English.** Considers the content of the English curriculum, effective methods, and significant trends. Prerequisites: SecEd 301 and Psy 366. (4F,Sp)

**330. Teaching Science.** Objectives of science education. Curriculum materials to achieve these aims. Class members participate in video laboratory experiences and secondary school presentations. Prerequisites: SecEd 301 and Psy 366. (4F,W)

**404. Evaluation of Student Achievement.** Principles and techniques for developing useful measures of student achievement, interpreting test results, and reporting evaluations. Prerequisites: SecEd 301 and Psy 366 or permission of instructor. (3F,W,Sp)

**450. Student Teaching Seminar.** Focus upon problems arising during student teaching. Includes teaching plans, procedures, adaptive classroom practices, and evaluation. To be taken concurrently with SecEd 460. (3F,W,Sp)

**460. Student Teaching in Secondary Schools.** Candidates assigned to cooperating teachers in the public secondary schools in their major and/or minor subjects. Students will have professional responsibilities associated with teaching. (12F,W,Sp)

**465. Modified Student Teaching.** Candidates assigned to cooperating teacher in a public secondary school. Only for those students seeking dual certification earning one-half of their student teaching credit in secondary education. (3-9F,W,Sp,Su)

**466. Internship.** Provides advanced practical teaching experience under combined public school and University supervision. (3-6F,W,Sp)

**500 (d600).<sup>1</sup> Managing Student Behavior.** Theory and application of basic principles for responsible student behavior in school. (3)

**510 (d609). Content Area Reading/Writing.** A performance-based class focused on ways to help teachers improve comprehension, study skills, and critical thinking of students through "across the curriculum" reading/writing activities. Prerequisites: SecEd 301 and Psy 366. (4F,W,Sp,Su)

**556. Practicum in Improving School System Programs.** A seminar focused upon a phase of the instruction program, upon a sequence of developmental training programs, or upon new and persisting problems in the many dimensions of teaching. Not applicable for credit in degree program. (1-6)®

**590. Independent Study.** (1-3)®

**591. Independent Research.** (1-3)®

## Graduate<sup>2</sup>

**600 (d500). Managing Student Behavior.** (3)

**604. Measurement and Evaluation in Education.** (3)

**606. Human Development: Adult.** (3)

**609 (d510). Content Area Reading/Writing.** (4F,W,Sp,Su)

**610. Remedial and Developmental Reading in Secondary Schools.** (3)

**612. Issues in Literacy.** (3W,Su)

**615. Foundations of Curriculum Development.** (3)

**619. Theories of Teaching in Public Schools.** (3)

**620. Middle School-Junior High Curriculum.** (3)

**624. Current Problems in Secondary Education.** (3)

**630. English Curriculum and Instruction.** (3)

**632. Workshop in English Curriculum.** (3)

**633. Supervision and Administration Internship.** (3)®

**635. Social Studies Curriculum and Instruction.** (3)

**638 (f538). Values Education.** (3)

**640. Science Curriculum and Instruction.** (3)

**642. Laboratory Practicum for Secondary Science Teachers.** (3)

**644. Creative Education.** (See El Ed 644.) (3W,Su)

**645. Mathematics Curriculum and Instruction.** (3)

**646. Education of the Gifted and Talented.** (See El Ed 646.) (3)

**647. Identification and Evaluation in Gifted Education.** (See El Ed 647.) (3)

**648. Materials and Methods in Gifted Education.** (See El Ed 648.) (3)

**656. Practicum in Improvement of Instruction.** (1-9)®

**670. Cross Cultural Education and International Understanding.** (3)

**671. Multicultural Education.** (3)

**690. Independent Study.** (1-3F,W,Sp,Su)®

**691. Independent Research.** (1-3F,W,Sp,Su)®

**696. Masters Project.** (3F,W,Sp,Su)

**697. Thesis.** (3-9F,W,Sp,Su)®

**699. Continuing Graduate Advisement.** (1-12)®

**705. Internship in Program Evaluation.** (1-6)®

**706. Internship in Research.** (1-6)®

**712. Student Teaching Supervision.** (3)

**733. Supervision Internship.** (3-12)

**735. Internship in Curriculum Development.** (3)

**781. Doctoral Research Seminar.** (1-6)®

**790. Independent Study.** (1-3)®

**791. Independent Research.** (1-3)®

**797. Dissertation.** (1-18)®

**799. Continuing Graduate Advisement.** (1-12)®

<sup>1</sup>Parenthetical numbers preceded by *d* indicate a *dual* listing; parenthetical numbers preceded by an *f* are the *former* course numbers.

<sup>2</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

*Department of*

# ***Sociology, Social Work and Anthropology***

## ***College of Humanities, Arts and Social Sciences***

**Head:** Professor Michael B. Toney

**Assistant Head:** Associate Professor Richard S. Krannich  
Office in Main 220

**Professors** Richley H. Crapo, Yun Kim, Ann Leffler, Ronald L. Little, Mark W. Lusk, Jon R. Moris, Brian L. Pitcher, David L. Rogers, William F. Stinner; **Professors Emeritus** Wade H. Andrews, Thel R. Black, H. Bruce Bylund, William A. DeHart, Gordon N. Keller, Wesley T. Maughan, Nile D. Meservy, R. Welling Roskelley, Alison C. Thorne; **Associate Professors** Edna H. Berry, Reed Geertsens, Gary H. Kiger, Carol J. Loveland, Gary E. Madsen, Bradley W. Parlin, Pamela J. Riley; **Assistant Professors** Susan E. Dawson, Derek T. Mason, Steven R. Simms; **Clinical Assistant Professor** Marcia D. Calloway

**Degrees offered:** Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), Master of Arts (MA), and Doctor of Philosophy (PhD) in Sociology; BS and BA in Social Work; Master of Social Science (MSS)

### ***Objectives***

The department offers educational programs for students to prepare for positions in social welfare, teaching, research, personnel, government service, law enforcement, business, and industry, as well as providing liberal and general education for all interested students. The program offers a wide range of courses for the study of social, cultural, and behavioral dynamics. The department also provides General Education and other service courses for various groups of students.

**Departmental Admission Requirements.** Admission requirements for the Department of Sociology, Social Work and Anthropology are the same as those described for the University on pages 8-11. Students in good standing may apply for admission to the department, but must have a 2.5 GPA in all courses being applied toward the major.

### ***Sociology***

In its broadest usage, sociology is defined as the scientific study of human groups. Sociology attempts to systematically describe and explain group behavior. This includes the effects of one group upon another as well as the effects of groups upon individual behavior. Sociologists focus upon social structures, that is, patterned behaviors which are recurring rather than random or occasional. Social structures thus provide the basic subject matter for sociology, and this emphasis upon social structural analysis distinguishes sociology from the other social sciences.

### ***Requirements***

Sociology majors must meet the following course requirements:

1. Complete the general requirements of the University (a suggested schedule of courses to meet these requirements is available from the department's secretary or from the student's adviser).

2. Complete a minimum of 48 credits within the department. This is exclusive of any department course used to fill General Education requirements. Sociology majors must maintain a grade point average of 2.5 in courses within the department.

3. Completion of a minimum of 18 credits as specified by any outside department, as a minor field of interest, is encouraged but not required.

4. Complete the following required courses: Soc 101, 201, 301, 311, and 415.

5. Choose a minimum of 31 credit hours from the following departmental elective courses. Any sociology course taught by the department may be included as an elective, but a student must have at least 6 credits from three of the four different areas listed below. In addition, a combined total of only 6 credits of approved course work in social work and in anthropology may count toward the sociology elective credits.

a. Modern Problems Area: Soc 140<sup>1</sup>, 240 (or SW 240), 275, 341, 342, 343, 442, 443, 475, 480; SW 365, 435; Anthr 461.

b. Group Process Area: Soc 238, 350<sup>1</sup>, 352, 452, 472, 480; SW 250; Anthr 150.

c. Institutional Area: Soc 102, 330<sup>1</sup>, 332, 333, 433, 437<sup>1</sup>, 480; SW 105, 535; Anthr 210, 402, 405, 505.

d. Demography and Ecology Area: Soc 160, 320<sup>1</sup>, 360, 361, 420, 462<sup>1</sup>, 463, 465, 473, 480; Anthr 452.

<sup>1</sup>These courses are highly recommended as each gives an overview of the general subject area.

**Sociology and Social Work Dual Major.** Sociology majors who desire additional preparation for employment in the social services may take a dual major in sociology and social work. With the help of advisers, students who will seek positions in other special areas could include appropriately related courses.

**Minor.** Students minoring in sociology must meet the University minimum of 18 credits. Soc 101 is required and the following courses are recommended: Soc 140, 201, 320, 330, 350, and 437.

**Teaching Certificate.** Sociology is defined as an approved teaching major in Utah Secondary Schools by the State Board of Education. The sociology major must have as a minor a subject which is required in Utah high schools. In addition to completing the courses required for the sociology major, the sociology teaching

major must also complete the required teaching certificate courses in education. Students can also elect sociology as an approved teaching minor.

**Gerontology Program.** The Department of Sociology is sponsoring an interdisciplinary gerontology program which prepares students for careers in the field of aging. Students may earn a certificate in gerontology by completing a selected list of course requirements (20 credits). This includes 180 clock hours of supervised field practicum in a gerontological setting.

A certificate is awarded upon completion of the following required courses: Soc 275, 475, 480; SW 365 or 375 or Soc 333, SW 426, 435. Students from any major are welcome to apply for this certification program. All credits within this program apply toward the overall total required for graduation from Utah State University.

More information concerning the gerontology certification program may be obtained from the department.

**American Studies Major.** The Department of Sociology, Social Work and Anthropology is one of several departments offering an area of concentration for the American Studies program. The student who wishes to focus his or her work in American culture should refer to the American Studies program description (see listing under English Department) and check with the Sociology Department for further information.

### Graduate Study

The department offers courses leading to the Master of Science, Master of Arts, and Doctor of Philosophy degrees in sociology, and the Master of Social Science degree. (See the graduate catalog for further information.) Seniors are strongly advised to take the Graduate Record Examination in anticipation of graduate study and other special opportunities.

### Sociology Courses

**SS 101. Introductory Sociology.** How people become human. How and why people of different cultures control their societies, evaluate their behavior, and organize as they do. (3F,W,Sp)©

**SS 102. American Culture.** Basic beliefs, values, customs, and institutions of America. (3F,Sp)

**SS 140. Modern Social Problems.** Major American social problems. Adjustments and changes as a means of minimizing disorganization. (3F,W,Sp)©

**160. Rural Sociology.** Patterns of settlement and their influence upon rural life. Rural institutions and adjustments to meet rural problems. (3)

**201. Foundations of Modern Sociology.** Basic principles of sociology are considered in their theoretical and methodological settings. (3F,Sp)

**IO 238. Sex Roles in American Society.** An examination of the socialization of females and males for their expected roles in American society. (3F,W,Sp)

**240. Social Welfare and Minority Groups.** Examines social and cultural characteristics of various minority groups and emphasizes the use of social welfare resources for finding solutions to minority group problems. (3F,Sp)

**275. Introduction to Study of Aging.** Introduces the student to the general field of aging. Biological, psychological, and sociological aspects of aging will be emphasized. (3F)

**301. Contemporary Sociological Theory.** This course examines crucial issues and theories of contemporary sociology and looks at how earlier theorists and more contemporary theorists have dealt with these issues and concepts. (3W)

**311. Methods of Social Research.** Methods and techniques of analyzing and interpreting social data. (3F,Sp)

**320. Population and Society.** Growth and changing patterns of the population and socioeconomic and other factors related to population change. The significance of these population changes on today's living. (3)©

**330. Social Change.** A systematic analysis of society with emphasis on understanding the change process and alternative strategies for effecting change. (3)

**332. Sociology of Work.** Stresses contribution of sociology to the understanding of industry as a social system. Includes work behavior and impact of technology change on society. (3)

**333. Medical Sociology.** Examines the basic contributions of sociology to the field of medicine. An essential course for anyone contemplating a career in a health-related field. (3W)

**341. Juvenile Delinquency.** The nature, extent, causes, and treatment of delinquency. Programs of delinquency prevention are explored. (3F,W,Sp)©

**342. Criminology.** A social analysis of the crime problem in the U.S. Characteristics and causes of crime as well as social and legal reactions. (3F,W)©

**343. Social Deviance.** An examination of lifestyles, deviance, and social control in the counterculture. (3F,Sp)

**350. Social Psychology.** Cultural and social determinants of personality growth. Application of such knowledge to the understanding of group process, mass behavior, and the human relations problems. (3F,W,Sp)

**352. Collective Behavior.** A study of sociological conditions that give rise to various types of social movements, and the role of social movements in changing society. (3)

**360. Urban Sociology.** The changing nature of social life as it has moved from predominantly rural to urban patterns. Significant events that have led to urbanization. (3)

**361. Human Ecology.** Social, cultural, and natural-spatial factors affecting the distribution of modern human society. Relationship of social behavior to the physical environment and resources. (3W)

**415. Social Statistics I.** Levels of measurement; measure of central tendency dispersion and association; probability, the normal curve, statistical inference. (3)

**420. World Population Problems.** Current and future population problems, particularly in less developed areas of the world. Factors affecting population growth and change. (3)

**\*\*433. Religion and Society.** Potential influences of religion on our schools, sexual relations, family lives, and foreign policies. Addresses how these and other areas of our society influence religion. (3F)

**\*437. Social Inequality.** Nature and consequences of the differential distribution of rewards and prestige in our own society and in other societies. (3F)

**442. The Criminal Justice System.** A sociological analysis of the criminal courts, law enforcement, and prisons. Alternatives to current practice are examined. (3)

**443. Law and Society.** Relationship between both civil and criminal law to power, morality, interest groups, social control, and social change. (3Sp)

**452. Group Dynamics.** Group processes from the point of view of improving individual groups. Social action as a group process. (3)

**\*\*462 (d662).<sup>1</sup> Sociology of Natural Resources.** For students interested in the social organization and social systems associated with natural resources. Includes principles and a field of study of resource problems. (3W)

**\*\*463 (d663). Social Impact Assessment.** Theoretical and methodological problems of social impact assessment. Government policy processes are increasingly mandating social impact assessments to evaluate policy. (3)

**465 (d665). Sociology of Developing Societies.** Survey of theories and methods of social development with emphasis on the problems of less developed countries. (3)

**472. Community Organization and Leadership.** To assist the student to gain an understanding of sociological pressures within and outside the community that affect courses of decision making and action. (3)

**473 (d673). Women in International Development.** Focuses on status of women in developing countries and the role they play in the development process. (3)



**475. The Sociology of Aging.** Course examines social adjustments of aging; i.e., special problems relating to retirement, public attitudes, the myths about aging, and role or place in society. (3W)

**480. Seminar in Sociology.** Seminars in various areas of sociology: (a) theory, (b) methodology, (c) demography, (d) social organization, (e) social deviance, (f) social psychology, (g) human ecology, (h) gerontology. Instructor's permission required. (1-3F,W,Sp)@

**490. Independent Readings in Sociology.** Independent readings in various areas of sociology: (a) theory, (b) methodology, (c) demography, (d) social organization, (e) social deviance, (f) social psychology, (g) human ecology. Instructor's permission required. (1-5F,W,Sp,Su)@

**497H. Senior Thesis.** Individual research on a topic or problem in sociology. Required of all students for graduation from the Honors Program in sociology. Students must also complete HASS 480H. (1-9F,W,Sp,Su)

## Graduate<sup>2</sup>

**601. Development of Sociological Theory.** (3F)

**602. Advanced Sociological Theory.** Prerequisite: Soc 301. (3W)

**603. Theory Construction in Sociology.** (3)

**609. Philosophy of the Social Sciences.** (3)

**610. Advanced Methods of Social Research.** (3F)

**615. Social Statistics II.** (4W)

**616. Computer Usage in Social Research.** (1)

**617. Survey Research.** (3)

**\*\*621. Social Demography.** (3)

**\*622. Population Theories and Policies.** (3)

**\*623. Methods of Population Analysis.** (3)

**\*624. Advanced Methods of Population Analysis.** (3)

**630. The Sociology of Complex Organizations.** (3)

**631 (f550). Human Relations in Industry.** (3)

**635 (f535). The Family and Economic Change.** (3Sp)

**\*651. Theories in Social Psychology.** (3)

**\*653. Socialization through Interaction.** (3)

**\*654. Attitudes and Behavior.** (3)

**\*\*655. Small Groups.** (3)

**660. Theories in Human Ecology.** (3)

**662 (d462). Sociology of Natural Resources.** (3)

**\*\*663 (d463). Social Impact Assessment.** (3)

**665 (d465). Sociology of Developing Societies.** (3F,Sp)

**\*670. Advanced Rural Sociology.** (3)

**\*\*671 (f571). Community Theory and Research.** (3)

**673 (d473). Women in International Development.** (3)

**680. Seminar in Sociology.** (2-4)@

**690. Independent Readings in Sociology.** (1-5)@

**697. Thesis Research.** (1-10)@

**699. Continuing Graduate Advisement.** (1-3)@

**\*701. Critical Issues in Sociological Theory.** (3)

**\*\*702. Seminar on Theorists.** (3)@

**710. Advanced Sociological Analysis.** (3)

**711. Contemporary Issues in Sociological Research.** (2)

**\*\*725. Advanced Demography.** (3)@

**762. Social Theories on Natural Resources and the Environment.** (3)

**780. Seminar in Sociology.** (1-5)@

**790. Independent Study.** (1-5)@

**797. Dissertation Research.** (1-10)@

**799. Continuing Graduate Advisement.** (1-3)@

<sup>1</sup>Parenthetical numbers preceded by *d* indicate a *dual* listing; parenthetical numbers preceded by an *f* are the *former* course numbers.

<sup>2</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

@ Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

\*Taught 1990-91.

\*\*Taught 1991-92.

© This course is also offered by correspondence through the Life Span Learning Independent Study Division.

## Social Work

The Social Work Program provides a learning environment for those who seek to acquire knowledge and skill in order to bring about meaningful social change in individuals, groups, communities, and society in accordance with democratic principles of civil, social, political, and economic justice. The program is committed to the realization of the goals of the American people through recognized practice principles of the social work profession and to the resolution of contemporary human social problems such as poverty, racism, discrimination, exploitation, economic injustice, poor housing, malnutrition, alienation, and inadequate education.

Social Work at Utah State University recognizes the historic importance of social welfare in balancing the country's economic and social structure. Correspondingly, the mission of the program is to prepare social workers for practice in a diverse society that has been unable to meet the needs of a vast segment of its people and to equip students with the knowledge and skills essential to the general tasks of promoting social welfare in institutions such as education, health, employment, housing, and criminal justice.

The program's guiding educational philosophy is based on two broad traditions: the Land Grant university heritage and generalist social work practice. Thus the program is directed toward providing grounding in the fundamental generic skills, knowledge, and values of social work; is dedicated to research, extension, and service to the profession and the State of Utah; and is reflective of the fundamental need to adjust social institutions to the democratic and egalitarian ideals of both the University and the social work profession.

## Program Goals

There are four fundamental goals that guide the Social Work Program:

1. To prepare qualified students for employment at the beginning level of professional social work practice. The program is based on a generalist conception of social work and a problem solving approach to practice. The social work sequence stresses

problem solving at the interface of person and environment, which requires that students develop a repertoire of generalist practice skills. The program inculcates in students the knowledge, skills, understanding, and values necessary to perform multi-level assessments and interventions utilizing a theoretical knowledge base.

2. **To contribute to the profession of social work and the delivery of human services through research and service at the local, regional, and international levels.** The program encourages faculty and students to develop research and training grants, to present papers at regional, national, and international meetings, and to publish scholarly research in professional journals and extension publications. Also supported are faculty training, research, and consultation activities to improve the quality of human services in Utah, the region, and in developing countries overseas. This goal grows out of the research and extension mission of Utah State University as a major land grant institution.

3. **To provide selected liberal education course work for the general student body.** The program is committed to disseminating through course work the knowledge, attitudes, and values of social work to the general student body of Utah State University, which enhances their understanding and sensitivities to the complexities of social welfare.

4. **To prepare students for advanced professional and continuing education.** The program endeavors to prepare students for advanced standing in graduate professional programs and to provide a solid academic base for continuing education. To accomplish this, the program is designed to facilitate the development of a well-rounded liberal arts educational foundation, good study habits, written and verbal communication skills, and the ability to think critically.

## **Social Work Major**

**Licensure and State Merit System.** The baccalaureate social work program at Utah State University is accredited by the Council on Social Work Education and meets the requirements set by the State of Utah for certification of social service workers.

**Admission to the Major.** New and transfer students seeking to major in social work must complete an application form and attach a transcript. Application forms are available from the secretary, Social Work Program office.

Majors must meet the following graduation requirements:

1. Overall University requirements for graduation. In addition, Social Work majors are specifically required to take Biology LS 101, Biology and the Citizen, as part of their Life Science General Education Quadrant.

2. Completion of Engl 101, and 200 or 201, or equivalent.

3. Completion of 62 credits in social work and other selected areas as specified below. For purposes of admission to field practicum, a grade point average of 2.5 must be maintained in courses required for the major.

a. Complete the **Basic Core Curriculum**: SW 105, 227; FHD 150; SW 250, 305; Anthr 101; SW 240, 365, and 410. The Basic Core Curriculum is designed to introduce the student to fundamental knowledge in social work. This includes field observation, research skills, minority issues, and a basic understanding of human behavior in the social environment.

b. Complete the **Advanced Core Curriculum**: Soc 415; SW 415, 416, 417, and 535. The Advanced Core Curriculum builds on fundamental Social Work knowledge. It is designed to prepare the student in Social Work skills and to address issues and fields of practice.

4. Complete the **Field Practicum** requirements of a minimum of 450 clock hours of supervised field practicum. This is done through enrollment in SW 487 (10 credits) and SW 587 (5 credits) on a concurrent basis. Advanced students are admitted to SW 487 only after making application with the Practicum Director. Such application must be made during the winter quarter of the academic year prior to enrollment in the practicum.

5. During academic and field training, the student is required to abide by the Code of Ethics and standards of conduct as specified by the National Association of Social Workers and the Utah State Board of Social Work Examiners.

## **Social Work Minor**

The minor in Social Work at USU is designed to offer to majors in other fields a professional orientation to the knowledge base, values, and skills of the field of social work in order to complement and enhance their training in another academic major. Students electing to complete a minor in social work should contact the Social Work Program Coordinator for advising and consultation.

Social work training can augment preparation in a variety of fields. Generally those who elect a minor in social work receive their major education in the social sciences, behavioral sciences, or education. The knowledge and skills of social work are also relevant to preparation for a career in business, the medical helping professions, and other allied disciplines. The content of the social work minor is flexible and can be adapted to the specific educational needs of each student.

**Requirements.** 1. All minors complete a minimum of 18 credits in social work courses.

2. Introduction to Social Welfare is required of all social work minors: SW 105 (3 credits).

3. The balance of 15 credits can be selected from the following list in consultation with the Program Coordinator: SW 227, 240, 250, 300, 335, 336, 365, 375, 410, 435, 485, 535, 590, and 595.

**Teaching Certification.** The student majoring in social work who seeks certification in secondary education may take the required courses listed in the handbook for teaching majors and minors in the approved subject areas.

By careful planning, a social work major preferring to do so can complete requirements for a secondary or elementary teaching certificate.

## **Social Work Courses**

**SS 105. Introduction to Social Welfare.** Public and voluntary programs which provide social services. Prerequisite to social work core courses. (3F,W,Sp)

**227. Field Observation.** A supervised volunteer experience in a social service agency. (2F)

**240. Social Welfare and Minority Groups.** Examines social and cultural characteristics of various minority groups and emphasizes the use of social welfare resources for finding solutions to minority group problems. (3W)

**250. Human Behavior in the Social Environment.** Interrelatedness of social, cultural, and environmental factors that combine with biological and psychological components to mold human behavior; and their relevance to generalist social work practice. (3W)

**300. Child Abuse and Neglect: A Multidisciplinary Approach.** Goal is to equip students with an increased knowledge and awareness of the etiology, identification, reporting, and treatment of abused children and abusive parents. (3W)

**305. Social Work Practice.** Introduction to social work practice; the generalist approach, helping process, values and ethics, skills and assessment. Prerequisite: SW 105. (3F,Sp)

**335. Child Welfare.** Developments in programs for meeting such needs of children as substitute parental care, adoptions, delinquency problems, mental retardation, and unmarried motherhood. (3F)

**336. Social Work With Adolescents.** Theory and technique of working with delinquent and troubled youth using the social work perspective. (3W)

**365. Mental Health.** Services offered for the prevention and treatment of mental illnesses and the feasibility of social action programs on a community level. (3Sp)

**375. Medical Social Services.** Factors specific to social work practice in medical settings and with physically ill and terminal patients. (3Sp)

**410. Social Work Research.** Survey of scientific methods of research in social work. Articulation of research with practice and policy. (3F)

**415. Social Work Skills I.** Planning and intervention theories, techniques and skills within a generalist practice framework. Prerequisites: SW 105, 227, 305. Open only to social work majors. (3W)

**416. Social Work Skills II.** Intervention, termination, and evaluation skills, methods and techniques within a generalist practice framework. Prerequisites: SW 105, 227, 305, 415. Open only to social work majors. (5Sp)

**417. Social Work Skills III.** Organizing within a generalist framework; building constituencies, mobilizing resources, brokering, advocacy, negotiating, and grassroots development. Prerequisites: SW 105, 227, 305. (3Sp)

**426. Field Practicum for Gerontology.** Individualized and specialized practicum training for students earning a certificate in gerontology. (1-6F,W,Sp)@

**435. Service to the Aged.** Effect of the aging process on social adjustment and trends toward development of services and programs for the aged. (3Sp)

**485. Social Work Seminar.** Current selected social work issues and procedures, such as social legislation, social service to rural areas, trends, etc. Recommended for social work majors and others interested in current social concerns. (3-6)@

**487. Field Practicum.** Individualized field practicum to meet internship requirements of departmental students. Prerequisites: field instructor's permission and SW 105, 227, and 305. Enrollment limited to social work majors. Students will be required to complete SW 415, 416, and 417 as early as possible or while in the field practicum sequence. (1-10F,W,Sp)@

**497H. Senior Thesis.** Individual research on a topic or problem in social work. Required of all students for graduation from the Honors Program in social work. Students must also complete HASS 480H. (1-9F,W,Sp,Su)

**535. Public Social Policy.** Examination and evaluation of various social welfare institutions and programs attacking poverty and inequality of opportunity. (3Sp)

**587. Advanced Field Practicum and Projects.** Supervised agency practicum and projects for advanced students in the social sciences. Prerequisite: instructor's permission. (1-10F,W,Sp)@

**590. Topical Issue Seminar.** Advanced social science seminar, designed as a forum for advanced students from varied social science disciplines. (2-6)@

**595. Directed Readings in Social Work.** Instructor's permission and a plan for study required. (1-5F,W,Sp,Su)@

understanding human beings and society through courses dealing with the present diversity of cultures and human types, prehistoric cultural change, and biological evolution. It is integral to a liberal arts education, because its holistic perspective lays a foundation for other disciplines which study particular aspects of the human experience. In addition to complementing other disciplines, anthropology can lead to careers in international development, business, cultural resources, and education.

**Minor.** Students minoring in anthropology are required to take the University minimum of 18 credits in anthropology courses. These may be selected by the student with assistance and approval of his or her adviser, but should include Anthr 101 or 150, and Anthr 110 or 231.

## Anthropology Courses

**SS 101. Introduction to Anthropology.** Basic areas of anthropology including biological and cultural human evolution, culture and social life, and analyses of the nature and variability of human institutions. (5F,W,Sp,Su)@

**SS 102. American Culture.** Basic beliefs, values, customs, and institutions of America. (3F,Sp)

**SS 110. Human Origins.** Introduction to biological anthropology including study of fossil and living primates, evolution and variability of fossil humans, contemporary human variation, processes and factors in evolution. (5W)

**SS 150. Peoples and Cultures of the World.** Intensive comparisons of the economic, political, kinship, and religious structures of representative societies from the major culture areas of the world. (5F,Sp)@

**IO 210. Perspectives on Race.** Study of the processes of racial differentiation, the analysis of biological differences found among existing races, and the influence of biology and culture upon race. (3F)

**IO 231. Introduction to Archaeology.** Survey of the interdisciplinary science of archaeology, the study of past human behavior from material remains. Major transitions in prehistory are examined. (5F)

**235. Prehistory of Utah and the Great Basin.** Ecological perspective on the prehistory of Utah and surrounding states from initial human occupation to historic contact. Three credits lecture, five credits lecture/field trips. (3-5Sp)

**IO 340. An Introduction to Linguistics.** Theory of language and survey of structural and generative phonology, morphology, syntax; language acquisition; second language learning. (See Lin 340.) (5F)

**351. Traditional Africa.** Geography, ethnology, and early history of Africa to the coming of the colonial powers. (3F)

**355. Southwestern Indian Cultures.** Native cultures of the Pueblo, Navajo, Apache, Utes, and other peoples of the Great Basin and Colorado River areas. Overview of the prehistory of the Greater Southwest. (3Sp)

**400 (d600). Anthropological Theory.** The intellectual history and development of alternate theoretical perspectives in anthropology. (3F,Sp)

**401. Value Systems and World Views.** Comparative and theoretical study of the nature and variability of values, value systems, cultural orientations, and world views. Relationships of these cultural phenomena to personality. (3Sp)

**402. Comparative Family Systems.** Basic anthropological concepts and theories relating social structures based on kinship, its analysis, evolution, function, change, and variability over the world. (3F)

**405. Anthropology and Religion.** Theoretical analysis of religion as a cultural phenomenon. The functional relationships of religion to culture, society, and the individual. (3F,W)

**407 (d607). Anthropology of Sex and Gender.** A cross-cultural study of gender and sexual customs. (3F)

**409 (d609). Medical Anthropology.** Study of disease, medicine, and health as they relate to human biology, beliefs, and lifeway examined from prehistoric to modern times and cross-culturally. (3Sp)

## Anthropology

Anthropology is the integrated and holistic study of human beings in all of their aspects. It offers a broad perspective for

**430 (d630). North American Prehistory.** Archaeology of Native Americans from initial occupation of North America to historic contact. Scientific nature and ecological approach of contemporary archaeology is emphasized. (3F,W,Sp)

**431. Prehistory of Mesoamerica.** An analysis of prehistoric cultural development in Mexico and Guatemala from the time of early hunters and gatherers through the Spanish conquest of the Aztec empire. (3W)

**433 (d633). Archaeology Field School.** Three to eight week internship on an archaeological field project including survey, excavation, recording, mapping, and scientific conduct of archaeological problem solving. (4-10Sp,Su)

**434. Anthropology Lab Techniques.** Laboratory experience enabling participation in analysis/reporting stages of archaeological or physical anthropology project. Includes discussions, laboratory work, and student project. Instructor's permission required. (1-3F,W,Sp)®

**435 (d635). Archaeological Method and Theory.** History of archaeological thought emphasizing archaeology as human ecology. Explores means by which inferences are made to decipher the material record of past human behavior. (3F,W)

**450 (d650). American Indian Cultures.** Economic, political, kinship, and religious structures of representative native cultures of North America. Emphasis on the peoples of the American West. (3W,Sp)

**452 (d652). Applied Anthropology and Culture Change.** Nature and problems of planned interventions in Third World societies undergoing technical, economic, and social change. (3W)

**459. Folklore of Utah.** Study of the lore of major Utah folk groups (ethnic and immigrant, occupational, religious, and regional). (3)

**461 (d661). Psychological Anthropology.** Comparative analysis of psychiatric disorders and behavior disturbances in various societies of the world; special consideration given to contemporary Western diagnostic concepts and therapeutic practices. (3F,W)

**480 (d680). Seminar: Topics in Anthropology.** Seminar in various special topics in anthropology. Topics will vary from quarter to quarter. (3-5F,W,Sp,Su)®

**497H. Senior Thesis.** Individual research on a topic or problem in anthropology. Required of all students for graduation from the Honors Program in anthropology. Students must also complete HASS 480H. (1-9F,W,Sp,Su)

**505. Third World Economic Systems.** Anthropological analysis of economic institutions and development in non-Western societies. (3F,Sp)

**524 (d624). Regional Folklore.** Regional folklore of a specific region, identified each quarter taught. (3)®

**IO 526. Legends, Myths, and Folktales.** Substance and significance of folk prose narratives both in the past and in contemporary society. (3)

**590. Independent Studies.** (1-5F,W,Sp,Su)®

### Graduate<sup>2</sup>

**600 (d400). Anthropological Theory.** (3F,Sp)

**607 (d407). Anthropology of Sex and Gender.** (3F)

**609 (d409). Medical Anthropology.** (3Sp)

**624 (d524). Regional Folklore.** (3)®

**630 (d430). North American Prehistory.** (3F,Sp)

**633 (d433). Archaeology Field School.** (4-10Sp,Su)

**635 (d435). Archaeology Method and Theory.** (3F,W)

**650 (d450). American Indian Cultures.** (3W)

**652 (d452). Applied Anthropology and Culture Change.** (3W)

**657. American Studies Internship in Mountain West Culture.** (2-13)

**661 (d461). Psychological Anthropology.** (3F,W)

**680 (d480). Seminar: Topics in Anthropology.** (3-5F,W,Sp,Su)®

**690. Independent Studies.** (1-5F,W,Sp)®

<sup>1</sup>Parenthetical numbers preceded by *d* indicate a *dual* listing.

<sup>2</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through the Life Span Learning Independent Study Division.

\*Taught 1990-91.

\*\*Taught 1991-92.

## Department of Special Education College of Education

**Head: Professor Charles L. Salzberg**  
Office in Emma Eccles Jones Education 313A

**Professors** Marvin G. Fifield, Alan M. Hofmeister, Glenn I. Latham, Ron J. Thorkildsen, Karl R. White; **Professor Emeritus** Donald F. Kline; **Associate Professors** Martin Agran, Hyrum S. Henderson, Daniel P. Morgan, Sarah Rule, Richard P. West, K. Richard Young; **Clinical Associate Professor** Phyllis Cole; **Research Associate Professor** Joseph M. Ferrara; **Associate Professors Emeritus** Phyllis Publicover, Devoe C. Rickert; **Assistant Professors** Pamela J. Hudson, Benjamin Lignugaris/Kraft, Chris MacFarlane (temporary); **Clinical Instructors** Barbara Fiechl, Joan F. Forsgren-White, Patty Willis

**Degrees offered:** Bachelor of Science (BS), Master of Science (MS), Master of Education (MEd), and Doctor of Philosophy (PhD) in Special Education

**Areas of Specialization:** The Department of Special Education offers training programs for individuals desiring to work with children and adults with handicaps. A student fulfilling the undergraduate course requirements will qualify for a BS degree in special education and be eligible for an endorsement to teach either students with mild/moderate handicaps or students with severe handicaps. Either endorsement allows graduates to teach pupils with handicaps from kindergarten through twelfth grade. Students interested in teaching preschool children with handicaps may receive an early childhood special education certificate for ages 0-5. The graduate program offers specialization in Early Childhood Handicapped, Behavioral Disorders, Learning Disabilities, Severely Handicapped,

Special Educator Administration/Supervision, and Rehabilitation Counseling.

## Objectives

The Department of Special Education offers educational and training opportunities for teachers, supervisors, support personnel, rehabilitation counselors, and others working with exceptional children and adults. The undergraduate program prepares students to work with mildly, moderately, and severely handicapped students, and with early childhood special education. The masters programs emphasize the preparation of master teachers and rehabilitation counselors. Courses are open to all students who have the necessary prerequisites. Additionally, students who are majoring in other teaching fields (i.e., elementary education, secondary education) are encouraged to pursue a second endorsement by taking those courses which lead to a special education credential. The doctoral program emphasizes national leadership in special education through empirical research, scholarship, and development of innovative approaches to service and personnel training on behalf of individuals with disabilities.

## Requirements

**Departmental Admission Requirements.** Admission requirements for the Department of Special Education are in compliance with the College of Education admission to Teacher Education requirements. A 2.5 GPA is required for admission.

**Bachelor of Science in Special Education.** Undergraduate study leads to the Bachelor of Science degree in Special Education with certification to teach students with mild/moderate handicaps, severe handicaps, or early childhood special education. Freshmen and sophomores considering special education as a major may take Sp Ed 215 for early practicum experience.

### I. General Education

- A. Written Communication (12 credits)
- B. Learning Skills (10 credits)
- C. Broadening Knowledge (30 credits)

### II. Professional Education (18-21 credits)

III. Special Education Major (63-73 credits). Course work includes human growth and development, applied behavior analysis, introduction to systematic instruction (task analysis, criterion-referenced measurement, behavioral objectives, contingent reinforcement), designing curriculum, Individualized Educational Programs (IEP); educational assessment, analysis and adaptation of instructional materials, intervention strategies for academic and social behaviors, and parent involvement.

Additionally, each block of courses includes practicum work with exceptional children or youth. The final practicum involves student teaching in a special education setting.

IV. Emphasis Area (24 credits). The emphasis area is designed to enhance the Special Education major's background. Areas recommended include communicative disorders, psychology, sociology, family and human development, recreation, and physical education.

### V. Electives (16-29 credits).

### VI. Total credits (186).

## Graduate Study

See the graduate catalog for further information concerning certification, Master of Science, Master of Education, Supervisory Credential, and Doctor of Philosophy programs in special education.

## Special Education Courses

**215. Introductory Experience With Students With Handicaps.** In this beginning practical experience, students use videodisc simulations to learn teaching methods, which they apply in public schools with pupils with handicaps. (1-6W,Sp)®

**301. Education of Exceptional Children.** Characteristics of all types of exceptional children with emphasis on the educational and psychological implications of these conditions to the development of the child. (3F,W,Sp,Su)©

**491. Undergraduate Research and Creative Opportunities.** Individually directed study at the undergraduate level. (1-3F,W,Sp,Su)

**501. Behavioral Assessment and Data-based Decision Making.** Methods of collecting performance data, using data to make decisions regarding student progress, teacher accountability, and methods of graphing and analyzing data. (3F)

**502. Assessment of Handicapped Persons.** Students will learn to assess persons referred for special education services to determine eligibility and to assess their progress in special education. (3F)

**503. Introduction to Transition and Vocational Education.** Introduction to transition programming and vocational training for students with handicaps (mild-severe), including daily living, community survival, and career education issues. (3F)

**504. Introduction to Effective Instructional Procedures.** Provides prospective special education teachers with effective instructional approaches to help students achieve mastery and proficiency in learning. (3F)

**505. Applied Behavior Analysis in Education.** Students will learn to effectively apply principles of behavior to management and instruction of children with handicaps. (3W)

**506. Consulting with Parents and Teachers.** Provides strategies for communicating with parents and teachers, as members of a multidisciplinary team, to assist parents in advocacy and other teachers in collaborative problem solving. (3Sp)

**507. Policies and Procedures in Special Education.** Provides an understanding of federal and state laws for the handicapped and procedures for organizing a special education classroom and auxiliary staff. (3W)

**508. Remediating Behavior Problems and Social Deficits.** Helps develop skills for remediating behavior problems and teaching social skills in elementary/secondary settings; emphasizes protecting rights of persons exhibiting behavior problems. (4Sp)

**520. Student Teaching in Special Education.** (1-15F,W,Sp,Su)

**528. Educational Audiology.** Management of the hearing-impaired child in regular schools; population and individual profiles; evaluation and staffing; models of delivery; integration considerations; remedial and facilitative programming. (3)

**532. Curriculum for Students with Mild/Moderate Handicaps.** Students learn basic school curricula and develop skills in analyzing and defining objectives for academic instruction of students with mild/moderate handicaps. (4W)

**533. Teaching Secondary Students with Mild/Moderate Handicaps.** Provides prospective resource teachers with methods and techniques appropriate for teaching students with mild and moderate handicaps in secondary special education programs. (3Sp)

**539. Teaching Exceptional Children in the Regular Class.** (3-5)

**540. Practicum: Direct Instruction Reading, Math, and Language.** Students teach academic skills to mild or moderately handicapped pupils daily using direct instruction techniques. Prerequisite: Permission of instructor. (1-6F)®

**541. Practicum: Individualized Instruction in Reading and Mathematics.** Students will learn to teach students with mild/moderate handicaps in reading and arithmetic so that each progresses as fast as his/her capabilities allow. Prerequisite: Permission of instructor. (1-6W)®

**542. Practicum: Eligibility Assessment.** Students will conduct assessments of school-aged pupils suspected of being mildly or moderately handicapped according to state guidelines. Prerequisite: Permission of instructor. (1-2W,Sp)

**543. Practicum: Teacher Designed Instruction.** Students assess, design teaching materials, and provide daily instruction to mildly or moderately handicapped pupils deficient in academic or behavior skills. Prerequisite: Permission of instructor. (1-6Sp)

**551. Curriculum for Students with Severe Handicaps.** Provides students with information about commercially available curricular materials, as well as the skills necessary to plan for and design curricula for persons with severe handicaps. (3W)

**552. Analysis and Adaptation of Instructional Materials.** Systematic procedures for analyzing and/or adapting instructional materials for use with handicapped learners. (3F,Sp)

**554. Advanced Transition and Vocational Programming.** Students will learn to evaluate, administer, and interpret various assessment instruments and design and implement vocational programs. (3Sp)

**556. Practicum in Improving School System Programs.** Seminar focused upon a different phase of the instruction program; a sequence of developmental training programs; and new and persisting problems in many dimensions of teaching. (1-6)

**557. Adaptive Equipment and Communication Technology.** Trains students to assess needs for augmentative/alternative communication devices; and select, program for, maintain, repair, and build adaptive devices. (3W)

**558. Issues in Educating Persons with Severe Handicaps.** A seminar to discuss current topics and research trends affecting persons with severe handicaps. (1Sp)

**561. Practicum: Introduction to Instruction of Students with Severe Handicaps.** A field-based class providing experience in observing and teaching students with severe handicaps. Prerequisite: Permission of instructor. (1-6F)@

**562. Practicum: Systematic Instruction of Students with Severe Handicaps.** Provides an opportunity to assess a student and to select a program to teach, revising it as necessary. Prerequisite: Permission of instructor. (1-6W)@

**563. Practicum: Advanced Systematic Instruction of Students with Severe Handicaps.** Provides the opportunity to assess a need, design a program with goals and objectives, and revise the instruction to teach another to implement the programs. Prerequisite: Permission of instructor. (1-6Sp)@

**574. Methods and Materials for Educating the Preschool Child with Handicaps.** Provides students with a knowledge of curricula and instructional strategies for teaching preschool children with handicaps. (3Sp)

**575 (d675).<sup>1</sup> Educating Autistic Children.** The basic knowledge and skills needed to teach autistic children will be discussed. The course will cover etiology, assessment procedures, intervention strategies, and learning characteristics. (3F,Su)

**576 (d676). Teaching Infants and Young Children with Handicaps.** Provides methods of interventions for children aged 0-5 with handicaps, skill areas, environmental organizations, and family role in developing individual family service plans and interventions. (3Su)

**578. Teaching the Young Child with Handicaps in the Least Restrictive Environment.** Presents techniques for working with multidisciplinary staff teams and techniques of serving preschoolers with handicaps in an array of program environments. (4W,Su)

**582 (d662). Teaching Vocational Skills to the Handicapped.** Prepares students to develop and implement programs that teach vocational skills to handicapped persons. Curriculum will include interpersonal work skills, production-related skills, and job responsibility. (3W)

**583 (d663). Job Procurement, Analysis, and Placement for Handicapped Persons.** Students will develop and procure jobs for handicapped youth and adults. They will learn systematic models for job placement that enhance handicapped individuals' opportunities for employment success. (3Sp)

**584. Practicum in the Least Restrictive Environment with Family Service Plans.** Students will participate in a variety of environments serving handicapped preschoolers, assist in developing a Family Service Plan, and train another adult to conduct programs. (4W,Sp)

**590. Independent Study.** (1-3F,W,Sp,Su)@

**591. Independent Research.** (1-3F,W,Sp,Su)@

**601. Counseling Parents of Exceptional Children.** (3)

**602. Diagnostic Programming of Instruction.** (3)

**603. Clinical Practicum in Special Education—Clinical Teaching.** (3-12F,W,Sp,Su)

**610. Introduction Rehabilitation Counseling.** (3F,Sp)

**611. Psychosocial Aspects of Disability.** (3W)

**612. Medical Aspects of Disability.** (3W)

**613. Vocational Counseling.** (3Sp)

**614. Teaching the Severely Handicapped.** (3)

**615. Case Studies in Rehabilitation.** (3Su)

**618. Rehabilitation Practicum.** (3-6F,W,Sp,Su)

**619. Rehabilitation Internship.** (6-12F,W,Sp,Su)

**621. Assessment of Complex Learning Behavior Disorders.** (3)

**622. Education of Emotionally Disturbed Children.** (3)

**623. Education of the Socially Maladjusted.** (3)

**624. Issues in Development of Early Childhood Handicapped.** (1-3)

**626. Methods Materials for Educating the Early Childhood Handicapped.** (1-3)

**629. Teaching Social Skills to Handicapped Children and Youth.** (3)

**630. Consulting with Regular Classroom Teachers.** (3W,Su)

**633. Supervision and Administration Internship.** (3F,W,Sp,Su)

**634. Teaching Secondary Students: Content Acquisition.** (3W)

**635. Practicum: Content Acquisition.** (1-3W)

**638. Theory, Practices, and Research in Learning Disabilities.** (3F,Su)

**639. Classroom Procedures and Management in Learning Disabilities.** (3)

**650. Interdisciplinary Workshop.** (1-3)@

**655. Practicum in the Evaluation of Instruction.** (1-6)@

**656. Practicum in the Improvement of Instruction.** (1-6)@

**658. Educational Audiological Management of the Hearing Impaired.** (3W)

**662 (d582). Teaching Vocational Skills to the Handicapped.** (3W)

**663 (d583). Job Procurement, Analysis, and Placement for Handicapped Persons.** (3Sp)

**670. Systematic Evaluation of Individual Performance.** (3F,Sp,Su)

**675 (d575). Educating Autistic Children.** (3F,Su)

**676 (d576). Interventions for Handicapped Infants and Preschoolers.** (3Su)

**681. Seminar in Special Education.** (1-3)@

**682. Rehab Professional Seminar.** (1-3F,W,Sp,Su)

**690. Independent Study.** (1-3)@

**691. Independent Research.** (1-3)@

**693. Internship in Special Education.** (3-15)

**697. Thesis.** (1-9)@

**699. Continuing Graduate Advisement.** (1-12)@

**705. Internship in Program Evaluation.** (1-6)

**706. Internship in Research.** (1-6)

## Graduate<sup>2</sup>

NOTE: Sp Ed 301 or permission of instructor required for registration in 600-level courses.

733. Supervision Internship. (3-12)  
750. Interdisciplinary Workshop. (1-3)®  
755. Evaluation of Supervisory Performance. (1-6)®  
780. Issues in Special Education. (1-6)  
781. Research Seminar in Special Education. (1-6)®  
783. Special Education Personnel Preparation. (3F)  
790. Independent Study. (1-3)®  
791. Independent Research. (1-3)®

793. Internship in Special Education. (1-15)®

797. Dissertation. (1-15)®

799. Continuing Graduate Advisement. (1-12)®

<sup>1</sup>Parenthetical numbers preceded by *d* indicate a *dual listing*.

<sup>2</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

© This course is also offered by correspondence through the Life Span Learning Independent Study Division.

\*Taught 1990-91.

\*\*Taught 1991-92.

## Department of *Theatre Arts* College of Humanities, Arts and Social Sciences

**Head:** Professor Sid G. Perkes

**Acting Head (9/90 to 5/91):** Professor Colin B. Johnson  
Office in Chase Fine Arts Center 232

**Professor W. Vosco Call; Associate Professors** Lynda Linford, Arthur Y. Smith; **Associate Professor Emeritus** LeRoy C. Brandt, Jr.; **Assistant Professors** Gary R. Bird, Farrell J. Black, Daniel G. Guyette, Philip C. Haslam, Nancy E. Hills; **Assistant Professor Emeritus** Barbara M. Hales; **Lecturer** Maggi Moar

**Degrees offered:** Bachelor of Arts (BA), Bachelor of Fine Arts (BFA), Master of Arts (MA), and Master of Fine Arts (MFA) in Theatre Arts

### Objectives

The primary responsibilities of the Theatre Arts Department are (1) to teach appreciation, service, foundational, and specialized courses, (2) to assist in training students for careers as theatre teachers in secondary schools, (3) to prepare students for advanced study and training, and (4) to sponsor worthwhile production programs in which students can practice the art and craft of theatre, interpretation, and narrative theatre, and which will be dynamic contributions to the cultural life of the University community.

**Production Groups and Theatres.** Production groups sponsored by the Theatre Arts Department are Utah State Theatre, Studio Stage, Utah State Children's Theatre, Narrative Theatre, and the Old Lyric Repertory Company. Facilities used for performances by these groups are a thrust stage theatre in the Chase Fine Arts Center; the Lyric, a small proscenium theatre in downtown Logan; and the Studio Theatre. Information concerning the production groups and theatres is available in the Theatre Arts Department office, Fine Arts 232.

### Requirements

**Departmental Admission Requirements.** Admission requirements for the Department of Theatre Arts are the same as those described for the University on pages 8-11. Students in good standing may apply for admission to the department.

**Undergraduate Requirements.** Students must accumulate 40 credit hours of approved General Education courses plus 6 credits of Written Communication.

**Core Courses.** Majors in all areas of Theatre Arts must take the following core courses: ThArt 105, 109, 121, 150, 205, 246, and 430 or 432.

### Bachelor of Arts Degree

**Communication-Theatre Arts Composite Teaching Major (72 credits):** core (25 credits); design-technical courses (5 credits); performance courses (7 credits); production practicum (4 credits); communication courses required are listed in Communication Department section of this catalog.

**General Theatre Studies (82 credits):** core (25 credits); performance courses (12 credits); design/technical courses (12 credits); dramatic literature-history (21 credits); production practicum (6 credits); controlled electives (6 credits).

**Theatre Arts Teaching Minor (25 credits):** ThArt 105, 121, 140, 150, 205, 246, and 400 or 3 credits of production practicum (292 or 592) (20 credits); elective theatre arts courses (3 credits).

To obtain the Bachelor of Arts degree, a student must fulfill the foreign language requirement.

### Bachelor of Fine Arts Degree

This degree is specifically designed for those students with a firm idea of their professional goals. It is a concentrated four-year program which requires students to demonstrate acquired abilities in their emphasis area.

**Theatre Arts Teaching Major—Theatre Arts Emphasis (45 credits):** performance courses (10 credits); design-technical courses (10 credits); dramatic literature (9 credits); oral interpretation (16 credits). Candidates must also complete the teaching certification requirements.

#### Acting/Directing (Performance) Emphasis

#### Theatre Design and Technology Emphasis

Candidates are accepted into the performance program through audition and interview and into the design-tech program through



interview and submission of a portfolio. A departmental BFA committee presides over the acceptance process and progress reviews. Transfer students are subject to the same acceptance process and progress review. Inquiries about specific requirements and expectations should be directed to the Theatre Arts office.

Students seeking the BFA degree should work closely with advisers. General Education requirements, core courses, production practicum, and some area emphasis courses should be completed before the end of the sophomore year. Individual needs, interests, and goals of the student will be used in elective course selection. The department maintains an updated Course of Study to aid the student in selecting courses for the first two years of the curriculum in recommended sequence. Inquire at the Theatre Arts Department office, FA 232.

### Production Responsibilities

All majors and teaching minors are required to participate in the various production programs of the department. A theatre participation record is maintained for each student, and successful completion of crew and performance assignments is a requirement for graduation.

Majors who wish to qualify for a secondary teaching certificate must apply for admission to teacher education.

During the senior year all theatre arts majors are required to complete a project in a phase of theatre in which they are interested. (Inquire at department office, FA 232, for further information.)

### Graduate Study

For information about the graduate study program and requirements for the MA and MFA in theatre arts and theatre arts with special emphasis, see the graduate catalog.

### Theatre Arts Courses

**HU 101. Understanding Theatre.** Survey of dramatic principles and theatrical conventions. The function of theatre personnel and practices of the contemporary stage. (5)

**105. Introduction to Theatre Studies I: Script Analysis.** Textual study of scripts from contemporary and historical drama, readers theatre, film, TV, and radio for analysis of plot, character, language, ideas, and staging. (3W)

**107. Stage Movement.** Develops self-awareness through self-discipline. Class emphasis: tension/relaxation, postural correction, balance, strength, flexibility, breath control, spacial exploration, and developing awareness of habitual movement patterns. (1F)

**109. First Year Voice for Theatre.** Introduction to the fundamental techniques of vocal production for the theatre. Emphasizes an individual program of personal vocal development. Can be repeated for up to 3 credits with permission of instructor. (1F,W,Sp)@

**121. Fundamentals of Acting.** Development of the actor's physical, mental, and emotional resources. Can be repeated with permission of instructor. (2F,W,Sp)@

**HU 140. Communicative Performance of Literature.** Introduces students to fundamental concepts and practices of oral language arts. Integrates listening, speaking, and reading by emphasizing oral communication of major literary genres. (5F,W,Sp,Su)

**150. Technical Workshop.** Taught as a three-quarter series. One quarter is drafting and scene painting. Second is stagecraft, lighting, and sound. Third is costume construction, figure drawing, and rendering techniques. Emphasis is on terminology and techniques applicable to the theatre. Can be repeated for up to 6 credits with permission of instructor. (2F,W,Sp)@

**152. Makeup.** Practice in makeup for the stage. Recommended to performers and directors of educational, church, and community theatres. (2)

**154. Children's Theatre.** Theory and practice in the selection, preparation, and presentation of plays for children. Recommended for prospective elementary school teachers. (3)

**172. Mime and Movement for Theatre I.** Practice in movement fundamentals for realistic theatre mimes. For teachers and actors. (1)@

**HU 201. Understanding Movies.** Development of a "film sense" through appreciation of the language, content, and social utility of significant motion pictures. (3F,W)

**202. Film and the Arts.** Movie viewing to explore the special kinship of film with literature, the visual arts, music, and social and aesthetic concerns. (3)

**205. Introduction to Theatre Studies II: Forms and Modes.** Study of the universal characteristics of theatre apart from chronology through a categorical survey of tragedy, comedy, melodrama, and farce in both classical and romantic modes of understanding. Prerequisite: ThArt 105. (3Sp)

**209. Second Year Voice for Theatre.** Intermediate voice for theatre. Emphasizes techniques for characterization, special problems for stylized voice, and work in verse drama. Can be repeated once for credit with permission of instructor. Prerequisite: ThArt 109. (2F,W)

**221. Intermediate Acting.** A skills acquiring course based on organic acting techniques. Can be repeated for 4 credits with permission of instructor. Prerequisite: ThArt 121. (2F,W)@

**246. Fundamentals of Directing.** Study and use of composition, picturization, movement, rhythm, gesture, etc. (3Sp)

**251. Historic Costume for the Stage I.** Historical survey of the development of costumes from Egyptian to A.D. 1700 with emphasis on reproduction for the stage. Survey of manners and movement in period costume. Prerequisite: ThArt 150. (3F)

**252. Historic Costume for the Stage II.** Continuation of ThArt 251. Historical survey of costumes from 1700 to present with emphasis on reproduction for the stage. Survey of manners and movement in costumes. Prerequisite: ThArt 150. (3W)

**254. Stage Lighting.** Lighting design, instrument placement, and control board operation. Prerequisite: ThArt 150. (3F)

**272. Mime and Movement for Theatre II.** Advanced theory and practice in stylized mime for the theatre. Emphasis on creative approach for projecting character, emotion, and mood. Prerequisite: ThArt 172. (1Sp)@

**292. Production Practicum.** Specialized work in performance, technical practice in ongoing productions of Utah State Theatre. Prerequisite: permission of instructor. (1-3F,W,Sp)@

**303. Introduction to Playwriting.** Practice in writing plays. Prerequisite: Engl 202 or equivalent. (3)@

**316. Dialects for Performance.** Phonetic study of the major European accents and English dialects. Includes oral practice of relevant literature. Prerequisite: ThArt 209. (3)

**350. Scenery Painting for the Theatre.** Advanced work in theory, techniques, and practice in scenery painting for the theatre. Prerequisite: ThArt 150. (3W)@

**\*\*372. Dance for Theatre.** Body movement designed for the needs of the actor. Emphasis on the requirements of period drama and musical comedy. (1)@

**\*\*374. Choreography for the Stage.** Study and use of dance forms for the theatre: space relationships and movements for ceremonials, musicals, and stylized stage fighting. (2)

**400. Company Workshop.** Supervised rehearsals, technical preparation, and public performances. Prerequisite: permission of instructors. (3)@

**410. Interpretation Programming and Performance.** Script analysis, cutting, compiling, mounting of solo and group programs for various audiences, educational settings, and community groups. (3F,W,Sp)@

**\*430. History of the Theatre I: Origins to 17th Century.** Surveys development of theatre from ritual origins through the Spanish Golden Age by examining its architecture, staging practices, performers, management systems, and playwrights. (3F)

**\*\*432. History of the Theatre II: 17th Century to WW II.** Continuation of the preceding course from the Elizabethan stage to the modern period. (3F)

**434. History of American Drama and Theatre.** (3W)

**436. Masterpieces of British Drama.** Study of major works in British drama from the beginnings to 1890, including Elizabethan, Stuart, Restoration, eighteenth and nineteenth century plays. (3)

**440. Performance of Literature.** Oral study of the various types of literature with special emphasis on the functional relationships between literary form and oral performance. (5W,Sp)

**446. Directing.** Theory and practice of stage direction. Students study directing techniques and select, cast, direct, and present scenes and short plays. Prerequisite: ThArt 246. (2W,Sp)@

**450. Scene Design.** Development of scene design techniques through study of and practice in rendering, perspective drawing, plan drafting, sketching, and model building. Prerequisite: ThArt 150. (3)

**451. Stage Costume Design.** Theory and practice in the design and selection of costumes for nonrealistic, historical, and modern plays. Study of the relationship of costume to character and production. Prerequisite: ThArt 150. (3Sp)

**458. Creative Dramatics.** Use of improvised drama as a base for developing creative thinking in children. Relevance to teaching stressed. Recommended for elementary education majors. Includes laboratory experience with children. (3)

**510 (d610).<sup>1</sup> Interpreters Theatre.** Survey of Readers Theatre including skills and techniques in cutting, building, and mounting programs using all genres of literature for the classroom. (3F,W,Sp,Su)@

**518 (d618). Storytelling.** Techniques of traditional storytelling; collecting stories appropriate for periods in the child's and young adult's development. (5F,W,Sp,Su)

**519 (d619). Tales and Telling: Preserving an Oral Tradition.** Workshop oriented course focusing on techniques for telling, building resources, and using storytelling in the curriculum and as a means to self-discovery and personal growth. (3F,W,Sp,Su)

**\*\*520. Voice Methods.** Advanced work in voice that continues the training of ThArt 109 and 209. Also an introduction of various voice methodologies. (3Sp)

**521. Advanced Acting.** Analysis and creating of roles with emphasis on classic characterizations, traditional acting methods and styles. Prerequisites: ThArt 221, 316, 372, or equivalencies. Repeatable for up to 8 credits. (2)@

**522 (d622). Poetry Appreciation.** Oral reading principles and positive strategies for introducing poetry to young people. (3F,W,Sp,Su)

**523. Teaching of Speech Communication and Theatre Arts.** Development of materials and strategies for teaching secondary school speech and theatre. Team taught by Communication and Theatre Arts faculties. Prerequisite: admission to teacher education. (4F)

**530 (d630). Oral Interpretation Workshop of Children's Literature.** Theory and practice of oral reading principles for various forms of children's literature; emphasis on choral reading, play reading, and readers theatre. (3F,W,Sp,Su)

**532 (d632). Creative Projects in Oral Language Arts.** Workshop focusing specifically upon a creative approach to one of the following: poetry, storytelling, creative dramatics, choral reading, readers theatre, and drama in the classroom. (3F,W,Sp,Su)@

**534 (d634). Modern Continental Drama.** (3)

**\*536 (d636). Contemporary Theatre.** Theatre from WW II to the present day, reviewing the major movements in experimentalism in literature and production from the late 19th century. (3Sp)

**549 (d645). Modern American Drama.** (3)

**550 (d650). Period Styles, Architecture, and Decoration for the Stage.** The study of theatre structural forms, period architecture, furniture, ornamentation and motifs for stage settings, and techniques and practical experience in stage prop construction. Prerequisite: ThArt 150. (3W)

**551 (d651). Advanced Scene Design.** Advanced study in design theory and rendering techniques with emphasis on scenic design for productions in a variety of styles and physical theatre spaces. Prerequisites: ThArt 150, 450, and 550. (3Sp)

**552 (d652). Costume Construction Lab.** Individualized practical laboratory experience in pattern drafting, cutting, fitting, construction, and decoration of costumes for theatre productions. (2F,W,Sp,Su)@

**555. Theatre Organization and Management.** Managerial aspects of educational and community theatres: objectives, staff, facilities, schedules, promotion, budgets, financial support, etc. Taught on demand. (2Sp)

**570. Repertory Theatre Production.** Rehearsals, crew and staff assignments. Performance members selected through audition and based on ability and commitment to theatre. Enrollment limited and by permission of the Theatre Arts Department staff. (3-12Su)@

**581 (d681). Dramatic Theory and Criticism.** Explores the traditional works of critical theory that relate to the theatrical arts beginning with Aristotle's *Poetics*. (3W)@

**584 (d684). Modern British Drama.** (3)

**590. Special Projects in Theatre.** Directed individual research studies or creative projects related to theatre. Prerequisite: permission of instructor. (1-6)@

**592. Production Practicum.** Specialized work in performance, technical practice, and design in ongoing productions of Utah State Theatre. Prerequisite: permission of instructor. (1-3)

**598. Problems of Drama Directors.** Appraisal of various approaches to planning, teaching, and directing high school theatre programs. Scrutiny of typical production problems and practical solutions for them. (3Sp,Su)

## Graduate<sup>2</sup>

**610 (d510). Interpreters Theatre.** (3F,W,Sp,Su)@

**618 (d518). Storytelling.** (5F,W,Sp,Su)

**619 (d519). Tales and Telling: Preserving an Oral Tradition.** (3F,W,Sp,Su)

**622 (d522). Poetry Appreciation.** (3F,W,Sp,Su)

**HASS 625. Graduate Internship/Co-op.** (1-15)

**630 (d530). Oral Interpretation Workshop of Children's Literature.** (3F,W,Sp,Su)

**632 (d532). Creative Projects in Oral Language Arts.** (3F,W,Sp,Su)@

**634 (d534). Modern Continental Drama.** (3)

**\*636 (d536). Contemporary Theatre.** (3Sp)

**645 (d549). Modern American Drama.** (3)

**650 (d550). Period Styles, Architecture, and Decoration for the Stage.** (3W)

**651 (d551). Advanced Scene Design.** (3Sp)

**652 (d552). Costume Construction Lab.** (2F,W,Sp,Su)@

**670. Repertory Theatre Production.** (3-6Su)@

**680. Seminar in Drama.** (1-5)@

**681 (d581). Dramatic Theory and Criticism.** (3W)@

**684 (d584). Modern British Drama.** (3)

**690. Research Studies.** (1-5)@

**692. Projects in Theatre.** (1-9)@

**697. Thesis.** (1-6)@

**699. Continuing Graduate Advisement.** (1-3)@

<sup>1</sup>Parenthetical numbers preceded by *d* indicate a *dual* listing.

<sup>2</sup>Descriptions for courses in the 600 and 700 series can be found in the graduate catalog.

@ Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.

\*Taught 1990-91.

\*\*Taught 1991-92.

## Cooperative

# Nursing Program

## College of Science

## Weber State College/Utah State University

**Coordinator:** Instructor Pamela Hugie  
Office in Technical Services 201

**Assistant Professors** Joanne Duke, Joyce Murray; **Instructors** Marsha A. Castleton, Christine Espy

### Objectives

Weber State College and Utah State University jointly offer an Associate Degree Program in Nursing at Logan.

All nursing theory, General Education, and laboratory practice classes are offered on the Utah State University campus and in health service agencies within Weber, Box Elder, and Cache Counties.

Weber State College admits the prospective students and grants the Associate of Science degree upon the student's completion of the course. Registration takes place at Utah State University Nursing office unless there are unusual circumstances. The student participates in pinning ceremonies held on the Utah State University Campus and graduation ceremonies held on the Weber State College campus.

### Departmental Admission Requirements

Students apply for admission to the Cooperative Nursing Program by contacting the coordinator of the program, Technical Services Building, Room 201, Utah State University, Logan, Utah 84322-1205.

The student's application is handled through the Office of Admissions, Weber State College, Ogden, Utah 84408. Applicants have until February 14 to complete their application process. All application forms must be completed and sent to the Nursing Program admissions secretary at Weber State College. Notifications of status are sent to applicants by May 1.

A graduate of this program is eligible to write the State Board Test Pool licensing examination to become a registered nurse. The program is accredited by the Utah State Board of Nursing and the National League for Nursing.

Students admitted to the program have the prerogative of taking the licensing examination for Practical Nursing upon an equivalency basis with the completion of the first year's course of studies.

### Requirements

The curriculum listed below is planned over a seven-quarter period, using two academic years plus one summer quarter. It is planned to include a broad General Education program concurrently with courses in Nursing.

### Nursing Courses

**101. Fundamentals of Nursing Care.** Assists students to develop fundamental skills and identify simple nursing problems related to basic needs of people. (8F)

**111. Needs of Adults.** Uses nursing assessment and more advanced skills dealing with common types of pathology, diagnostic procedures, and specialized equipment to help meet basic human needs. (9W)

**Health Science 114. Basic Pharmacology.** (2F)

**121, 123. Needs of Family.** Uses nursing assessment and more advanced particular skills which help meet basic human needs of the family through the cycle of childbearing and child rearing. (10Sp)

**201. Needs of Adults.** (Medical Intervention) (7F)

**211. Needs of Adults.** (Surgical Intervention) (7W)

**Health Science 214. Pharmacology.** (3F)

**221. Emotional Needs of People.** (7Sp)

**Health Science 230. Introduction to Pathophysiology.** The nature of disease and its effect upon body systems. (4F)

**299. Nursing Seminars.** (2Sp)

(Courses 201, 211, 221 are interrelated. Students apply known principles and plan and administer nursing care for individuals with more complex health problems, regardless of age. Students assess, plan, implement, and evaluate nursing care of patients with an alteration of their basic needs.)

# *Other University Components*

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# *University Library and Learning Resources Program*

The University Library is combined with other educational media programs at the University in a single administrative organization: The Merrill Library and Learning Resources Program. The program focuses on collecting, organizing, storing, preserving, accessing, preparing, and delivering information to the University community, as well as to the citizens of Utah and the people of the Intermountain West.

## *Administration*

**Acting Executive Director of the Merrill Library and Learning Resources Program:** Glenn R. Wilde  
**Business Manager:** Steven P. Nielsen

## *Library and Information Services*

**Director:** Max P. Peterson

### *Divisions*

**Public and Technical Services:** Robert G. Murdoch

- Reference Services
- Circulation Services
- Government Documents
- Microcomputer Centers
- Cataloging
- Acquisitions
- Serials and Binding

**Special Collections and Archives:** A. J. Simmonds

- Manuscripts
- Archives
- Rare Books and Printed Matter

**Media Services:** LaDell C. Hoth

- Media Distribution Services
- Media Collection Development
- Equipment Services

A variety of media from videotape to microforms to books to periodicals is represented in the library collection. The library has been designated as a regional depository for federal documents, resulting in one of the outstanding collections in the Intermountain West. A diverse collection of local, state, and international documents is also available. Further, the library holds many specialized

bibliographies, indexes, indexing and abstracting services, and subscription services crucial to the location of needed materials.

Trained library personnel specializing in reference and documents are available to provide assistance. Through the Interlibrary Services Department, library patrons can access the collections of libraries in this country and around the world. The library is a member of the Bibliographic Center for Research, the Center of Research Libraries, and the Utah College Library Consortium. The Division of Special Collections and Archives contains a significant body of primary source material (manuscripts and rare books) for area studies and for all aspects of the University's history.

## *Production Services*

**Deputy Director:** Robb Russon

### *Publication Design and Production*

**Manager:** Randy B. Gessel

Responsible for the creation of materials used in the teaching/learning process, as well as other University Publications.

### *Photography Service*

**Manager:** Arlen L. "Ted" Hansen

Provides support to the faculty and the University through the availability of photographers, the production of photographic prints and slides, consultation, and specialized photographic services for research and instruction.

### *Telecommunications*

**Acting Manager, Audio and Video Engineering:** Rickey D. Hughes  
**Supervisor, KUSU-FM Radio:** Jerry Allen  
**Supervisor, Television Production:** Kenneth E. Boutwell

Provides support to the faculty and the University through the production of various types of instructional and informational television programs and the operation of a noncommercial FM radio station providing "alternate" programming to listeners throughout the state, Southern Idaho, and Southwestern Wyoming. Teleconferencing and satellite down-linking of programs are available to enhance the educational experience.

# Summer Quarter

## Summer Quarter Administrative Committee:

C. Blythe Ahlstrom	Main 118
Lynn J. Poulsen	SC 246
Rex L. Tueller	LSLCC 101B

### 1991 Schedule

Presession: June 10-21  
 Eight-week session: June 24-August 16  
 Postsession: August 19-23

### 1992 Schedule

Presession: June 15-19  
 Eight-week session: June 22-August 14  
 Postsession: August 17-21

Summer quarter at USU is first in the four-quarter academic year. It is regarded as the *opportunity quarter* because of its provisions for a number of special opportunities for students at all collegiate levels. There are numerous special programs, such as short workshops, seminars, clinics, and institutes, as well as regular courses.

The full summer quarter consists of a 10-week period. A one-week presession is devoted to workshops and short courses of various kinds. This is followed by an eight-week session of classwork. Following the eight-week session is a one-week period called the postsession, which is primarily established for workshops and various types of short courses. The eight-week session of classes allows a full quarter's work, customarily amounting to 15 credits of classwork. Thus, the quarter of activities may enable the student to fill his or her program with different kinds of workshop and classwork combinations.

In some areas where classes are extensive, the graduate student may complete course requirements for a masters degree in three summers. The doctoral student may complete requirements for candidacy and supplement his or her candidacy with rich high-level

classes and special seminars. The summer is also a busy time for those who wish to complete comprehensive examinations and hold special meetings with advisory committees for thesis proposals, guidance, and examinations.

In the summer quarter the University's highly qualified resident faculty is augmented by distinguished visiting professors of national and international reputation. Many of these dignitaries are present for short lectures and special seminars, as well as the teaching of entire courses. Additional opportunities are provided for hearing these individuals of renowned achievement at luncheons and evening lectures. Thus, the student has an opportunity for personal contact with people of acknowledged distinction.

Numerous cultural advantages are available during summer quarter. Recitals, concerts, dramas, and other special events, including the Festival of the American West, the plays of the Old Lyric Repertory Company, and the concerts of Music West, encourage individuals of all ages to participate and enjoy activities that enhance the growth and development of individual talents.

A distinguishing feature of the summer quarter calendar is a program of recreation and enrichment. There are attractive opportunities supplied students in their various interests for out-of-class diversion and change of pace. They include a diversified program of activities such as special tours, games, tournaments, and hikes. Numerous outlets for snacks, relaxation, movies, dances, and parties highlight summer quarter extra-class activities.

Utah State University takes great pride in its attractive green and cool campus. This beautiful area provides an enjoyable haven for those who wish to study quietly out-of-doors, enjoy a casual stroll with friends, or lounge on the lawns beneath the trees. In addition to the inviting campus environs, the nearby scenic canyons, national parks, and monuments all provide special inducements for evening and weekend trips and associating with friends. Such a pleasant climate and environment makes summer study at Utah State University a profitable and enjoyable experience.

## School of

# Graduate Studies

Dean: Lawrence H. Piette  
 Acting Dean (9/1/90 to 8/31/91): James P. Shaver  
 Office in Main 130-132

The first masters degree was awarded at Utah State University in 1914, and graduate programs have increased in response to state and national needs. The growth of the graduate program has been closely linked to the development of an extensive research program. The School of Graduate Studies is accredited as a school, and many of the departments and programs have also been accredited by their respective professional accrediting agencies.

In the eight colleges, 40 departments offer advanced degrees, including 76 masters degree programs, the Civil Engineering degree, the Irrigation Engineer degree, the Educational Specialist degree,

and 36 doctoral degree programs. The dean of the School of Graduate Studies, assisted by the Graduate Council, supervises graduate programs. A Graduate Student Senate is organized and active.

Endeavor at the graduate level is directed toward (1) training students for competence in creative activity and research that culminates in a contribution to knowledge; (2) developing scholarship, including interpretation, organization, evaluation, and application of knowledge, and (3) developing proficiency in the dissemination of knowledge.

Qualified persons are invited to apply for admission to one of the academic programs leading to a graduate degree. Application forms and graduate catalogs will be sent upon request from: School of Graduate Studies, Utah State University, Logan, Utah 84322-0900.



# Student Services

The University provides a number of programs and agencies to facilitate students in their educational pursuits. Related services are also provided. Students are invited to contact the following offices for information about the University, student services, and student-organized activities.

**Vice President for Student Services:** Val R. Christensen, SC 220

**Assistant Vice President for Student Services:** Bill Sampson, SC 220

**Assistant to the Vice President:** Ronald L. Jones, SC 311

**Director, Student Center:** Gary A. Chambers, SC 326

**Director of Residential Living:** Gary L. Smith,  
1151 East 700 North

**Director, International Student Office:** Afton B. Tew, SC 313

**Director, Parking and Visitor Information:** Terry K. Moore,  
Parking

**Director, Minority Affairs:** Clifton B. Wilkes

**Adviser, Student Publications:** Jay Wamsley, SC 312

**Coordinator, Festival of the American West:** Ronald L. Jones,  
SC 311

**Director, Student Activities:** Gary A. Chambers, SC 326

**Associate Vice President for Student Services:** Joan A. Kleinke,  
SC 220

**Acting Director, Student Health Services:**

Richard C. Wuthrich, SC 102

**Director, Career Placement and Cooperative Education:**

David F. Hart, University Inn

**Director, Women's Center:** Janet Osborne, SC 310

**Director, Counseling:** J. Whorton Allen, SC 306

**Director, Personal Development Center:** Glen H. Maw,  
SC 304

**Coordinator, Helpline/Information Referral:**

Jaynan Chancellor, SC 121

**Director, Testing:** Glen H. Maw, SC 304

**Assistant Vice President for Student Services:**

LaVell E. Saunders, SC 104

**Director, Academic Service Center:** Melvin H. Larsen, SC 104

**Director, General Registration:** LaMar R. Frandsen, SC 104

**Director, Learning Assistance:** Margaret Dyreson, SC 104

**Director, New Student Orientation:** LaVell E. Saunders,  
SC 104

**Director, Student Support Services:** Nazih T. Al-Rashid,  
SC 104

**Director, Summer Citizens:** Bruce E. Darley, SC 302

**Director, Disabled Student Center:** Diane C. Baum, SC 302

**Coordinator, Athletic Eligibility:** Kenneth B. Mitchell,  
SC 302

**Assistant Vice President for Student Services:** Lynn J. Poulsen,  
SC 246

**Director of Admissions:** J. Rodney Clark, SC 246

**Registrar:** Charles L. Olson, SC 246

**Director, Financial Aid:** Vicki Atkinson, SC 106

**Director, High School and College Relations:** Mark Tenhoeve,  
SC 302

**Director, Scheduling Office:** Charles L. Olson, SC 246

**Director, Veterans Office:** Charles L. Olson, SC 246

**Director, Graduation Office:** Elizabeth Thom, SC 246

**Director, Records Office:** Elizabeth Thom, SC 246

**Director, Residency Office:** J. Rodney Clark, SC 246



# Financial Aid and Scholarship Information

## Financial Aid Office

**Director, Financial Aid:** Vicki Atkinson  
**Associate Director, Financial Aid:** Judy LeCheminant  
**Assistant Director, Financial Aid:** Richard Watkins  
**Assistant Director, Financial Aid:** Dallin J. Phillips  
**Assistant Director, Financial Aid:** Sharon B. Robinette  
**Loan and Collection Officer:** William E. Jensen, Main 10

Application for financial aid begins in January for any awarding anticipated during the following academic year. In most instances, early application benefits the applicant. Those who apply early have a greater chance of selection for funding and of having aid available in time to meet school needs. Some aid is available throughout the year. See the Financial Aid Office for assistance.

Scholarships are awarded to qualifying applicants who apply on or before March 1, prior to the award year.

## Grants, College Work-Study, and Loans

**Pell Grant.** Nonrepayable grant up to \$2,300 for which all undergraduates must apply before being considered for any other type of federal aid.

**Supplemental Educational Opportunity Grant (SEOG).** Nonrepayable grant given to undergraduates with need. The maximum award varies yearly. Awarding is based on need and funding.

**State Student Incentive Grant (SSIG).** For eligible Utah undergraduates. Awarding is based on need and funding.

**Other Grants and Special Benefits.** Contact the Financial Aid Office for details concerning BIA or Tribal Grants.

**College Work-Study (CWS).** Provides part-time on-campus and off-campus employment assignments to enable students to earn a portion of their educational expenses during the college year. Awarding is based on the availability of funds, and minimum wage is generally paid to undergraduates.

**Perkins Loan (NDSL).** Undergraduate students may borrow up to \$1,800 a year, to a total school amount of not more than \$9,000. Graduate students may borrow \$2,700 per year, up to \$18,000. Monthly payments and interest begin after graduation, withdrawal, or otherwise leaving school, or after dropping below 6 credit hours. A 5 percent simple interest rate applies. Loans of more than \$2,800 are repaid over a 10-year period on a repayment schedule determined by the borrower and the loan officer during the borrower's school exit interview. Awarding is based on need and funding.

**Stafford Loan (GSL).** Low-interest loans (averaging 8%) made by a lender such as a bank, credit union, or savings and loan association. These loans are insured by a guarantee agency, and reinsured by the federal government. Freshmen and sophomores may borrow up to \$2,625 a year; juniors, seniors, and second bachelors up to \$4,000 a year; and graduates up to \$7,500 a year.

Aggregate borrowing limits are \$17,250 for undergraduates and second bachelors, and \$54,750 for graduates. Monthly repayment begins after completing or leaving school, or after dropping below 6 credit hours. Interest accrued to the beginning of repayment is paid by the federal government. Maximum repayment period is 10 years. Funding is based on need.

**PLUS and SLS Loans.** PLUS loans are for parents who want to borrow for their children's education; Supplemental Loans for Students (SLS) are for student borrowers. Both loans provide additional funds for educational expenses and, like Stafford Loans, are made by a lender such as a bank, credit union, or savings and loan association. Repayment begins within 60 days after the last loan disbursement, at about 12 percent interest. These loans are available when other awarded federal aid to the student does not fully meet the school's estimated cost of education.

**Emergency Loan.** Emergency money up to \$300 is available for USU students with fees paid for at least 6 credit hours. Emergency loans are not available for tuition. Payback is on or before the last day of the quarter for which the loan is made. A low rate of interest, or service charge, applies.

## Method of Awarding Financial Aid

The Financial Aid Office determines a student's yearly cost of education at Utah State University. Residency status has bearing on this cost figure. The student's **family contribution** (the student's financial resources and expected help from family members) is subtracted from the **cost of education**. The **family contribution** is derived from the information provided in the federal financial aid application. Once the application process is completed, using a congressional methodology and processing schedule, the student's **financial need** is determined as the difference between the cost of education and the family contribution. Awarding is based on this difference and available funding.

## Estimated Cost of Education for Three Quarters (1990-91)

	Resident	Nonresident
Tuition and Fees <sup>1</sup>	\$1,605	\$4,420 <sup>2</sup>
Room and Board	2,577	2,577
Books and Supplies	500	500
Personal Expenses	1,000	1,000
Total	\$5,682	\$8,497

<sup>1</sup>See complete schedule of tuition and fees in the Admissions and Records section, pages 11-13.

<sup>2</sup>See tuition and fee schedule for international students, pages 11-12.

<sup>3</sup>Part-time students (less than 12 credit hours) may be eligible for and be awarded Pell Grant Aid, but in smaller amounts.

## Refund and Repayment Policies

Students who withdraw during the quarter may be required to repay a portion or all of any financial aid received. Consideration is given to the time of withdrawal in the quarter and the reason for withdrawing. Students who receive a Perkins Loan are required to have an exit interview when withdrawing from school. See the Admissions and Records section of this catalog for information on refunding of registration fees.

## Responsibility of Financial Aid Recipients

Undergraduate financial aid recipients are expected to achieve a USU GPA of at least 2.0 (3.0 for graduate students), and register for and complete at least 12 credits (6 credits for graduate students) each quarter of awarded grant<sup>3</sup>, Perkins Loan, or College Work-Study aid. The Stafford loan requires a minimum of 6 credits quarterly to receive and protect the award. Students not maintaining either the quarterly credit or the required grade point average will be placed on financial aid probation for a minimum of one quarter. Students not meeting the required minimums when on probation will be terminated from further aid. Upon appeal, exceptions to the above policies and procedures may be granted when a student's circumstances warrant.

In addition to maintaining academic progress as defined above, recipients may not owe a refund on grants previously received, or be in default of any student loan fund at USU or any other institution.

## Student Consumer Information

Students may receive information concerning the following areas by contacting individuals listed.

- |  |   |
|--|---|
| 1. Academic programs for each College  | Dean of College   |
| 2. Student retention rate  | J. Rodney Clark,<br>Director of Admissions<br>UMC 1600                  |
| 3. Number and percentage of students completing the program in which a student is enrolled | Dave Hart,<br>Career Placement and<br>Cooperative Education<br>UMC 4305 |
|  | Dean of College or<br>Department Head                                   |

## Scholarship Policy

**Who can apply.** The scholarships listed are those consistently available to Utah State University students. They are awarded through the services of the Financial Aid Office and through the various colleges and academic departments. Some scholarships are awarded without restriction, while others may be limited by certain majors or colleges, class standing, minimum grade point, past accomplishments, financial need, or special qualifications established by the donor. College students, including transfer students, are evaluated on the basis of their college cumulative grade point averages. Students entering from high school are judged on the basis of their high school grade point average and scores from the American College Test (ACT). The ACT test should be taken by at least October of their senior year. A four-point scale is used to determine the cumulative GPA. The scholarship application deadline is March 1.

**Waiver Scholarships.** These scholarships pay full or partial tuition, provided the student is registered for 12 or more credits. Three types of waiver scholarships are offered by USU. (1) *Academic Honors at Entrance Scholarships* are awarded to students showing academic excellence during high school. (2) *Achievement/Leadership Scholarships* are awarded to incoming students with exceptional talents and selected studentbody officers in high school or junior college, or students with regional or national credentials. (3) *University Academic Scholarships* are awarded to students who are or who have been students at USU. Such applicants compete with other students within their college on the basis of their academic records.

**Donor Scholarships.** Students applying for these scholarships should list them on their scholarship applications, in addition to any applications for the waiver scholarships listed above. Donor scholarships are listed on pages 204 through 213.

## Scholarships and Grants-in-Aid

**Alumni Scholarships.** Scholarships established by the class of '39 to help offset the cost of nonresident tuition for the children of out-of-state alumni. Primarily for nonresident students who may not qualify for other academic scholarships.

**Army ROTC Scholarship.** Two-, three-, and four-year scholarships pay full tuition, books, laboratory fees, and a tax-free subsistence allowance of \$100 per month. Includes free housing, if used at USU. See Military Science Department for information and application. Applications can be picked up starting December 1.

**Ezra Taft Benson Scholarship.** For entering freshmen with a high school grade point average of at least 3.8 and an ACT score of at least 31. High moral standards must be verified by two letters of recommendation. For application and more information contact the Office of High School/College Relations.

**Dee and Belva Broadbent Scholarship—Wasatch High School.** Awarded to one boy and one girl graduating from Wasatch High School in Heber City, Utah, to be used for enrollment at Utah State.

**Marie Eccles Caine Scholarships.** Scholarships for incoming freshmen with abilities in the arts. One scholarship will be given to a graduate of each of the following high schools: Bear River, Box Elder, Logan, Mountain Crest, Preston, and Sky View.

**Eccles-Jones Scholarship.** Marriner S. Eccles and Emma Eccles Jones have established a scholarship fund to assist deserving minority students in achieving a college education. Pays up to \$1,000 per year.

**Utah State University Emeriti Scholarship.** Application should be made by freshmen students who have superior academic qualifications. Applicants must be related to an Emeriti member. See Financial Aid scholarship secretary for details.

**USU Classified Employees Scholarship.** An annual scholarship awarded to a son or daughter of a classified employee. Recipient must be an undergraduate and must carry at least 12 credit hours per quarter.

**USU Faculty Association Member Scholarship.** The scholarship is for full-time students who will be attending USU for at least three quarters following the award of the scholarship. This scholarship must be the *only one* that the student holds for the academic year(s) covered. The student will be selected on the basis of intellectual potential, scholarly achievement, creativity, and leadership. No discrimination will be allowed in the selection procedure. Children of emeriti members and deceased members are eligible.

**USU Faculty Women's League Annual Scholarship.** A scholarship award to be applied toward first year's tuition for an incoming freshman woman. Selection is based on need, scholarship, and leadership. See College of Family Life for details.

**USU 4-H Achievement.** Twelve full-tuition waivers. Applicants must have been members of 4-H at least two years. Available to high school senior or college undergraduate planning to enroll at USU the next fall quarter for the first time. Applications are due January 15.

**Von H. and Elaine Y. Jarrett 4-H Scholarship.** Financial aid for current or former 4-H members attending USU. See supervisor of USU 4-H program for details.

**The Weston G. Henrie Scholarship Fund.** One or more scholarships are awarded annually to seniors from Logan High School attending Utah State University who have demonstrated high academic achievement in social studies. The scholarship is established in honor of Mr. Henrie who teaches social studies at Logan High School.

**Native American Scholarship Fund.** Established by the United Inter-Tribal Council at USU to provide scholarships for Native American Indian and Alaska Native students attending USU at both the undergraduate and graduate level. Applicants must be able to demonstrate high scholastic achievement in secondary and postsecondary education.

**President's Leadership Council Scholarship.** Four-year scholarships awarded to high school and junior college leaders. Pays full tuition and fees.

**Woodey B. Searle Scholarship.** A tuition scholarship is awarded each year by Woodey B. Searle to a needy and deserving graduate of Uintah High School. Applications should be filed before April 15 with the principal of UHS at Vernal.

**Tuition Scholarships.** The President of the University is authorized by Title 53, Chapter 34, Section 1-a, Utah Code Annotated, 1953, to waive registration and tuition fees in full or in part for a limited number of meritorious or impecunious students who reside in Utah.

**Union Pacific Scholarships.** The Union Pacific Railroad awards four scholarships annually to seniors in high school who are enrolled as 4-H Club members and four to FFA members. These \$500 scholarships are available in the following counties: Beaver, Box Elder, Cache, Davis, Iron, Juab, Millard, Morgan, Salt Lake, Summit, Tooele, Utah, Wasatch, and Weber. Applications are due January 15.

**University Club Scholarships.** The University Scholars Program offers the most prestigious scholarships awarded at Utah State University. Each year 15 scholarships are awarded to students who attend a competition held on campus. The scholarship pays tuition and fees plus \$700 per year. In addition, 10 scholarships are awarded by the individual colleges with a cash stipend that varies from \$250 to \$1,250 per year. For more information and an invitation contact the High School/College Relations Office.

**Alice Fennesbeck Gardner and Sharon Gardner Ellis 4-H Scholarship.** Financial aid for students participating in the 4-H program. See supervisor of USU 4-H program for details. Applications due January 31.

**USU 4-H Merit Scholarships.** Two \$1,500 scholarships to outstanding 4-H members. Contact 4-H office for further details. Applications are due January 15.

**The Wallace R. Wayman Memorial Scholarship Fund.** From an endowment established by Mr. Wayman, these funds are to help needy students attending USU. The recipient is chosen by the family.

**Women's Center Scholarships and Grants.** Maximum support is for three quarters. Awards are based on need, proposed academic and personal goals, and scholarship. Four types of awards are available: **Encouragement Grants.** For women who are attending college for the first time and have a gap of at least five years since finishing high school. Must be enrolled for a minimum of 3 credits. Undergraduates only. Residents or nonresidents. (A limited number available to men who meet the criteria). **Re-entry Grants.** For women who have a gap of at least five years at some point in their education, but have been attending college for at least one quarter. A 2.5 GPA is required. Must be enrolled for a minimum of 6 credits. Undergraduates only. Residents or nonresidents. (A limited number available to men who meet the criteria). **Traditional Grants.** For senior or graduate women. Must have a 2.5 GPA or a 3.0 GPA respectively. Must be enrolled for a minimum of 6 credits. Residents or nonresidents. **Tuition Waivers.** For women or men who have a five-year gap at some point in their education. A 3.0 GPA is required. Must be enrolled for a minimum of 12 credits. (Any credits over 18 are not covered.) Undergraduates and Utah residents only.

The following are presented principally to students already enrolled:

**Utah Air Force Association Scholarship.** For use in the junior or senior year by students in engineering or science majors. Applicants must have 3.0 cumulative GPA and 3.5 GPA in major, and include on application how they have or expect to contribute to the nation's aerospace efforts. The scholarship, equal to in-state tuition amount, is given to USU students every third year, beginning with the 1985-86 academic year.

**Air Force ROTC Scholarship.** Arranged for two to four years, this scholarship pays for tuition, fees, and books and \$300 towards a room contract, plus a nontaxable allowance of \$100 per month. See USU Air Force ROTC for application and further details or call 750-1834.

**Elmer Aldous Memorial Fund Rodeo Club Scholarship.** Established by family and friends in memory of USU student Elmer Aldous. See Darwin Nielsen for further details.

**The Lieutenant Clyde Parker Baugh Memorial Fund.** A gift of Mr. and Mrs. Wilford F. Baugh in memory of their son Clyde Parker Baugh, it provides scholarships annually for deserving students of high scholarship and leadership.

**Marriner S. Eccles—Emma Eccles Jones Scholarship Fund.** The Marriner S. Eccles Scholarship Fund and the Emma Eccles Jones Scholarship Fund were established by the individuals after whom the funds are named and are intended to help deserving students of Spanish-American or Black descent obtain a college education. The scholarship awards are administered by the Financial Aid Office, but the selection of the award recipients is made by a special committee designated for the purpose. To be eligible for consideration, an applicant must (1) be a citizen of the United States; (2) be of Spanish-American or Black descent; (3) be capable of succeeding in a University program; and (4) be able to demonstrate need of assistance. The maximum award for one year shall be \$1,000 and may be continued if the student applies and is successful.

**The Johansen Scholarship Fund.** A gift of Johana Johansen, this provides scholarships annually, worth in the aggregate from \$125 to \$150, for help to worthy students of junior and senior rank.

**Martin Luther King Fellowship.** Available to black graduate students attending Utah State University. Presented through the graduate office.

**Lao-American Scholarship Fund.** For students at USU who are native to Laos and eligible for acceptance into a USU degree program at any level who will study agriculture, education, engineering, forestry, or public health. For details see Prof. Ross Allen in Secondary Education Department.

**Helen Lundstrom Scholarship.** Given in honor of Dean Lundstrom, this aid is for an undergraduate or graduate female student with high academic standing. For application see the adviser of USU student government.

**Merrill O. Maughan Scholarship Fund.** One or more scholarships given annually to returned LDS missionaries who have served 18 months or two years in the mission field who are in need of financial aid.

**Mortar Board Scholarship.** Offered to members of Mortar Board, this scholarship can be used for senior year or graduate study. Apply through Mortar Board officers or advisers.

**N. Glen Neeley Scholarship.** Nathan Glen and Deta P. Neeley established, in their will, scholarships for worthy students.

**Phi Kappa Phi Scholarship.** A \$125 cash award given to one or two junior students of high scholarship and outstanding character. Given only upon recommendation of Dean.

**T.G. Rechow Scholarship.** Unrestricted scholarships established in their will by the Rechows.

**Harriet Smith Scholarship.** Unrestricted.

**Sorosis Scholarship.** Given to a girl during her junior year who has attended USU at least two years and displays leadership ability and shows promise of achievement in the future.

**Lynn H. Stevens Scholarship.** This \$125 scholarship is given to an outstanding military science student who will be enrolled in the advanced program. He or she must also show a desire to serve in the U.S. Army as a commissioned officer, pass entrance requirements for advanced course Army ROTC, have an academic standing of a minimum of 2.5 overall grade point average, and be selected by the professor of military science.

**The 1927 Class Gift to the College.** This yields an annual income sufficient to provide four scholarships. Application should be made by juniors and seniors.

**Debate Program (Debate Team).** Department of Communication. Undergraduate students, five openings.

**Emma Mosher Scholarship.** Unrestricted.

## College of Agriculture

### Scholarships and Awards

**Agricultural Economics Scholarship.** Awards for students majoring in agricultural economics or agribusiness, based on scholastic achievement, need, and performance.

**Agricultural Education Department Scholarships.** Scholarships or tuition waivers for students majoring in agricultural education and agricultural mechanics.

**American Breeders Service Award.** One or more awards to deserving students currently enrolled in the Dairy Herdsmen program, based on scholarship, need, leadership, and interest in becoming a dairy herdsman.

**Beef Calf Contest.** One or more scholarships each year based on student performance on a written test and in an interview. Scholarships are presented by Intermountain Farmers Association and Producers, and Livestock Marketing Association.

**Wayne and Lucille S. Binns Scholarship.** An endowed scholarship awarded to a junior majoring in Animal, Dairy, or Biometeorology Science who demonstrates academic achievement, personal integrity, and a high sense of social and moral responsibility.

**Ralph S. and Deora Anderson Blackham Scholarship.** An endowed scholarship awarded to undergraduate or graduate students studying agriculture. Awards are based on scholarship, accomplishments, and financial need.

**George T. Blanch Memorial Fund.** This scholarship is to be given to upper division students in agricultural economics with good academic abilities.

**J. Grant Broadbent Award.** One or more awards for students of sophomore, junior, or senior standing on the basis of their potential for making a significant contribution to the range livestock segment of agriculture. They must demonstrate leadership and scholarship.

**Cache Valley Select Sires Award.** One or more awards to deserving students currently enrolled in the Dairy Herdsmen's Program, based on scholarship, need, leadership, and interest in becoming a dairy herdsman.

**Cache Valley Cooperative Scholarship.** These funds are for graduate students in dairy science, agricultural economics, and sociology involved in studies on farm cooperatives. See department head for details.

**George B. Caine Dairy Memorial Scholarship Award.** One or more scholarships are awarded annually to outstanding upper division dairy students as determined by scholarship, leadership, and need. Prof. Caine was the founder and first department head of dairy science at Utah State University.

**CENEX Cooperative Studies Scholarships.** Awards of \$500 each for students completing one-year and two-year vocational-technical programs who complete an agribusiness internship work experience. First-year recipients are eligible for a second year award.

**CENEX Foundation Agribusiness Scholarships.** Awards of \$750 each for students in agriculture who have had academic instruction in farm cooperatives, based on scholarship, leadership, and financial need. Initially, students of any class rank are eligible but will gradually be limited to upper division students. Special consideration will be given to students who have completed or are enrolled in a course on farm co-ops.

**Richard L. Chase Memorial Scholarship.** An award of \$300-400 from an endowment fund provided by family, friends, and colleagues of Richard L. Chase is given to an undergraduate student in the Department of Plants, Soils, and Biometeorology who has expressed an interest in weed science. Selection is based on academic achievement and professional potential.

**William C. Claypool Scholarship.** Awarded to a graduate student at USU whose thesis is directed toward the study of some problem of significance to the agriculture of Cache Valley.

**Dairy Industries Scholarships.** Awards for dairy students based on past academic achievements and demonstrated interest in and experience with the dairy industry. The number and amount of each scholarship is dependent on available funds.

**Dairy Heifer Contest.** Several scholarships are awarded each year based on student performance in a written test and an interview. Contributors include KSL Radio, Utah State University, Utah Holstein Association, Cache Valley Select Sires, Federal Land Bank, and other individuals and organizations.

**Wade G. Dewey Scholarship Award.** One or more scholarships with a combined value of \$600-800 will be provided to outstanding junior or senior students from the Plants, Soils, and Biometeorology Department who have a special interest in agronomy and plant breeding. Selection is based on academic performance and potential for professional achievement. These awards are provided by the Utah-Idaho Grain Exchange Endowment established in honor of Dr. Dewey for his contribution to the improvement of cereal grains for the Intermountain Region.

**First Security Foundation.** A scholarship of \$1,000 awarded to a student in agriculture at the end of his or her sophomore or junior year.

**Dan Freed Scholarship.** A \$1,000 scholarship given annually to an outstanding agricultural student who is interested in range livestock operations.

**Dan and Lloyal Hunter Scholarship.** Two awards of \$500 each to students majoring in agricultural economics or agribusiness. The award is based on academic performance and professional promise.

**Agricultural Dean's Leadership Award.** Three quarters of in-state tuition waiver. To be eligible, the student must (1) have served as or be currently serving as the state of Utah FFA president, (2) have a high school GPA of 3.00 or higher on a four-point system, (3) enroll as a full-time student with courses leading toward a degree in an approved major in the College of Agriculture at USU, (4) maintain a GPA of 3.00 or higher each quarter in order to use the waiver the subsequent quarter, (5) submit a scholarship application and a transcript of high school and college credits (indicate the years served as state FFA president). These documents should be submitted on or before April 1 of the calendar year prior to the first quarter when the waiver is used, and (5) have no other tuition waiver for the quarters this award is to be used.

**Institute of Food Technologists Scholarships.** Scholarships of \$500-\$1,000 are available on a nationally competitive basis for students in accredited food science and food technology programs.

**Frank H. and Pearl L. Jackson Agricultural Endowment Scholarships.** One or more scholarships awarded annually to assist future generations of students in the College of Agriculture. Students should demonstrate financial need, personal integrity, quality academic achievement or potential, and a strong sense of performance commitment.

**David S. and Retta W. Jennings Scholarship.** An annual scholarship of \$500-600 is awarded to an undergraduate or graduate student in the Department of Plants, Soils, and Biometeorology to honor David W. Jennings. Special consideration will be given to students majoring in soil science; selection is based on academic performance, financial need, and worthiness.

**Glenn E. Leggett Memorial Scholarship.** One or more scholarships with a combined value of \$350-450 established by Mrs. Glenn E. Leggett to honor her late husband's work in soil fertility and plant nutrition. Scholarships awarded to students based on scholastic achievement who are majoring in the Department of Plants, Soils, and Biometeorology who have an emphasis in soil fertility and/or plant nutrition.

**Lewiston State Bank Scholarship.** A yearly award of \$1,000 to a junior or senior student in the College of Agriculture. The recipient must write an essay. See the associate dean of College of Agriculture for details.

**Marriner Wood Merrill Endowment.** Awarded to a student demonstrating quality academic achievement, superior potential, personal integrity, and a high sense of social and moral responsibility.

**Milton A. Madsen Memorial Scholarship Fund.** An award is given to an undergraduate student majoring in Animal Science, awarded on the basis of scholarship, need, and dedication to the livestock industry. This fund was established by family, friends, and colleagues as a memorial to Dr. Madsen's contributions to the livestock industry and USU.

**Moorman Manufacturing Company.** Scholarship for \$800 to students majoring in the animal science area.

**Darwin Nielsen Scholarship.** One or more scholarships to be awarded each year for use in the junior or senior year, on the basis of scholarship and participation in the USU Rodeo Club as a member in good standing.

**Pacific Northwest Plant Food Association.** A scholarship of \$500 is given to a sophomore or junior student majoring in agronomy. Offered competitively with other universities.

**Pillsbury Scholarship Award.** An award of \$800 for an outstanding student majoring in agriculture who demonstrates leadership and scholarship.

**Department of Plants, Soils, and Biometeorology Scholarship.** Awarded to outstanding undergraduate students majoring in the department. Selection is based on academic performance and potential for future contributions in agriculture. Special consideration will be given to incoming freshmen and transfer students.

**Loren D. Pollard Memorial Scholarship.** Awarded to a student demonstrating quality academic achievement, superior potential, personal integrity, and a high sense of social and moral responsibility.

**The Charles Redd Foundation Scholarships.** Awarded to agricultural undergraduate students based on need, academic achievement, personal integrity, and responsibility.

**Rolla M. Rich Memorial Fund.** The interest derived from this fund is to be awarded to a senior student who is a member of the Agriculture Club's Council.

**Nelson Ricks Creamery Company Scholarships.** Two awards of \$500 each to outstanding freshmen majoring in food science with an interest in dairy processing.

**Pepperidge Farm, Inc. Scholarship.** One or more awards for students in food science based on scholarship and dedication to the food industry.

**Ritewood Inc. Scholarship Endowment.** Provides annual awards to a nutrition student and a food science student in the Department of Nutrition and Food Sciences.

**Seely-Hinckley Scholarship.** A scholarship established as a memorial for John H. Seely and Robert H. Hinckley. Awards based on superior achievement and financial need.

**Joseph C. Street Fund in Toxicology.** Established in memory of Prof. Street, this endowment is for graduate students majoring in toxicology to attend scientific meetings in their profession. See program chairman for details.

**Sterling A. Taylor Memorial Scholarship.** One or more scholarships with a combined value of \$900-1,000 donated by Frances Taylor and friends to honor Sterling A. Taylor. Awarded to an outstanding sophomore, junior, or senior in the Department of Plants, Soils, and Biometeorology with special consideration given to students majoring in soil science or biometeorology. Selection is based on high scholastic standing, leadership qualities, character, and potential in the field of soils or biometeorology.

**Utah Dairy Commission.** One or more scholarships awarded annually to outstanding junior or senior students majoring in a dairy curriculum or a closely related agricultural major dealing with production, processing, product development, or marketing.

#### Utah Farm Bureau Federation Scholarships.

**a. President's Award.** An award of \$500 to an undergraduate student in agricultural production.

**b. Leadership Award.** An award of \$500 to the student who has exhibited the greatest measure of growth and excellence in scholarship, constructive organization, and leadership in the College of Agriculture through university courses.

**Utah Feed Manufacturing and Dealer's Association Award.** A cash award to an outstanding senior with a major in some phase of animal science, preferably one interested in animal nutrition.

**Harris and Eleanor Van Orden Scholarship.** One or more scholarships awarded annually from earnings of an endowment provided nutrition and food science majors.

## College of Business

### Undergraduate Scholarships

More than \$80,000 in scholarships and tuition waivers are awarded annually in the College of Business. Included in this amount are contributions from the following:

**Alexander Hamilton Life Insurance Scholarship.** A \$1,000 scholarship to be awarded to a deserving student.

**Arthur Andersen & Company Scholarship.** A \$500 scholarship to be awarded to a deserving student.

**Herschell K. Bullen Scholarship.** A \$850 scholarship to be awarded to a deserving student.

**Professor Vernon M. Buehler '41 Scholarship Honoring Brent Sandberg '85.** Annual scholarship based on the earnings of the endowment will be awarded each year to an undergraduate accounting major with promising leadership potential and above average scholastic record.

**Professor Vernon M. Buehler '41 Scholarship Honoring Dr. Larzette G. Hale.** Annual scholarship awarded to a graduate or undergraduate accounting major with promising leadership potential and above average scholastic record.

**Business Information Systems and Education Scholarships.** One-quarter tuition waivers to entering freshmen or transfer students based on academic achievement and an interest in programs in the Business Information Systems and Education Department. Funds provided by the Annual Office Symposium.

**Cache Valley Bank Scholarship.** Two \$500 scholarships awarded to deserving students.

**Orson A. and Rae N. Christensen Scholarship.** Two \$335 scholarships to be given to College of Business students who show scholarship, integrity, and leadership.

**Cooper Norman & Company Scholarship.** A \$500 scholarship to an outstanding student majoring in accounting, who has expressed an interest to work for a local medium-to-large accounting firm.

**Coopers & Lybrand Scholarship.** A \$500 scholarship to a deserving student.

**Farmers Insurance Group.** A \$1,000 scholarship awarded to a deserving student for academic achievement.

**First Interstate Bank Scholarship.** A \$1,275 scholarship based on scholastic attainment, need, and parental residence in Utah.

**First Security Foundation Scholarship.** Two \$1,660 scholarships awarded to students of junior or senior standing who are studying banking and finance.

**Russell Hanson Business Scholarship.** A \$245 scholarship awarded to a deserving student for academic achievement.

**Floris B. Henderson Scholarship.** A three-quarter tuition waiver to an incoming student in business education.

**Vernon L. Israelsen Scholarship.** A \$730 scholarship awarded to a junior or senior student majoring in economics, based on academic promise, character, and citizenship.

**Jones, Wright, Swenson & Simpkins Scholarship.** A \$500 scholarship awarded to a student showing promise for success in the accounting profession.

**KPMG Peat Marwick Scholarship.** Two \$500 scholarships awarded to the superior chapter of Beta Alpha Psi for undergraduate students who demonstrate superior scholarship and service.

**Key Bank Scholarship.** A \$1,000 scholarship awarded to a junior or senior based on academic promise, personal characteristics, and need.

**Ore-Ida Food Scholarship.** A \$800 scholarship awarded to an undergraduate business student with high academic standing.

**Schrieber Foods Inc. Scholarship.** A \$500 scholarship awarded to a female or minority student of sophomore level standing or above.

**Seeley-Hinkley Scholarship.** A \$1,200 scholarship for a student with superior academic credentials with a clearly defined program leading to graduate work.

**Bert L. and Barbara Palmer Thomas Scholarships.** Two \$1,250 scholarships awarded to outstanding upper division students.

**H. Ward and Helen Roghaar Thomas Scholarship.** A \$455 scholarship awarded to a student in business.

**Timothy Roghaar Thomas Scholarship.** A \$500 scholarship awarded to a student of junior or senior standing who is majoring in accounting.

**University Club Scholar.** A four-year scholarship consisting of three-quarter tuition waiver plus fees. Awarded to an outstanding entering freshman selected in competition by the College of Business Scholarship Committee.

**Robert L. and Patricia W. Wangsgard Scholarship.** A \$685 scholarship awarded to a deserving student.

**Western Association of Food Chains Scholarship.** A \$800 scholarship awarded to a deserving student.

### Partners in Business Scholarships

**Human Resource Seminar Scholarships.** Three \$400 scholarships to students majoring in business, based upon academic achievement.

**Management Information Systems Seminar Scholarships.** Three \$400 scholarships awarded to students majoring in business information systems or business.

**Utah Association of CPA's Scholarship.** Three \$400 scholarships awarded to students majoring in accounting, based on academic achievement.

**Utah Association of Realtors Scholarship.** A \$200 scholarship to a student majoring in real estate or business.

**Utah Bankers Association Scholarships.** Three \$400 scholarships awarded to students majoring in business, based upon academic achievement.

**Utah Manufacturers Association Scholarships.** Three \$400 scholarships awarded to students majoring in business, based on academic achievement.

## Graduate Scholarships

**Arthur Andersen & Co. Scholarship.** A \$1,000 graduate scholarship awarded to a student majoring in accounting.

**Deloitte Haskins & Sells Scholarship (Deloitte Touche).** A \$1,000 graduate scholarship awarded to a deserving student.

**Arthur Young Scholarship (Ernst & Young).** A \$1,000 graduate scholarship awarded to a student majoring in accounting.

**KPMG Peat Marwick Scholarship.** A \$1,000 graduate scholarship awarded to a student majoring in accounting.

**Roland Monson Scholarship.** A \$1,086 graduate scholarship awarded to a student majoring in accounting.

**Sylvan Erickson Graduate Scholarship.** A \$500 scholarship awarded to a graduate student in Business Administration based on academic achievement, integrity, and character.

College of Business students interested in scholarships need fill out only one application form to be considered for all business scholarships.

If you have questions about scholarships, see the director of the College of Business Academic Service Center. Application forms are available at the Financial Aid Office (Taggart Student Center 106) or from the College of Business Academic Service Center.

## College of Education

### Scholarships

**Edith Bowen Scholarship Fund.** Two \$1,000 scholarships are awarded each year in memory of Miss Edith Bowen from an endowment established by her niece, Stella Young Griffiths. The awards are for junior, senior, or graduate students majoring in elementary education. Information and applications may be obtained from the Department of Elementary Education or the Student Services office.

**Pam Cheney Memorial Scholarship.** Department of Psychology, AOB female graduate students are eligible for this \$500 award. Contact USU Women's Center.

**Eldon Drake Student Teaching Award.** Awarded to a student majoring in Secondary Education whose exemplary performance in student teaching indicates a high potential for success in the teaching profession.

**Mary Jane Faylor Scholarship for a Junior Woman in Health, Physical Education and Recreation.** Junior women students in the department are eligible to apply for this scholarship, established in memory of her mother by Orpha Faylor Bradley. These recipients should have attained a high scholarship standard; maintain a high ethical standard; be involved in department sponsored activities, College of Education, University and campus, and community activities; and have a financial need. Selection of the recipient is made by the department head upon recommendation of the Scholarship and Awards Committee. Contact head, Department of HPER.

**Orpha Faylor Scholarship in Dance.** All Dance majors are eligible for this award. The recipients of the Orpha Faylor Scholarship in Dance should have attained a high scholarship standard, be a current major in the dance program, demonstrate talent in dance performance, choreography, or teaching, and agree to perform with DANCEWORKS for the academic year. In addition, the following may be considered by the committee when making selection: (1) financial need, (2) volunteer production, and (3) volunteer work for any dance program project. Contact head, Department of HPER.

**Clifford and Julie Manning Frye Scholarship.** Department of Elementary Education. Upper division and graduate students are eligible for this scholarship. Contact head, Department of Elementary Education.

**Matthew David Hillyard Endowment Scholarship Fund.** Established by Mr. and Mrs. Lyle W. Hillyard in honor of their son, this scholarship is for students in the Special Education Department. Contact head, Department of Special Education.

**H. B. and Ethel Hunsaker Scholarship.** All HPER majors are eligible for this award. These recipients should have attained a high scholarship standard; maintain a high ethical standard; be involved in department sponsored activities, College of Education, University and campus, and community activities; and have a financial need. Selection of the recipient is made by departmental faculty upon recommendation of the Scholarship and Awards Committee. Contact head, Department of HPER.

**Lois Downs Scholarship.** All HPER majors are eligible for this award. The recipients of the Lois Downs Scholarship should have attained a high scholarship

standard, maintain a high ethical standard, and be involved in department sponsored activities, College of Education, the University and campus, and community activities, and have a financial need. Selection of the recipient is made by the departmental faculty upon recommendation of the scholarship and awards committee. Contact the HPER department head.

**Arthur D. Jackson Scholarship in Elementary Education.** Awards are made annually to senior or graduate students majoring in elementary education. Information and applications may be obtained from the Department of Elementary Education.

**Ina W. Kurzhals Scholarship.** Department of Elementary Education. Upper division and graduate students are eligible for this scholarship. Contact head, Department of Elementary Education.

**Thomas Alva Taylor Scholarship.** Established by Edna Cardon Taylor in memory of her husband, Thomas Alva Taylor. Recipients shall be known as Taylor Scholars and shall be outstanding male senior or graduate students majoring in Elementary Education at USU.

**Dean LeGrande Miller Scholarship in Communicative Disorders.** Awards are made annually to senior or graduate students majoring in communicative disorders, who have demonstrated academic excellence despite personal hardships or handicaps. Selection of recipients is made by the departmental faculty, upon recommendation of departmental faculty committees.

**The Joanne Lillywhite Christensen Endowment in Communicative Disorders.** Mrs. Ray L. Lillywhite established this endowment in memory of her daughter, Joanne Lillywhite Christensen. Recipients of these awards, known as Lillywhite Scholars, are identified annually by the faculty of the Communicative Disorders Department and represent academic distinction in either undergraduate or graduate education.

**Chloe Priday Steward Memorial Fund.** Given by Dean and Mrs. L. Mark Neuberger to students in elementary education in memory of their aunt, Mrs. Steward. Contact the Financial Aid Office.

**Marie Shoup Scholarship.** Upper-division and graduate students are eligible for this \$500 scholarship. Awards are made on a three-year rotation to senior or graduate students majoring in elementary education, family and human development, and home economics. Information and applications may be obtained from these three departments.

**Myrtle Sowards DeHart Scholarship in Elementary Education.** In honor of Mrs. DeHart, this fund is for a student whose GPA is at least 3.4 and who wishes to become an elementary school teacher. See department for details.

**Student Travel Scholarship in Psychology.** For psychology students whose papers are accepted by the American Psychological Association to use as partial or full travel expenses to the annual meetings. Contact head, Department of Psychology.

**Summer Fellowships.** Three at \$500 each. Application by competition college-wide. Graduate students from any department may apply. Contact the office of the dean.

**Out-of-State Waivers.** Eleven quarters of nonresident tuition. Application by competition college-wide. Graduate students from any department may apply. Contact the office of the dean, College of Education.

**Tuition Waivers.** Twenty-nine total waivers or 87 quarters. Eligibility by academic standards.

**Undergraduate Special Education Major Scholarship.** Department of Special Education. Upper class and special education majors are eligible to apply for this \$200-\$300 award. Contact head, Department of Special Education.

**Academic Olympiad Scholarships.** Awarded to high school students who are winners of the scholastic competition at the annual USU Academic Olympiad sponsored by the Northern Utah Curriculum consortium and the College of Education chapter of Phi Delta Kappa. Information can be obtained from the Office of the Associate Dean for Extension and Field Services, College of Education.

## College of Engineering

### Scholarships

Most of these scholarships are reserved for juniors and seniors in the College of Engineering. Freshmen will only be considered if they take the Engineering Scholarship Exam, which is offered annually in conjunction with the University Scholars Competition.

**Baker Mining Equipment Company Engineering Scholarship.** A tuition scholarship to be awarded annually to an instate student enrolled in the Mechanical Engineering Department.

**Bourns Scholarship.** Awarded annually to two juniors or seniors in Electrical or Mechanical Engineering. Recipients must be U.S. citizens and residents of Utah. Amounts vary.

**Roy Bullen Memorial Fund for Engineering Students.** Approximately \$1,000 to be available annually to aid undergraduate engineering students. Established by the late Mrs. Bullen in honor of her husband after whom the fund is named.

**CEE Faculty Scholarships.** Department of Civil and Environmental Engineering. Available to students entering their junior or senior year. Amounts vary from year to year.

**Jerry Christiansen Memorial Engineering Scholarship.** Established by Prof. and Mrs. Jerald E. Christiansen in memory of his father, this fund is for students enrolled in the College of Engineering.

**Dr. and Mrs. Clayton Clark Engineering Scholarship.** Annual grant to support needy students in electrical engineering. Amount varies.

**Blaine P. and Louise Christiansen Clyde Engineering Scholarship Fund.** The Clydes, alumni of USU, have established these scholarships for students majoring in engineering who have financial need.

**W.W. Clyde and Company Engineering Scholarship Fund.** Scholarships for undergraduate students majoring in engineering.

**Larry S. Cole Electrical Engineering Scholarship.** To be used for students in the electrical engineering professional program.

**James A. Comstock Memorial Scholarship.** Scholarships given annually to a junior or senior in electrical engineering.

**The Philip S. Coolidge Memorial Scholarship.** An endowment from the Department of Agricultural and Irrigation Engineering that gives a two-year upper division scholarship to students in the field. GPA must be at least 3.25. See department head for details. Established in memory of USU student Philip S. Coolidge.

**Don M. Corbett Scholarships.** Awarded to entering freshman women students in engineering by Mr. and Mrs. Corbett to encourage women in this field. Ten to 12 scholarships annually.

**William A. Cordon Scholarship.** Department of Civil and Environmental Engineering. A scholarship for a graduate student to research concrete materials.

**Electrical Engineering Scholarship.** To be used for students in the electrical engineering professional program.

**Bertis L. and Anna E. Embry Scholarship.** To be used for students in agricultural and irrigation engineering and electrical engineering.

**Forsgren-Perkins Scholarship in Civil and Environmental Engineering.** Awarded annually to an outstanding student enrolled or to be enrolled at USU.

**Industrial Technology Scholarships.** Several \$500 scholarships given annually to students in aerospace technology.

**LeGrand Johnson Memorial Scholarship.** Department of Civil and Environmental Engineering. Available to students entering their junior or senior year. Amounts vary from year to year.

**Mechanical Engineering Alumni and Faculty Scholarship.** Student must have a high GPA and be pursuing a degree in mechanical engineering.

**Lawrence R. and Abelina Megill Scholarship.** Two scholarships to be awarded annually: one in electrical engineering, one in physics. Each year at least one of the recipients shall be a woman or ethnic minority student. Preference will be given to students involved in the "Get-Away Special" program.

**E. Joe Middlebrooks Scholarship.** An annual scholarship for a woman or minority engineering student.

**David R. Miller Memorial Scholarship in Civil and Environmental Engineering.** One or more full tuition and fees scholarships given annually to undergraduate or graduate students. Preference will be given to those with financial need.

**Nielsen, Maxwell, Wangsgard Scholarship.** An annual scholarship to be given to a student in the Civil and Environmental Engineering Department. Student must be interested in consulting engineering.

**Henry J. and Rebecca Henderson Nelson Memorial Scholarship in Engineering.** Established by Prof. and Mrs. Jerald E. Christiansen in memory of her parents, this endowment is for students enrolled in the College of Engineering.

**Jack B. and Bonnie F. Parson Scholarships in Engineering.** Grants awarded to students of at least sophomore status, who show superior scholarship ability, a commitment to high social and moral values, and financial need.

**Dean F. and Bessie C. Peterson Scholarship in Engineering.** Available to students in the College of Engineering, applicants should apply to the college scholarship committee.

**Ace and Arville Raymond Scholarship in Engineering.** Awarded annually to an outstanding and worthy undergraduate in the College of Engineering.

**Charles Carlyle Rich Engineering Scholarship.** Established in Mr. Rich's memory for students enrolled in Civil Engineering.

**Lowell R. Rich and Afton T. Rich Scholarship in Civil and Environmental Engineering.** For undergraduate students. Amount varies.

**Harold W. and Helen Ritchey Engineering Scholarship.** A \$5,000 scholarship granted to an incoming freshman student for four years of study.

**Larry E. Roberts Scholarship in Electrical Engineering.** One or more scholarships representing full tuition and fees for one year for undergraduate or graduate students.

**SME Scholarship.** Student must have a high GPA and be pursuing a degree in mechanical engineering with a manufacturing option.

**Sidney R. Stock Scholarship in Electrical Engineering.** This scholarship, given in memory of the founder of the department, is for students majoring in electrical engineering. See department for details.

**Ivan M. and Ruth C. Teuscher Memorial Scholarship.** One year's tuition scholarships for students in the College of Engineering.

**Charles Thirkell and Pearl Parkinson Darley Scholarship.** Scholarship awarded to continuing students or transfer students in Civil Engineering. Amounts vary.

**Valley Engineering Scholarship.** Department of Civil and Environmental Engineering. Available to students entering their junior or senior year. Amounts vary from year to year.

**Edwin P. Van Leuven Scholarship.** To be given to students who will be teaching in the fields of industrial and technical education. Given by Mr. and Mrs. Van Leuven, leaders in this subject.

## College of Family Life Scholarships

**Anna Beth Reeder Bishop and A. Alvin Bishop Scholarship.** A scholarship awarded to a junior or senior student with a record of excellence in scholarship, with preference to be given to a member of Phi Upsilon Omicron. Provided by Dr. and Mrs. Bishop.

**Clara L. Budge Family Life Scholarship.** A scholarship established in memory of Mrs. Budge by her husband and son. This award is for undergraduate or graduate students who show personal integrity, superior potential, and academic achievement.

**Ellen Kathleen Powell Burton Scholarship.** A scholarship awarded to an undergraduate student with a record of achievement in scholarship with preference to be given to a student majoring in Home Economics Education.

**The Don C. Carter Graduate Fellowship.** A memorial for former USU Professor Carter. This award is for graduate students majoring in family and human development. See department for details.

**College of Family Life Scholarships.** Scholarships provided by contributions given by alumni and friends of the College of Family Life to worthy students who show outstanding ability in the field of family life.

**Ruth Swenson Eyre Early Childhood Education Scholarship.** Presented each year to an undergraduate student majoring in Early Childhood Education and with special interest in Alternative Preschool and Day-care Curricula which emphasizes and enhances the emotional and social growth of children.



**Mary Jane Faylor Scholarship.** Junior students in the College of Family Life are eligible to apply for this scholarship established by Thelma Faylor Allison in memory of her mother.

**Grace Williams Funk and Kaye Funk Scholarship.** An award to a Utah resident senior or graduate student in the field of clothing and textiles or food service management.

**Greaves Memorial Scholarship.** A scholarship in memory of Dr. Ethelyn O. Greaves, former dean of the college, for a student who has achieved in the field of home economics.

**Stella Young Griffiths Scholarship.** Established by Mrs. Griffiths for an outstanding undergraduate student. See the College of Family Life for details.

**Maurine Robson Humphris Scholarship.** A scholarship awarded to a junior or senior student with a record of excellence in scholarship who is majoring in home economics education.

**Theta Johnson Scholarship.** The recipient is to be an outstanding senior or graduate student whose area of study is either clothing and textiles or home economics education.

**Katie Karikka Scholarship.** For high school seniors who will enter the College of Family Life at USU. See the dean's office for details.

**Maurine Flint Keller Memorial Scholarship.** A graduate scholarship established in memory of his wife by Paul D. Keller for an outstanding student in home economics and consumer education.

**Marie N. Krueger Award.** An award to an outstanding home economics senior at Box Elder High School to major in home economics education in the College of Family Life.

**Arola B. McDonald Dietetics Scholarship.** An award presented to an undergraduate dietetics student. Provided by Mr. and Mrs. Leonard W. McDonald.

**Moen Memorial Scholarship.** An award in memory of Johanna Moen given to worthy students in the College of Family Life who show outstanding aptitude in the field.

**John and Grace Remund Owen Award.** Established by Grace Remund Owen in memory of her husband for an outstanding undergraduate student.

**Dr. Eldrow (Dutch) and Marjorie Seely Reeve Scholarship.** A scholarship for graduate and undergraduate students that show academic achievement, personal integrity, and superior potential.

**Ritewood Inc. Scholarship.** Provides awards to a nutrition student and a food science student in the Department of Nutrition and Food Sciences.

**Seely-Hinckley Scholarship.** A scholarship for a student of superior attainment and demonstrated need who has a clearly defined academic program leading toward postgraduate work in food sciences and nutrition.

**Marie Stowell Shoup Memorial Scholarship.** An award established in memory of Mrs. Shoup by her husband and daughters for an upper division woman student in home economics and consumer education based on scholarship and need.

**Phyllis R. Snow Graduate Scholarship.** Established in honor of Phyllis R. Snow, former dean of the College of Family Life. This award is given to a graduate student of high academic standing and potential. See College of Family Life for details.

**Frances G. Taylor Phi Upsilon Omicron Scholarship.** An award to stimulate interest in professional activity given to a member of Phi Upsilon Omicron.

**Harris O. and Eleanor Y. Van Orden Scholarship.** A scholarship for an undergraduate nutrition and food sciences major with high academic record.

**Angelyn Wadley Award.** An award to an outstanding student in the College of Family Life provided by the Wadley family and friends in memory of Angelyn Wadley.

**Leah D. Widtsoe Scholarship.** Presented to a graduate student in the College of Family Life. The fund was established by Dr. Virginia Cutler in memory of Mrs. Widtsoe.

**Ethelwyn Wilcox Award.** An award to worthy students majoring in human nutrition at the graduate or undergraduate level.

## College of Humanities, Arts and Social Sciences Scholarships

**The Ahmanson Art Education Scholarship.** Awarded annually to outstanding Art Education majors in their junior or senior year. See Department of Art for details.

**J. Duncan Brite Scholarship.** In honor of Professor Emeritus Brite, this scholarship is given to an outstanding junior in history for use during the senior year. See History Department for details.

**Asa and Vivian Bullen Prelaw Scholarship.** Donated in memory of his parents by Richard H. Bullen, this endowment provides resident tuition scholarships for outstanding prelaw students, senior year only. Apply through Financial Aid Office.

**The George B. and Marie Eccles Caine Scholarship in Music, Art, and Theatre.** These scholarships are given in each of the three departments named to students attending USU. See one of the departments above for details.

**O. Guy Cardon and M.N. Neuberger Scholarship in Social Science.** The Bluebird Candy Company at Logan offers a scholarship in the social sciences, in honor of the late O. Guy Cardon and of the late M. N. Neuberger. Students are nominated by the Social Science departments for this award. (Applications not accepted.)

**Mabel Carlson English Scholarship.** Awarded to English majors for junior or senior year study. Contact the English Department for details.

**Louise Christiansen Clyde English Scholarship Fund.** This endowment, established in honor of Mrs. Clyde, a 1941 USU graduate in English, is for undergraduate students majoring in English. See English Department for details.

**David E. and Leona E. Daley Theatre Arts Scholarship.** This memorial scholarship was established by the late Mrs. Daley for undergraduate or graduate students majoring in theatre arts, who have financial need. See the department for details.

**Carl T. Degener Scholarship.** Prof. Degener left a bequest for deserving juniors who are majoring in languages at Utah State University. See Department of Languages for details and application.

**Deseret News Professional Internship in Journalism.** The *Deseret News* offers the outstanding junior student in journalism a scholarship for \$150 and employment with the *News*, either at Salt Lake City or at one of its bureaus, during the summer between the junior and senior years. The winner is selected by judges representing USU and the *News*. See Department of Communication for details.

**Ellen Stoddard Eccles Scholarship.** An endowment given by Noni Eccles Harrison in memory of her late mother, after whom the fund is named. These scholarships are awarded yearly to three to five students majoring in ceramics. The scholarships begin in the junior year and extend through two years of graduate work. Selection of the recipients will be by the ceramics faculty of the Art Department.

**English Department Memorial Scholarships.** An annual scholarship is given in memory of King Hendricks and John Samuel Bullen. See English Department for details.

**Orpha Faylor Endowed Scholarship in Theatre Arts.** Awarded to outstanding students majoring in theatre arts. See the Theatre Arts Department for details.

**J.C. Fannesbeck Scholarship in English.** Students majoring in English with financial need and high academic standing may apply for this scholarship, established in memory of her father by Alice Fannesbeck Gardner. See Department of English for details.

**Earl A. and Carmen D. Fredrickson Fellowship in Sociology.** Limited to first-year graduate students in sociology. Earnings from an endowment fund of \$10,000 established in 1974 provide a fellowship award once every two or three years. The fellowship award will amount to about \$2,000 for the academic year. The Sociology Department supervises the funds and selects the fellowship recipient among the first-year sociology graduate students.

**The Joseph A. and Grace W. Geddes Research Scholarship.** For full-time graduate students majoring in sociology to use for research. See department chairman for details.

**Jay W. Glasmann Family Scholarship.** Scholarships endowed by the Glasmanns, a Utah pioneer family who founded the *Ogden Standard Examiner*, for journalism students. Preference is given to students from Weber, Box Elder, Morgan, and Davis Counties in Utah. Administered by the Department of Communication. Check with department for application details.

**LuAnn M. Hamilton Memorial Scholarship.** Established by family and friends in memory of Miss Hamilton, a baccalaureate graduate of the USU Social Work Program. Earnings from the fund are awarded to a junior or first quarter senior social work student, on the basis of scholarship, initiative, character, and professional promise. See Social Work faculty for details.

**Nora Eccles Harrison Graduate Fellowship.** A grant to a graduate student in ceramics selected by the head of the ceramics program to further study in ceramics from a generous endowment given by Mrs. Harrison. See Department of Art for details.

**Peter O. Holmgren Scholarship.** Awarded annually only to students in the humanities division of HASS. Application forms must be obtained from the dean's office of the College of Humanities, Arts and Social Sciences, Main 131. Applications and supporting materials must be turned in to the HASS dean's office on or before April 1.

**ICMA Scholarship in Newspaper Management.** A scholarship offered by the International Circulation Manager's Association, the Newspaper Center, Reston, Virginia. First preference is given to juniors and seniors with an interest in newspaper circulation management. Two awards annually. Administered by the Department of Communication. Check with department for application details.

**Jean Inness Theatre Scholarship.** The scholarship is for a female, upper division or graduate student with high academic standing, whose primary interest in theatre is acting or directing. See English Department for details.

**David L. Jensen Scholarship.** This endowed scholarship is awarded yearly to either an undergraduate or graduate student in the Department of Landscape Architecture and Environmental Planning. See LAEP Department for details.

**Glacus G. and Marie B. Merrill Scholarship Endowment.** A scholarship endowed by Utah radio pioneer Glacus Merrill for seniors in journalism. First preference is given to those with broadcast emphasis and interest in radio. Administered by the Department of Communication. Check with department for application details.

**Floyd T. Morgan Endowment Fund.** In honor of the former Theatre Department head, this scholarship is awarded to an upper division or graduate theatre arts major. See Department of Theatre Arts for details.

**Laval S. and Rachel B. Morris Traveling Fellowship for Students in Landscape Architecture and Environmental Planning.** Prof. Morris, who established the LAEP Department at USU, and his family have endowed this fund for LAEP students' educational travel outside of North America. See Department of LAEP for details.

**Music Department Scholarships.** The USU Music Department gives scholarships to incoming students and those currently enrolled in the areas of orchestra, band, vocal, piano, and organ. See Music Department for details.

**Preston Nibley History Scholarship.** A full tuition scholarship for one year to be awarded to an outstanding history student. See History Department for details.

**N. A. Pedersen Scholarship in English.** Undergraduate students majoring in English, who have high academic standing and financial need, may apply for this scholarship given in the memory of Dr. N. A. Pedersen, former department chairman and dean at USU. See Department of English for details.

**George Phatz Memorial.** Symphony orchestra scholarships. See Department of Music for details.

**Presser Scholarship.** A full tuition scholarship for one year to be awarded to an outstanding music major currently in his/her junior year. See the Music Department for details.

**Lucile C. Reading Scholarship for Students of Children's Literature.** A bequest from Mrs. Reading, who wrote and edited children's literature, for English majors at USU who plan to teach, study, or write for children. See English Department for details.

**Walter Siegenthaler Scholarship.** A scholarship endowed by the Media Law firm of King & Ballow, Nashville, Tennessee for juniors, seniors, or first-year graduate students. First preference is given to students with an emphasis in newspaper management in circulation. Two awards annually. Administered by the Department of Communication. Check with department for application details.

**Ralph Jennings Smith Creative Writing Award.** A tuition scholarship for fall quarter is granted to a senior, given on the basis of competition in poetry, fiction, and drama. See English Department for details.

**Social Work Scholarships.** Earnings from an endowment fund established in 1937 provide an annual scholarship award for a student majoring in social work. Junior and

senior women in social work are eligible for consideration. The amount of the grant varies from \$100 to \$200 per student. See Department of Sociology, Social Work and Anthropology for details.

**Teaching Assistant.** Department of Communication; \$4,000 with tuition waivers available; graduate student only. Three to six offers. Apply through Department of Communication.

**Gwendella Thornley Memorial Scholarship.** Awarded to students who are in their junior year and who are majoring in oral interpretation. See Department of Theatre Arts for details.

**Ev Thorpe Art Scholarship.** Funds for students majoring in art at USU. See Art Department for details.

**W. Mont Timmins Essay on the Pioneering of Cache Valley.** A cash prize is awarded by the Timmins family for the best essay on an aspect of pioneering in this valley, from earliest recorded times to present. Open to all undergraduates and graduates. Details from USU History Department.

**Utah Headliners Scholarship.** A scholarship awarded annually by the Utah Headliners Chapter of the Society of Professional Journalists. It is open to all junior students who are pursuing careers in journalism. Administered by the Department of Communication. Check with department for application details.

**Utah Press Association Scholarship in Community Journalism.** Offered annually to juniors and seniors with a major interest in community print journalism. Administered by the Department of Communication. Check with department for application details.

**Utah State Theatre Talent Awards.** Several awards of \$200 to \$400 are given each year to outstanding students entering or already enrolled as theatre arts majors. Applicants must audition and be interviewed. See Theatre Arts Department for details.

**Angelyn W. Wadley Memorial Scholarship.** Awarded in memory of Mrs. Wadley to students in history. See History Department chairman.

**John S. and Unita Welch Prelaw Scholarship.** Provides resident tuition scholarships, senior year only, for outstanding students who intend to pursue law as a profession. Apply through Financial Aid Office.

**Esther V. Erickson Wrigley Scholarship.** The Robert L. Wrigley family presents two scholarships annually to English majors in memory of Mrs. Wrigley. Scholarships are given to outstanding students of sophomore and junior standing. See Department of English for details.

## College of Natural Resources Scholarships

**Joseph Barry Bass Memorial Scholarship.** Awarded to an outstanding freshman or sophomore in Range Science who meets as many of the following criteria as possible: has graduated from a high school outside of Utah, has been active in the USU student chapter of the Society for Range Management, has served as a range management employee with a federal land management agency or has worked for the federal government in fire control, is active in the USU Rodeo Club, is a member of Alpha Gamma Rho, and has served in the military.

**Ray Becraft Scholarship.** Awarded to a freshman on the basis of scholarship, need, leadership, and interest in natural resources.

**Mark R. Boyer Scholarship Endowment.** Recipient must be a junior or senior majoring in the Fisheries and Wildlife Department. The student must demonstrate financial need, personal integrity, and a high sense of social and moral responsibility.

**Class of '50 Endowment.** This endowment fund was created and is maintained by contributions from the College of Natural Resources graduating class of 1950. Recipient must enroll for at least 12 credit hours each quarter and earn a 3.0 cumulative GPA. Student must demonstrate need of scholarship.

**T.W. Daniel Scholarship.** Awarded to the outstanding junior student in Forest Resources as determined by scholastic excellence and contribution to the Forestry Club.

**Paul M. and Neva Dunn Scholarship.** Recipient must be at the end of his/her junior year in the College of Natural Resources. Award will be based on scholarship and need.

**J. Whitney Floyd Memorial Scholarship.** Recipient must be registered in the Forest Resources Department as a junior or senior. Selection will be based on academic performance, ethical and moral standing, and should show some evidence of financial need.

**Arthur F. Johnson Endowment.** Awarded annually to a qualifying junior for completion of his/her degree in fisheries and wildlife management. Candidates must have a career interest in the field of fisheries and wildlife and shall present a record of related accomplishments and potential in high school, college, or in field experience. Candidates with the greatest financial need will be given priority. Repayment may be made back into the endowment, but it is not required.

**George A. Judah Scholarship.** Determined on the basis of GPA, Society for Range Management activities, demonstrated leadership, and potential to contribute to the range management profession.

**George H. and Dorothy Kelker Scholarship.** Consists of endowment earnings. Awarded to deserving Natural Resources students.

**Timothy Leary Scholarship.** Awarded to a junior student majoring in Environmental Studies who exhibits a genuine concern for and dedication to natural resources conservation and the environment.

**Phelps/Ware Scholarship Award.** Awarded to a student in the Fisheries and Wildlife Department who has demonstrated a commitment to the hunting and fishing aspects of resources management.

**S. J. and Jessie E. Quinney Scholarship.** To qualify, student must be a high school or transfer student seeking either a first or second bachelors degree or a Master of Forestry degree. High School students must have a GPA of 3.8 or better and an ACT composite score of 24 or greater or a total of 1060 or greater. Transfer students must have a GPA of 3.65 or greater. Student must be able to communicate effectively and show motivation in some aspect of natural resources. This will be determined by a written essay, personal interview, and references.

**S. J. and Jessie E. Quinney Graduate Scholarship.** Awarded to the outstanding graduating Quinney Scholar, selected from students who have received an undergraduate Quinney Scholarship and plan to attend graduate school. The award of this scholarship will be determined by cumulative GPA, GRE scores, resume, references, interviews, and a letter of intent.

**Seely-Hinckley Scholarship.** Based on academic achievement and need, the selection of the recipient is determined by student's probability of attending with regards to financial support. Scholarship will not be active until a letter of acknowledgement and appreciation is received from student by John S. Hinckley.

**Gary Smith Scholarship.** Awarded to a student on the basis of academic scholarship who has the potential to become a "righter of wrongs and a singer of songs."

**Society for Range Management—Laurence A. Stoddart Memorial Scholarship.** Awarded by the Utah Section, Society for Range Management, to the outstanding Range Science sophomore or junior at Utah State University, Brigham Young University, or Southern Utah State University. Selection is based on GPA, Society for Range Management activities, demonstrated leadership, and potential to contribute to the range management profession.

**Laurence A. Stoddart Memorial Scholarship.** Recipient must be a student in the Range Science Department of sophomore or junior standing. Scholarship is awarded on the basis of GPA, Society for Range Management activities, demonstrated leadership, and potential to contribute to the range management profession.

**Allen W. and Alice Stokes Endowment.** This scholarship is based on need, with special consideration given to nontraditional or ethnic minority students.

## College of Science Scholarships

**James E. Brown Scholarship.** A scholarship in space sciences, space engineering, and aerospace corporation administration to be awarded to a graduate or undergraduate student with high academic standards majoring in some aspect of space sciences, space engineering, or aerospace administration.

**Christenson Memorial Scholarship.** One \$250 scholarship, for support of undergraduate study in biology, available to senior students in zoology or entomology. The award is based upon scholarship, character, and professional promise. The funds from which the award is made were contributed by the family and friends of L. D. Christenson; the fund is administered by the Department of Biology.

**College of Science Scholarship.** A four-year tuition plus cash award given to an incoming freshman. Selection is made on the basis of performance on a competitive examination.

**Oscar Wood Cooley Scholarship.** A scholarship awarded to an outstanding junior or senior majoring in the college. This scholarship is given to honor the memory of Oscar Wood Cooley.

**Get Away Special (GAS) Scholarship.** High school seniors with an interest in space research are eligible to apply for a GAS scholarship. The scholarship is a full in-state tuition waiver and, provided the student's USU GPA remains at or above 3.5, is good for 12 academic quarters. Under certain conditions, the scholarship can be a full out-of-state tuition waiver. Through this scholarship program, the student is provided with the facilities and resources to build his or her own experiment for flight on the NASA Space Shuttle. Information can be obtained from the GAS Program Faculty Adviser, Physics Department, USU, Logan, UT 84322-4415.

**Delbert Greenwood Memorial Fund.** A scholarship for a deserving student in the field of biochemistry.

**Datus M. Hammond Memorial Scholarship.** One scholarship in memory of late department head Datus M. Hammond for students in biology. Based upon scholarship, character, and professional promise, the award is generally made to a graduate student in biology.

**Neville C. and Annie P. Hunsaker Scholarship in Mathematics.** Scholarships for high school seniors going to USU and majoring in mathematics or for USU students enrolled in the Department of Mathematics and Statistics. This scholarship covers full tuition plus some expenses.

**Garth L. Lee Undergraduate Scholarship Award.** Four annual awards, given in honor of Garth L. Lee, former professor of chemistry at Utah State University. For a student in each year of study who demonstrates outstanding command of chemical science. Contact Richard Olsen for more information.

**Maeser Scholarship.**

**Lawrence R. and Abelina McGill Scholarships.** Scholarships established by Lawrence R. and Abelina McGill for students in Physics or Electrical Engineering. At least 50 percent of the recipients each year shall be female and/or members of an ethnic minority.

**Physics Undergraduate Scholarship.**

**Thomas Andrew Riemondy Scholarship.** Given in memory of the late Thomas A. Riemondy, student at USU, this fund is for undergraduate students majoring in geology who are not residents of the State of Utah. See the Geology Department for details.

**Seely-Hinckley Scholarship.** A scholarship established as a memorial for John H. Seely and Robert Hinckley. Awards are based on superior performance and financial need.

**Space Science Scholarship.** A four-year scholarship for students interested in a career in space science (physics). A tuition-free scholarship the first year with subsequent years contingent upon good performance. During their academic career, students will possibly have opportunity to work with appropriate faculty members in space science and earn some subsistence. They will also develop an experimental payload to be flown on the space shuttle.

**Van Orden Scholarship.** A scholarship given alternate years to an undergraduate majoring in chemistry with high academic record. This scholarship was endowed by Dr. Harris O. and Eleanor Y. Van Orden.

**J. Stewart Williams Graduate Fellowship in Geology.** In honor of Professor Williams, this endowment is for students whose studies are of the western conterminous United States. Contact Don Fiesinger for more information.

## Athletics Scholarships

**Tura M. and Jessie S. Aldous USU Men's Track Endowment Fund.** Scholarships for students who participate on the men's varsity track team.

**Ladell Andersen Scholarships in Athletics.** Information about these scholarships, endowed in honor of the former athletic director, is given at the Athletic Office.

**Dean C. Baugh Athletic Fund.** The Baughs are USU alumni, and Mrs. Baugh-Webber established this endowment in memory of her late husband for USU athletes. See athletic director for details.

**Wayne Estes Memorial Fund.** Established in memory of Wayne Estes. See athletic director for details.

**Mark O. Haroldsen Athletic Fund.** Scholarships are given from an endowment established by Mr. Haroldsen. See athletic director for details.

**Owen J. and Bonnie Jones Athletic Fund.** Dr. and Mrs. Jones, alumni of USU, have endowed this athletic scholarship fund for USU athletes. See athletic director for details.

**Durrell "Quig" Neilsen Scholarship Fund.** Basketball scholarships for returned LDS missionaries.

**Jack B. and Bonnie F. Parson Scholarship in Athletics.** The Parsons have endowed these scholarships for students with superior scholastic ability of at least sophomore status, a commitment to high social and moral values, and financial need. See the athletic director for details.

**Robert P. Shin Athletic Endowment Fund.** An endowment for students who participate in intercollegiate athletics at USU.

**Jerry Wilson Athletic Scholarship Fund.** Established in honor of Mr. Wilson, USU alumnus. This fund is for outstanding athletes from the southern California area who will be participating in intercollegiate sports at USU. See Athletic Department for details.

**Robert L. Wrigley Scholarship Fund.** Established in memory of their father by the children of Robert L. Wrigley.

## Awards and Honors

**Alpha Lambda Delta Award to Senior Students, Book Award.** An award to a senior who has been an Alpha Lambda Delta member and who carries the highest grade point during four years of college.

**Alpha Zeta Award.** An award is made annually by Alpha Zeta fraternity honor society of agriculture and forestry students to the sophomore in agriculture and forestry who made the highest scholastic record in the freshman year.

**The American Legion Military Medal.** A gift of the Logan American Legion Post, it is awarded each year to the athletic letterman who maintains the highest scholastic record during the year and who exhibits the most wholesome attitude toward military training.

**American Society of Agronomy Leadership Award.** A plaque to the outstanding senior in agronomy.

**American Society of Civil Engineering Associate Memberships.** Awarded annually to senior engineering students on the basis of scholarship, promise of success in engineering, personality, and ASCE student chapter activity. The awards consist of associate membership in the American Society of Civil Engineers. The first is given by the Intermountain Section of ASCE, the second by the Civil Engineering faculty, and the third by the student chapter of ASCE.

**ASCE Membership Award.** Junior membership in the American Society of Civil Engineers is awarded by the Intermountain Section, ASCE, to a graduating senior in civil engineering on the basis of scholarship, activities, and personality. Selection is made by the engineering faculty.

**ASCE Student Chapter Award.** Junior membership in ASCE to the senior doing most for the chapter. Selected by vote of members.

**ASLA Merit and Honor Awards.** The Utah Chapter of the American Society of Landscape Architects, in conjunction with the faculty of the Department of Landscape Architecture and Environmental Planning, present four awards to graduating seniors and graduate students annually. Candidates are judged on scholarship, professional experience, and the professional quality of their academic work.

**The Barnes Key.** Rey and Marjorie Barnes award a key annually to an undergraduate student who is affiliated with the campus radio or television station. The student must have a cumulative grade point average of 2.5 or above, must have carried at least one radio class during the year of the award, and must have demonstrated a deep interest in furthering radio and television arts at Utah State University. Selection shall be made by the director of radio and television at USU, the person directly responsible for the campus radio station, and Rey L. Barnes.

**Blue Key Award.** Each year Blue Key Honorary Service Fraternity awards a "Service Plaque" to an outstanding freshman or sophomore male student. Candidates are judged on University activities, scholarship, service to the University, and moral character. Application forms can be obtained from the organization and must be filed with the Blue Key Awards Committee on or before April 15.

**Business Education Student Teacher Award.** Presented to one or more senior student teachers who have exemplified superior ability in their student teaching experience.

**Burpee Award in Horticulture.** An annual award of \$100 to the student in horticulture who rates highest in scholarship, practical experience, and interest in flower, vegetable, and seed growing.

**Cache Valley Chapter of the Utah State Historical Society Award.** The Cache Valley Historical Society offers annually an award of \$25 to the USU student writing the best acceptable treatise on any phase or field of Cache Valley history. Papers must be submitted on or before the end of the spring quarter and become the property of the Cache Valley Historical Society.

**College of Natural Resources Outstanding Senior Award.** Awarded to the graduating senior in the College of Natural Resources who has maintained a high academic record and shows promise of achieving outstanding professional success.

**Freshman Chemistry Handbook Award.** A copy of the *Handbook of Chemistry and Physics* is presented to the students with the best scholarship record in the Principles of Chemistry course for science majors.

**Chi Omega Sorority Award.** An award of \$25 is given annually to the female student majoring or minoring in social sciences who gives evidence of superior scholarship and ability to make a contribution to organized group life. The committee of awards is appointed by Chi Omega Sorority each year from the teaching staffs of the Sociology and Economics Departments.

**Civil Engineering Faculty Award.** Junior membership in the ASCE or ASAE is awarded by the engineering faculty to a graduating senior in engineering on the basis of scholarship and promise of success in engineering. Selection is made by the engineering faculty.

**Danforth Foundation Award in Family Life.** Given on the basis of scholarship, leadership, physical vigor, and activity in religion. This award provides two weeks of leadership training at a camp on Lake Michigan.

**Danforth Summer Award.** Awarded to an outstanding freshman in agriculture. This award covers the expenses of two weeks' leadership training at the American Youth Foundation Camp on Lake Michigan. Transportation is up to the individual.

**Danforth Summer Fellowships.** Awarded to an outstanding junior in agriculture. This award covers the expense of two weeks marketing and research study at St. Louis and at the Purina Research Farm nearby and two weeks leadership training at the American Youth Foundation Camp on Lake Michigan.

**Virginia Dare Award.** A cash award of \$25 to the outstanding junior in dairy manufacturing.

**Delta Beta Chi Award.** Ten dollars is awarded annually by the Delta Beta Chi Chemistry Fraternity to the freshman or sophomore chemistry student who writes the best essay on some subject of chemistry.

**Distinguished Service Awards.** Awards are given annually to outstanding students in theatre, music, library, and physical education.

**Faculty Women's League Democracy Award.** An award for a senior and a graduate woman who has evidenced the best understanding of the democratic principle in its application to University life, as exemplified by the following considerations: (1) awareness of issues vital to university life, (2) individual responsibility for their solution, and (3) accommodation of individual interests to what seems to be the common good. (University award winner excluded.)

**Faculty Women's League Scholarship Award.** Awarded to a senior woman, based on scholastic record for full undergraduate work. Student must have spent at least two years at this institution. (Valedictorians excluded.)

**Foreign Student Achievement Award.** A certificate of achievement to a graduating foreign student from a non-English speaking country who has the highest scholastic average during undergraduate study.

**Institute of Electrical and Electronic Engineers Outstanding Senior.** A certificate given annually to a member of the local student chapter of IEEE.

**Institute of Electrical and Electronic Engineers Paper Contest.** A noncash award (e.g. a calculator) given to the winner of the annual technical paper contest.

**Jardine Juniper Award.** Awarded to a College of Natural Resources student who has been chosen by ballot by natural resources students on the basis of activities and contribution to CNR club activities.

**LAEP Faculty Medal.** The Faculty Medal is awarded annually to a senior or graduate student in the Department of Landscape Architecture and Environmental Planning. The medal is given to the outstanding student in the department based upon the judgement of the faculty. The award takes into account the academic record of the individual, their contribution to the department and the profession during their period of education, and, most importantly, their future potential contribution to the profession in practice.

**Logan Kiwanis Club Trophies.** Each year, the dean of each of the eight colleges selects an outstanding student in the college to receive the Kiwanis Club Plaque.

**Virginia Jenkins Award.** An award given to a male junior or senior student who has completed a mission for the LDS church. See Financial Aid Office for details.

**Maeser-Bauer Graduate Teaching Assistant Award.** In memory of Dr. Sherwin Maeser and Dr. Norman Bauer, a cash award is given annually upon recommendation of the Department of Chemistry and Biochemistry to outstanding graduate teaching assistants in good standing in the department.

**Maeser-Bauer Undergraduate Scholarship Award.** Established in memory of Drs. Sherwin Maeser and Norman Bauer, a cash scholarship award is presented annually to an outstanding junior or senior chemistry major. The award, which may be received only once, will be given primarily for high scholarship achievement.

**Mechanical Engineers Faculty Award.** An engineering handbook awarded annually to the mechanical engineering senior with the highest grade point average. The award is made by the mechanical engineering faculty.

**Merck Award.** Merck and Company, manufacturing chemists, awards annually a copy of the *Merck Index* to an outstanding student in organic chemistry and biochemistry.

**National Business Education Association Award.** An award presented by the National Association for Business Teacher Education to the senior who has distinguished himself or herself in business education.

**National Council for Geographic Education Award.** An excellence of scholarship award given annually by the National Council for Geographic Education to the outstanding graduating senior in geographic education.

**Outstanding Seniors in the College of Engineering.** A plaque and a cash award given annually to the outstanding senior in each of the departments in the College of Engineering: Agricultural and Irrigation Engineering, Civil and Environmental Engineering, Electrical Engineering, Industrial Technology and Education, and Mechanical and Aerospace Engineering.

**Outstanding Senior in the College of Engineering.** A plaque and a cash award given annually at the Engineering Banquet to the outstanding senior in the college.

**Outstanding Seniors in the College of Natural Resources.** Annual awards given to one senior in each department of the college—Range Science, Forest Resources, Fisheries and Wildlife, and Geography and Earth Resources. Based on demonstration of leadership in academic, political, and social activities. Selected by faculty in respective departments.

**The ROTC Medal.** A gift of the institution is awarded each year to the student in military science and tactics who most nearly represents the ideal that the Reserve Officers' Training Corps is striving to develop, upon the following basis: (a) character, 20 points; (b) scholarship, 15 points; (c) University activity, 15 points; (d) leadership, 20 points; (e) aptitude for an interest in Military Science, 20 points; (f) physique and bearing, 10 points.

**The Salt Lake Stockyards Company Challenge Cup.** Awarded each year to the student who shows the most proficiency in judging hogs.

**Scholarship A's.** In the form of a pin, these awards are given to undergraduate students who present evidence that their grades are all "A's" for three consecutive quarters of their residence. At least 15 credits must be carried. See the Financial Aid Office for details.

**Sigma Lambda Alpha Awards.** Sigma Lambda Alpha is the National Honor Society in Landscape Architecture. Invitations and awards are made each year to

outstanding upper division and graduate students in the Department of Landscape Architecture and Environmental Planning. Awards are recommended by the faculty based on the scholastic records of the individual. The minimum grade point average for invitation is 3.2 or above.

**Sigma Tau Award.** To the outstanding sophomore engineering student for scholarship, sociability, and practicability. Selection made by the Alpha Delta Chapter of Sigma Tau, an honorary engineering fraternity.

**Society of American Foresters Outstanding Senior Award.** Annual award given by the Wasatch Front Chapter of the SAF to a student who has achieved academic excellence and who has been active in professional activities and the USU Student Chapter of the SAF.

**Utah Association of Certified Public Accountants.** An award for the purpose of stimulating interest to the outstanding senior student majoring in accounting.

**Utah State Historical Society Award.** An award to the outstanding graduate majoring in history.

**Utah State University Business Education Student Teacher Award.** This honorary award is presented to one or more senior student teachers who have exemplified superior ability and excellence in completing their student teaching experience leading to the BS degree.

**Wall Street Journal Award in Business.** A medal and one year's subscription to the *Wall Street Journal* is given for outstanding achievement in accounting.

**Wall Street Journal Award in Business.** A medal and one year's subscription to the *Wall Street Journal* is given for outstanding achievement in business administration.

**Wall Street Journal Award in Economics.** A medal and one year's subscription to the *Wall Street Journal* for outstanding achievement in economics.

**Colonel Joe E. Whitesides Award.** This award is given to the outstanding student athlete selected by the Athletic Council on the basis of (1) academic achievement, (2) athletic achievement, (3) Army (ROTC) achievement, and (4) adjustment to meet the daily demands in character, social, and general culture.

## Loans

**The A Men's Athletic Association Loan Fund.** Monies to be used for tuition and books by the direct descendants of A Men members. The A Men Association consists of individuals who received the athletic award A from USU prior to 1970. Monies must be repaid within 24 months after borrowing. For details, see Director of Financial Aid.

**James W. and Margaret E. Bingham Student Loan Fund.** Senior students have priority to this loan fund, then junior students may borrow. The loans are to be repaid within a one-year period after the students graduate. See the Financial Aid Office for details.

**The Edgar B. and Laura Cowley Brossard Loan Fund.** An emergency loan account for needy junior and senior students given by the Brossards, alumni of Utah State University.

**Box Elder High School Loan Fund.** For USU students who have attended Box Elder High School.

**East Carbon Wildlife Federation Loan Fund.** Provides up to \$200 to deserving students in the College of Natural Resources for purposes related to the continuing of their education. For details see the dean's office, College of Natural Resources.

**Orson A. and Rae N. Christensen Loan Fund.** From a generous gift of the Christensens, a loan fund at a low interest rate is set up to help students through school. The accrued interest goes to create scholarships in the College of Business.

**J. Reuben Clark Small Loan Fund.** A reserve specifically provided for assistance to students in meeting school obligations.

**Latin American Student Loan Fund.**

**USU Faculty Association.** A loan fund provided by the Faculty Association to assist students in need.

**Frischknecht Memorial Fund.** A fund established in memory of Dr. Carl O. Frisknecht and his wife, Geniel Lund Frisknecht, by friends, associates, and members of the family to assist students in the College of Agriculture who are in need of short-term financial assistance. Applications should be made through the dean of the College of Agriculture.

**Annie Givens Anderson Gardner Loan Fund.** This loan is for needy freshman women with no previous college training who are members of the Church of Jesus Christ of Latter-day Saints in good standing.

**Edwin and Josephine Gossner, Sr. Cooperative Education Student Loan Fund.** For students attending USU; 30 percent of the fund is reserved for native American students. The loans are to be repaid within a six-month period. See the Director of Cooperative Education for details.

**Intercollegiate Knight Loan Fund.** Loan fund provided by the Intercollegiate Knights for needy USU students.

**O. W. Israelsen Memorial Loan Fund.** Upper division or graduate students in irrigation and drainage engineering may use this fund.

**Robert L. Judd Loan Fund.** This loan fund was given by Mrs. Judd in honor of her late husband. Loans are available to undergraduate men who have ability and need financial assistance.

**George Hills Kelker Memorial Loan Fund.** Provides up to \$200 to deserving students in the College of Natural Resources for purposes related to the continuing of their education. For details see the dean's office, College of Natural Resources.

**Editha Smith Kent Loan Fund.** Dr. Melvin Kent gave this generous gift to be used as a loan fund in honor of his wife, Editha Smith Kent. The Kents are both USU alumni. The fund is used to provide student loans at a low interest rate.

**Henry Lane Memorial Fund.** Established by his sons, Sid and MacArthur Lane, in memory of their father. This loan fund is to be used by black varsity athletes.

**Vera Nielson Langford Loan Fund.** From a generous gift, a loan fund to be used by needy home economics students.

**Larue H. Merrill and Ida K. Merrill Loan Fund.** An emergency loan fund for senior students given by the Merrills, alumni of USU. Monies are to be repaid within a maximum of 12 months after graduation. See Financial Aid Office for details.

**George A. Meyers Loan Fund.** Established in memory of Dr. Meyers, a friend and benefactor of foreign students, for their emergency needs.

**Edgar B. and Laprile B. Mitchell Loan Fund.** This loan fund was established for students who are in need of financial assistance to commence or continue their education at Utah State University. The loan shall be made only for undergraduate students.

**Marjorie Paulsen Loan Fund.** A fund provided by the father of a former Aggie student active in student body affairs.

**Arthur Pirsko Loan Fund.** Provides up to \$200 to deserving students in the College of Natural Resources for purposes related to the continuing of their education. For details see the dean's office, College of Natural Resources.

**W. B. Rice Memorial Loan Fund.** This loan fund provides loans up to \$200, usually for one year, to deserving students in the College of Natural Resources. Application is made to the dean's office.

**Senior Loan Fund.** A gift of the class of 1911, and added to by the class of 1922, has helped many students complete school.

**Margaret Sigler Loan Fund.** A short-term loan of \$100 to be repaid by the student in a specified time period with no interest charges. See Women's Center.

**H. Grant Stephens Loan Fund.** A special borrowing fund with minimum interest rates to be used with pressing financial needs. Given in honor of Mr. Stephens by his children.

**Lewis M. Turner Loan Fund.** Provides up to \$200 to deserving students in the College of Natural Resources for purposes related to the continuing of their education. For details see the dean's office, College of Natural Resources.

**Utah Forester's Association Loan Fund.** Provides up to \$200 to deserving students in the College of Natural Resources for purposes related to the continuing of their education. For details see the dean's office, College of Natural Resources.

**Ichel Water Loan Fund.** An individual gift to assist students in need.

# Intercollegiate Athletics— Men and Women

**Athletic Director:** Rod Tueller  
Office in Spectrum Addition 202M  
tel. (801) 750-1850

**Associate Athletic Director:** E. Kaye Hart  
**Assistant Director, Athletic Development:** Gale Anderson  
**Assistant Director, Business Affairs:** Ken Peterson  
**Assistant Director, Communications:** Craig Hislop

**Sports Information Director:** Craig Hislop  
**Associate Sports Information Director:** Tim Monsell  
**Promotions and Big Blue Club Director:** Dave Champlin  
**Academic Coordinator:** Ken Mitchell  
**Faculty Representative:** Mike Parent

## Head Coaches:

**Basketball:** Kohn Smith  
**Football:** Chuck Shelton  
**Golf:** Dan Roskelley  
**Gymnastics:** Ray Corn  
**Softball:** Lloydene Searle  
**Tennis (Men's and Women's):** To be appointed  
**Track and Field (Men's):** Gregg Gensel  
**Track and Field (Women's):** Vaughn Courtney  
**Volleyball:** Steve Carlat  
**Ticket Manager:** Tom Moulton  
**Head Trainer:** Dale Mildenerger  
**Assistant Trainer:** To be appointed  
**Strength Coach:** Doug Salmon  
**Equipment Manager:** Ken Seamons

The Intercollegiate Athletics program at Utah State encourages excellence in athletic and academic performance. The program is designed to develop qualities of leadership, sportsmanship, and individuality, helping each student athlete to realize his or her ultimate capabilities.

USU's Intercollegiate Athletics operates under the auspices of the National Collegiate Athletic Association (NCAA), the Big West Conference, and Utah State University. The Aggies compete at the NCAA Division I level in seven men's and seven women's sports.

Utah State has a storied history, gaining national attention in recent years in a number of different sports.

The Aggie football program has proved to be a breeding ground for NFL talent, sending numerous players to the professional ranks in recent years. Currently, nine former Aggies dot current NFL rosters.

The 1989 softball team won the High Country Championships—USU's first team championship in the HCAC—and went on to represent both school and conference in the first round of the NCAA Championships.

During the 1987-88 season, the Aggie basketball team won the Big West post-season tournament championship and an automatic bid to the NCAA Championships under present athletic director and former head coach Rod Tueller.

The gymnastics team finished the 1989 season ranked 13th, for their fourth straight finish in the top 15 in the nation. In those four

years the team has never finished lower than third in the High Country championships.

Individual Aggie athletes in individual and team sports have also made their mark during the past few years.

In track and field during the past two years, USU has sent two men and two women to the indoor and outdoor championships. Current athletes Craig Carter and Ime Akpan represented USU in the 1989 NCAA Indoor Championships. Carter and javelin thrower John Kelly also competed in the NCAA Outdoor Championships with Kelly earning All-American honors. Many athletes also earned Big West or HCAC all-conference honors.

Current NFL players Brent Snyder and Kendal Smith were two of five players selected to Big West all-conference teams in football during the past two seasons.

Former gymnast Tana Davis participated in the 1989 and 1990 NCAA Championships, the third gymnast to do so in the past four years. Current gymnast Barb Zahl was also a 1990 NCAA Championships participant.

Leah Young, Shannon Blackburn, and Linda Delacruz, current players for the nationally-prominent softball program, all earned post-season honors in 1989. Young earned Academic All-American honors, Delacruz All-HCAC honors, and Blackburn All-Region honors.

In basketball, Kendall Youngblood was the Big West "Freshman of the Year" in 1988-89. Former Aggie graduate assistant Reid Newey earned all-conference honors in the Big West in 1989.

National attention is nothing new to Utah State. Throughout the years, the Aggies have been able to boast of a storied past. The 1978 volleyball team went on to win a national championship title and was the national runner-up in 1979. Utah State became the second team in history to win back-to-back national championships in softball, taking top honors in 1980 and 1981. In gymnastics the Aggies finished 10th in 1979 and ninth in 1982 at the National Championships.

Numerous outstanding individual athletes have also represented the Aggies throughout the years, many earning All-American honors.

In football, former All-American Merlin Olsen went on to earn NFL Hall of Fame honors, as well as becoming a well-known television actor. Merlin's brother, Phil, also earned consensus All-American honors. Merlin also leads a group of three gridders that have earned Academic All-American honors. The group also includes Gary Anderson and Randy Stockham.

In track and field, four Olympians and 13 All-Americans have competed for the Aggies, including former world record holders L. Jay Silvester and Mark Enyeart.

Jay Don Blake became Utah State's first NCAA National Champion in golf, winning the title in 1980 and finishing second the following year.

Aggie basketball boasts the legacy of Wayne Estes, an All-American in the early sixties before his untimely death.

Three Aggie gymnasts have earned All-American honors and two others have represented their countries in the Olympics and World Championships. Lena Adomat twice represented Sweden in the Olympics, while Wanita Lynch competed for Australia in the 1976 Olympics.



Seven different athletes earned All-American honors in volleyball 12 times. In addition, Academic All-American honors have been bestowed upon Denise Cooper.

The softball team can be proud of the past as well. Four players earned All-American honors during their careers and Leah Young was chosen as an Academic All-American. Former Aggie shortstop Kelly Smith is the only Aggie to have earned All-American status three straight years (1984-86).

Utah State's past wrestling program also boasted 11 All-Americans and one Academic All-American (Bob Erickson).

**Participation.** The Aggies, as members of the Big West Conference, play conference schedules in basketball, football, softball, and volleyball. The conference winner in these sports earns an automatic bid to NCAA post-season play, with the exception of football. The conference winner in football earns a berth in the California Raisin Bowl. In addition, conference championships are held in cross-country, golf, tennis, and outdoor track and field. The gymnastics team will contend for post-season participation via the NCAA Midwest Region Championships.

In addition to Big West play, the Aggie's schedule includes many opponents within the intermountain area and the West Coast. Football, basketball, gymnastics, softball, and volleyball teams also compete nationwide.

**Facilities.** Excellent training and competition facilities are provided in all sports. Romney Stadium seats 30,257 for football crowds, with practice fields adjacent to the stadium. Basketball, gymnastics, and volleyball are played in the 10,270 chair seat Dee

Glen Smith Spectrum. Basketball practices are held in the Spectrum, while the HPER Building is the practice home for the gymnastics and volleyball teams. The recently renovated gymnastics practice gym is one of the finest in the nation. The Nelson Recreation Center is the home of the Aggie indoor track and field teams. A 200-meter tartan track is utilized, as well as runways and pits for other events. Outdoors, the Ralph Maughan Stadium is the home for the track teams. The softball team has its own practice and playing facility, Aggie Softball Field, and also has use of the Nelson Recreation Center for indoor practice. The tennis teams practice and play on the HPER courts and in the Nelson Recreation Center. Birch Creek Golf Course, one of the top municipal courses in the State of Utah, is the home of the Aggie golf team.

**Scholarships.** USU offers partial to full scholarships in each of the 14 sponsored sports. A student or prospective student desiring consideration for one of these awards may contact one of the coaches for further information about scholarship application.

**Registration and Eligibility.** Registration for athletic participation in Aggie athletics may be accomplished by contacting any of the coaches or the Athletic Department. Eligibility for participation is governed by the rules and regulations established by the NCAA, the Big West Conference, and by Utah State University.

**Supervision.** Supervision and direction for men and women is vested in the director of athletics and the Athletic Council, consisting of the president of the University, members of the faculty, the alumni, and student organizations.

# University Extension

**Vice President:** R. Paul Larsen  
**Associate Vice President:** Gerald R. Olson  
**Assistant Vice President, Life Span Learning:** Rex L. Tueller

**Supervisor, Family Life Programs:** Marilyn B. Noyes  
**Acting Supervisor, 4-H Youth Programs:** Scott S. McKendrick  
**Assistant Supervisors, 4-H Youth Programs:** Elizabeth Ellen  
 Gorham, Rebecca S. Mitchell, John P. Murphy  
**Supervisor, Community Development Programs:** David L. Rogers  
**Staff Development Leader/Evaluation Specialist:** Byron R.  
 Burnham

**District Supervisor (Provo):** Steven D. Cox  
**District Supervisor (Richfield):** Joseph W. Austin  
**District Supervisor (Brigham City):** Ben W. Lindsay  
**Director, Southeastern Utah Center for Continuing Education,  
 Moab:** "H" K. Hancock  
**Director, Uintah Basin Center for Continuing Education,  
 Roosevelt:** Laird M. Hartman

**Director, Class Division:** David A. Medlyn  
**Hill Air Force Base/Ogden Center:** Terry R. Teigeler  
**Independent Study:** Gary S. Poppleton  
**Evening School:** Gary S. Poppleton  
**Enrichment Classes:** Louis D. Griffin  
**Tooele Center:** Vincent J. Lafferty  
**COMNET:** Louis D. Griffin  
**Director, Conference and Institute Division:** Dallas L. Holmes  
**Programmers:** Tom Borg, Jill Edwards, Larry E. Riley  
**Director, Management Institute:** Michael E. Balliff  
**Life Span Learning Facilities:** Donald L. Wright  
**Administrative Assistant:** W. Arthur Cahoon  
**Administrative Assistant to Vice President:** Marlene Berger  
**Staff Assistant, Life Span Learning:** Arla Swensen  
**Extension Publications Editor:** Donna Falkenberg  
**Bulletin Room Secretary:** Karen Elwood  
**Printer:** John Monson

## State and Area Program Specialists

**Agricultural Education:** Darwin S. Jolley  
**Agronomist (Crops):** Ralph E. Whitesides  
**Agronomist (Weeds):** Steven A. Dewey  
**Animal Science:** W. Craig Burrell (Provo), Grant M. Esplin  
 (Beaver), Haven B. Hendricks, Nyle J. Matthews (Richfield),  
 Norris J. Stenquist  
**Clothing and Textiles:** Louise P. Young  
**Community Development:** David L. Rogers, Jeri Winger (Provo)  
**Computer Specialists:** James T. Belliston, V. Philip Rasmussen  
**Dairy Science:** Ron Boman, David P. Marcinkowski, Wallace R.  
 Taylor  
**Entomology:** Diane G. Alston, Ted Evans, Jay B. Karren  
**Extension Economists:** Jay C. Andersen, DeeVon Bailey, Larry K.  
 Bond, E. Bruce Godfrey, Darwin B. Nielsen  
**Family Life:** Glen O. Jenson, Thomas R. Lee  
**Family Resource Management:** Barbara R. Rowe  
**Food/Nutrition:** Georgia C. Lauritzen  
**Food Science:** Charlotte P. Brennand, DeLoey G. Hendricks  
**Graphic Artist:** L. Jay Smith  
**Horticulture:** Larry A. Rupp, Anthony H. Hatch (Provo), William  
 A. Varga (Farmington)  
**Housing and Home Furnishings:** Leona Hawks

**Human Resource Analyst:** Marion T. Bentley  
**Information and Publications:** Donna Falkenberg, Dennis L.  
 Hinkamp, Robin K. Sterns  
**Landscape Architecture and Environmental Planning:** Larry  
 Wegkamp  
**Radio-TV:** Roger McEvoy  
**Range Management:** Roger E. Banner, G. Allen Rasmussen  
**Soil Science and Water Use:** V. Philip Rasmussen  
**Veterinary Science:** Clell V. Bagley

## County and Area Agents

**Beaver:** Grant M. Esplin  
**Box Elder:** Ann E. Henderson, Lyle Holmgren, Ben W. Lindsay,  
 Thomas A. Reeve  
**Cache:** Don Huber, Ross A. Jacobson, Kristine S. Saunders  
**Carbon:** Joan B. Sellers, John A. Soper  
**Davis:** Stephen H. Jackson, Jo Ann L. Mathis, Shawn H. Olsen,  
 Janice P. Thomas  
**Duchesne:** Troy D. Cooper, Barbara B. Mathis  
**Emery:** Elaine B. Hatch, Dennis R. Worwood  
**Garfield:** Verl B. Matthews, Lucile H. Proctor  
**Grand:** Daniel R. Nelson  
**Iron:** G. Allan Edwards, Lenore I. Rasmussen  
**Juab:** Jeffrey E. Banks, Kathy Riggs  
**Kane:** Julie M. Ingersoll, Verl B. Matthews  
**Millard:** Jody A. Gale, Mar Genne B. Rowley  
**Morgan:** Sterling Banks, Josephine D. Clark  
**Piute:** Verl L. Bagley, Francis W. Price  
**Rich:** David Braun  
**Salt Lake:** Jerry L. Goodspeed, Kevin C. Kesler, Marilyn King, N.  
 Jean Kobayashi, Rebecca Low, Joann Mortensen, R. Mark  
 Nelson, Larry A. Sagers  
**San Juan:** James D. Keyes, Ann H. Tatnall  
**Sanpete:** Gary L. Anderson, Mary Lois Madsen  
**Sevier:** Joseph W. Austin, Clyde J. Hurst, Nyle J. Matthews, Diane  
 J. Reese  
**Summit:** Sterling Banks, Faye P. Boyer  
**Tooele:** Wade B. Bitner, Halcyon Robins  
**Uintah:** Ronda H. Olsen, Stuart Parkinson, Ronald B. Sorenson  
**Utah:** Donna Bird, W. Craig Burrell, Steven D. Cox, Brent L.  
 Gledhill, Judy L. Harris, Anthony H. Hatch, Jim C. Jensen, F.  
 Dean Miner, Jeri Winger  
**Wasatch:** Debra G. Proctor, Val D. Warnick  
**Washington:** Kip C. Hansen, Adrian C. Hinton, Mary Ann Page  
**Wayne:** Verl L. Bagley, Carol H. Williams  
**Weber:** James V. Barnhill, Teresa Brooks, Teresa Cooley, Kay L.  
 Evans, Ben L. Tueller  
**Hill Air Force Base:** Trent L. Searle

## Extension Representatives with Colleges

**Agriculture:** Gerald R. Olson  
**Business:** John R. Cragun  
**Education:** Varnell A. Bench  
**Engineering:** Loren R. Anderson  
**Family Life:** Marilyn B. Noyes  
**Humanities, Arts, and Social Sciences:** Joyce A. Kinkead  
**Natural Resources:** Charles W. Gay  
**Science:** Antone H. Bringham

# University Extension

Office in Agricultural Science 209

University Extension includes the Cooperative Extension Service and the Life Span Learning Programs, the latter encompassing the Conference and Institute Division, Class Division, Independent Study (correspondence home-study), evening school, enrichment classes, Uintah Basin Center (Roosevelt), and Southeastern Utah Center (Moab).

## Cooperative Extension Service

The Cooperative Extension Service is sponsored and financed jointly by federal, state, and county governments. There is a Cooperative Extension Service in the land grant institution of each state.

The main functions of the Cooperative Extension Service are to develop leadership, resourcefulness, and initiative; to supply factual information for discovering and solving problems; and to help people become more efficient, increase their income, improve their home and community environment, and raise their standard of living. University Extension takes the findings of research to the people of the state and brings unsolved problems back to the research workers at the University.

Extension programs are planned with the people. The demonstration method of teaching and mass media are used extensively. Group meetings, short courses, and publications are used to supply educational information.

Administrative and some supervisory personnel and subject matter program leaders are located on the USU campus. In addition, a field staff consisting of district supervisors, area specialists, area agents, county agents, home economists, and program aides serve the people in all areas of the state.

The Extension program includes work with both adults and youth.

Major program areas are centered around (1) agriculture, (2) 4-H youth, (3) family living, (4) community development, and (5) international extension.

Central in the function of University Extension is problem solving at the community level. Through research provided by the departments of the University, the community becomes a laboratory in the teaching-learning process. Community problems are extremely varied and complex. Consequently, University Extension educational programs designed to benefit the community require creativity and innovation of the colleges and departments according to their areas of competency.

To carry out this function, Extension programs at Utah State University focus on the knowledge competencies from the appropriate disciplines on four broad areas of concern to people of Utah: physical environment, social environment, economic and industrial development, and education instructional services.

## Life Span Learning Programs

During the past two decades, faculty and administration of the University have strengthened service to residents through the development of the Life Span Learning Programs, a combination of advanced educational philosophy and educational practice. Life Span Learning is a growing concept in higher educational philosophy. It recognizes that learning is necessary and takes place throughout one's life, from adolescence through retirement. Life Span Learning provides opportunities for professional or vocational learning, and also provides for lifelong enrichment through participation in social and cultural programs. Through such programs, persons of

all ages are able to enrich their lives and increase their knowledge without disrupting their employment or life-style.

**Kellogg Life Span Learning Complex.** The W. K. Kellogg foundation and other private funding sources have made it possible to build three new structures, centrally located on the campus, for Life Span Learning Programs. The five-story University Inn is located in an area between the Taggart Student Center and the Agricultural Science Building. The 53,079 square foot, five-story facility contains 75 modern motel-type rooms, two of which are suites, to house those who come to campus for a great variety of new programs.

The 39,143 square foot, three-story Conference Center is located between the Agricultural Science Building and the Library. The spacious conference meeting rooms overlook the beautiful quad area near the intersection of the two major malls serving the campus. The new facilities have been designed to utilize the most modern technology that could be anticipated in conducting educational programs. The conference facilities include twelve meeting rooms ranging from a 400-seat auditorium to small seminar rooms for 10 to 30 people. Administrative offices for Life Span Learning Programs are also located in the Conference Center. Individuals and groups of all ages are encouraged to investigate this expanded resource of Utah State University as a means of pursuing their unique educational goals.

**Conference and Institute Division.** The responsibility for conferences, short courses, symposiums, seminars, and institutes is vested in the Conference and Institute Division of Life Span Learning. The role of this office is to promote, coordinate, and administer conference programs in cooperation with faculty members of the various campus organizations and with individuals and groups outside the University. Noncredit courses and tours are also organized by this office in cooperation with the academic departments of the University.

There are no limitations in terms of age or educational background on the clientele to be served through the Conference and Institute Division. All that is required is a desire to learn. The scope of the program will be as broad as available knowledge resources will permit.

Continuing learners may participate in educational activities for a variety of justifiable reasons, all of which relate to recognized needs for self-improvement, an appetite for intellectual stimulation through social interaction, or simply a desire to know.

**Management Institute.** The Management Institute is an outreach unit of the College of Business with the responsibility of assisting executives, middle managers, supervisors, and professional specialists from all forms of organizations to meet their training and development needs. The institute maintains flexibility in responding to requests of clients. It tailors the length and content of programs, presents them either on or off campus, and conducts them for persons from different organizations or for individuals from a specific organization.

## Continuing Education

A large number of people living in communities or areas remote from the University campus desire to benefit from university training but cannot come to Logan to register for resident courses. For this group, USU provides a liberal program of Continuing Education which includes off-campus classes, Independent Study (correspondence), evening school, and a number of other educational services. USU is a member of the National University Continuing Education Association.

Courses offered by USU are made available to approximately 30 different communities of the state through seven outreach centers of the University. Such courses are offered by the respective academic departments. Off-campus credit courses are equivalent in content hours of class instruction and preparation, and otherwise meet the same prerequisites as comparable classes offered on the University campus.

Classes may meet the requirements for a bachelors degree, as determined by the individual departments and colleges. They also may meet the requirements for a masters degree with approval of the School of Graduate Studies.

All instructors in class division courses are either members of the regular University teaching faculty officially assigned to the teaching project concerned or nonresident members approved by the head of the department and by the college administration.

The registration fees charged for classes conform to regulations of the Board of Regents. Fees may not be less than the on-campus tuition and may be more if warranted by the additional expense of conducting the class off campus.

### **Independent Study**

Many individuals desire organized, systematic instruction but live in isolated areas, or for other reasons cannot meet for class instruction on the University campus or its resident centers. For such individuals, USU provides a liberal offering through a wide variety of Independent Study courses in many departments of the University. This program furnishes an excellent opportunity to students of high school or college level and to adults who desire general education and professional improvement in selected fields.

For admission to college level Independent Study courses, an enrollee must be at least 19 years of age or a high school graduate, or must submit 15 credits of high school work.

High school students demonstrating superior ability may enroll for University credit courses.

As many as one-fourth of the credits necessary for a bachelors degree may be earned by completing Independent Study courses (45 credits). Each college of the University, subject to faculty approval, determines the nature and amount of Independent Study credit accepted for admission and graduation. In no case is Independent Study credit to comprise more than 25 percent of the total number of credits accepted for graduation.

**Graduation Deadline.** Seniors who plan to apply Independent Study credits toward graduation in any one year must have their courses completed by May 1, so that lessons and examinations may be evaluated and credit filed in the Office of Admissions and Records two weeks prior to the day of graduation.

An enrollee is allowed one year from the registration date in which to complete a course. An extension of time may be granted upon payment of a small fee. Students who qualify for federal student aid must finish Independent Study courses within a designated quarter.

**Fees.** A fee of \$35 per credit is charged for Independent Study courses of college level. High school course fees are \$60 per credit and \$45 per half credit. All fees are subject to change.

**Independent Study Catalog.** Anyone interested in Independent Study may request a catalog containing complete information concerning this program by writing to the Independent Study Division, Utah State University, Logan, Utah 84322-5000, or phone 750-2132.

### **Evening School**

The Evening School provides a source of continuing education for those students unable to attend classes on the regular University schedule. In reality, the Evening School is an extension of the daytime program at USU. The classes and faculty are the same, and the credit is the same as if it were earned during the day.

As a convenience to students, course work has been combined into one class period per week. For example: students can take a three-credit course one evening a week, or one class Friday evening and one Saturday morning as part of the weekend college concept.

Further information can be obtained by contacting the Evening School staff in room 102 of the Eccles Conference Center or by calling 750-2075.

### **Enrichment Classes**

These noncredit classes are available through the Extension Class Division of the University. An example of classes includes ballet, ceramics, woodworking, banjo, guitar, home repair, horseshoeing, income tax preparation, karate, photography, sign language, swimming, gymnastics, women's body conditioning, auto body repair, small engine repair, tennis, golf, and many others. Classes are held during evening hours for the convenience of University employees, students, and townspeople desiring to participate in the program. For information, contact the Enrichment Class Office, Computer Center, Room 201, or phone 750-2079.

### **Uintah Basin Center for Continuing Education**

USU established a Continuing Education Center in the Uintah Basin at the beginning of fall quarter 1967.

A program of seminars, short courses, undergraduate, and graduate courses is offered in several communities located in Uintah, Duchesne, and Daggett Counties.

The Uintah Basin Center office is located at Roosevelt, Utah.

### **Southeastern Utah Center (Moab)**

The state legislature authorized funds for the establishment of the Southeastern Utah Center effective July 1, 1969.

Major objectives of the programs include implementing a series of lower division undergraduate credit courses, a limited program of upper division and graduate classes, fine arts programs, seminars, short courses, and lecture series.

# University Research

**Vice President for Research:** Bartell C. Jensen  
Office in Main 127

**Associate Vice President for Research:** Lawrence H. Piette

## Research Programs

**Utah Agricultural Experiment Station:** Director H. Paul Rasmussen  
**Engineering Experiment Station:** Director A. Bruce Bishop  
**Utah Center for Water Resources Research:** Director L. Douglas James  
**Utah Water Research Laboratory:** Director L. Douglas James  
**Ecology Center:** Director Frederic H. Wagner  
**Center for Atmospheric and Space Sciences:** Director Robert W. Schunk  
**Space Dynamics Laboratory:** President Bartell C. Jensen  
**Developmental Center for Handicapped Persons:** Director Marvin G. Fifield  
**Bureau of Research Services, College of Education:** James P. Shaver  
**Institute of Political Economy:** Director Randy T. Simmons  
**Economics Research Institute:** Director Herbert H. Fullerton  
**Institute for Land Rehabilitation:** Co-directors James P. Dobrowolski and Christopher A. Call

## Research Supporting Activities

**Computer Services:** Director Karl A. Fugal  
**Contract and Grant Office:** Director M. Kay Jeppesen

## Research Committees

**University Research Council:** Chairman Bartell C. Jensen  
**University Safety Committee:** Chairman O. Harry Otteson  
**Radiological Safety Committee:** Acting Chairman LeGrande C. Ellis  
**Committee on Experimental Animals:** Chairman Stanley D. Allen  
**Committee on Human Subjects:** Chairman Reed P. Warren  
**Recombinant DNA Committee:** Chairman Robert W. Sidwell  
**Indirect Cost Waiver Committee:** Secretary M. Kay Jeppesen  
**Computing Advisory Committee:** Chairman Bartell C. Jensen  
**State Arboretum at Utah State University:** Mary E. Barkworth

## Cooperative Research Units

**Utah Cooperative Fish and Wildlife Research Unit:** John A. Bissonette  
**USDA Forestry Sciences Laboratory:** Roy C. Sidle

USU was among the first of the colleges and universities in the intermountain area to have a research program. Originally research was principally in agriculture. Now research projects are in every college and almost every department of the University.

Research is closely associated with teaching and student activities. Most research is conducted by staff members who also teach.

Many graduate and undergraduate students are employed to assist in research. The experience thus gained by students is an important part of their education.

Research affiliated with the University is under the general administration of the Vice President for Research. Actual research operations are conducted in colleges and departments and within the research units designated above.

Research stipends are available for many graduate students within the several colleges and research units. Opportunities exist for multidisciplinary programs through such units as the Ecology Center, the Center for Atmospheric and Space Sciences, the Agricultural Experiment Station, the Institute for Land Rehabilitation, the Center for Biotechnology, and the Center for Water Resources Research. There are numerous well-equipped laboratories such as the Utah Water Research Laboratory, the Space Dynamics Laboratory, the Developmental Center for Handicapped Persons, the many facilities of the Agricultural Experiment Station, and in Biology and Natural Resources.

Policies on research and requests for support are reviewed by the University Research Council. Present members of the council and the area each represents are: Bartell C. Jensen, chairman; Karen W. Morse, Provost; M. K. Jeppesen, Contract and Grant Office; Robert W. Schunk, Center for Atmospheric and Space Sciences; Doyle J. Matthews, Agriculture; David B. Stephens, Business; James P. Shaver, Bureau of Research Services; Oral L. Ballam, Education; A. Bruce Bishop, Engineering; Bonita W. Wyse, Family Life; Robert A. Hoover, Humanities, Arts and Social Sciences; Joseph A. Chapman, Natural Resources; James A. MacMahon, Science; Lawrence H. Piette, School of Graduate Studies; H. Paul Rasmussen, Agricultural Experiment Station; L. Douglas James, Utah Water Research Laboratory; Allan J. Steed, Space Dynamics Laboratory; Frederic H. Wagner, Ecology Center; Marvin G. Fifield, Developmental Center for Handicapped Persons; Gardiner S. Stiles, Faculty Senate; and two student members.

## Division of

## University Research

**Vice President for Research:** Bartell C. Jensen  
Office in Main 127

The policy of the University is to encourage and support research and all forms of creative, scholarly activities by staff members. Much of the research is supported by funds directly assigned to various administrative units of the University. Unrestricted funds for general support of research are administered through the Division of Research.

The Division of Research serves as a coordinating center for all research associated with the University. General policies and procedures pertaining to research and the promotion of a coordinated research program is the responsibility of the University Research Council.

## Agricultural Experiment Station

**Director:** H. Paul Rasmussen  
Office in Agricultural Science 225

The Agricultural Experiment Station, a major division of the University, was established in 1888 when the territorial legislature passed a bill creating Utah Agricultural College and Utah Agricultural Experiment Station. It is commissioned by state and federal legislative acts to conduct the research needed to conserve and manage natural resources; to produce, prepare, and market food and fiber; and to develop and improve rural living.

The Experiment Station fulfills its responsibilities with over 130 full- or part-time professional staff members located in 14 departments of the University. The staff includes about 35 employees of the U.S. Department of Agriculture who collaborate in agricultural research activities. A large number of undergraduate and graduate students are employed on a part-time basis to assist with the research.

The Experiment Station investigations include over 200 research projects, ranging from applied field tests to fundamental research under controlled laboratory conditions.

Experiment Station research is periodically reviewed by advisory committees representing all of the agricultural industries. These committees evaluate the research progress and recommend areas for further study.

Most of the research facilities of the Experiment Station are on the USU campus, distributed in various University buildings. In addition the Experiment Station operates 12 permanent farms and associated research facilities distributed throughout the state. Field tests and studies of industries and communities are conducted on a short-term basis at more than 100 other locations each year.

## **Engineering Experiment Station**

**Director:** A. Bruce Bishop  
Office in Engineering Class 110B

The Engineering Experiment Station, as part of the College of Engineering, has the broad purpose of furthering engineering sciences; engineering, research, design, and development; and engineering education. The station was established in 1918 by the Board of Trustees and is financed by mineral lease funds and federal, state, and industrial grants.

The director of the Engineering Experiment Station, the engineering department heads, and the individual faculty members share the responsibility to develop engineering research programs to advance knowledge and to serve the needs of the state and the nation. Interdisciplinary programs are encouraged. Financial support and professional training for graduate and undergraduate students are provided in the research programs.

Faculty members with similar and complementary talents have organized into working groups which appropriately identify their areas of research. The mutual stimulation and organizational visibility thus achieved aids in mounting effective attacks on engineering problems encountered by the state and nation. Some of the recent areas of research in the Engineering Experiment Station include irrigation and water management, toxic and hazardous wastes management, risk assessment, transportation, structural systems, geotechnical analysis and buried structures, CAD/CAM, robotics and automation, thermal systems, image processing and compression, computer networking, and parallel computing.

## **Utah Center for Water Resources Research (UCWRR)**

**Director:** L. Douglas James  
**Associate Director:** David S. Bowles  
**Assistant Director:** R. Ryan Dupont

**Council Members:** A. Bruce Bishop, Chair; Joseph A. Chapman, Robert A. Hoover, L. Douglas James, Bartell C. Jensen, James A. MacMahon, Doyle J. Matthews, H. Paul Rasmussen, Frederic H. Wagner  
Office in Utah Water Research Laboratory

Purposes of the Utah Center for Water Resources Research are to (1) provide University-wide coordination of water resources research, (2) administer the State Water Research Institute Program funded through the U.S. Geological Survey at USU for the state of Utah, and (3) foster interdepartmental research and educational programs in water resources.

The governing body for the Utah Center for Water Resources Research is a council composed of the deans of the Colleges of Agriculture, Engineering, Natural Resources, Science, and Humanities, Arts and Social Sciences; directors of the Utah Agricultural Experiment Station, Utah Water Research Laboratory, and Ecology Center; and Vice President for Research.

To foster interaction of the water research programs at USU with state needs, a Citizen Advisory Council for Water Resources Research has been established. The 17-member council has representatives from various economic sectors and water professionals as well as those in administrative policy-making roles. The Citizen Advisory Council serves both the UWRL and the UCWRR.

All University faculty engaged in water resources education or research are considered associates of the center. The center promotes and coordinates the development of research and instructional programs that will further the training of water resource scientists and engineers. It maintains liaison relationships with appropriate state, national, and international organizations and agencies having similar objectives.

## **Utah Water Research Laboratory (UWRL)**

**Director:** L. Douglas James  
**Associate Director:** David S. Bowles  
**Assistant Director:** R. Ryan Dupont

The Utah Water Research Laboratory houses one of the finest facilities in the country for research in hydraulics, environmental engineering, hazardous waste management, water resources, and hydrology. Campus-wide interactions give all of these programs a strong interdisciplinary flavor that few other programs can match. The building provides more than 102,000 square feet of research space that is intensively used for a wide variety of studies. The faculty, students, and technical support personnel connected formally or informally with the laboratory (totaling approximately 250 individuals working on about 100 projects during 1990) provide and train a breadth and depth of expertise important for water resources management in the state, nation, and world.

**Facilities.** The hydraulic testing facilities employ flows up to 180 cfs on model studies served by a variety of flumes, channels, pumps, pipelines, weighing tanks, and supporting instrumentation. Environmental research is served by gas chromatographs, high pressure liquid chromatographs, a gas chromatograph/mass spectrophotometer, an ion chromatograph, a liquid scintillation counter, an atomic absorption spectrophotometer, an inductively coupled plasma emission spectrophotometer, and microscopy, bioassay, Ames test, and toxicity testing capabilities. Computer facilities provide real time data collection, and sophisticated instrumentation has been developed for atmospheric water resources research.

**Program and Staff.** The laboratory serves as the research arm to many agencies that encounter water problems, and it conducts research on a wide variety of problems affecting agricultural, municipal, industrial, and recreational users of water. Both basic and applied research are joined in practical problem solving.

A diversified staff of internationally recognized experts conducts multidisciplinary studies in surface and groundwater management. The expert teams draw from engineering, chemistry, biology, meteorology, sociology, economics, political science, and other fields. The research program addresses hazardous waste management, groundwater development, water supply and systems operation optimization, water resources planning at the river basin scale, cavitation, flow transients, hydraulic structure design, use of satellite data in hydrologic analysis, risk-benefit assessment, effects of climate change, and water education in public schools.

**Academic and Research Liaison.** The Utah Water Research Laboratory and the Utah Center for Water Resources Research have the same Citizen Advisory Council. Research at UWRL is closely coupled to academic programs through graduate research and joint appointments for professorial staff who have teaching assignments in academic departments.

UWRL assistance helps students in both a training and financial sense. The "tutorial" relationship between student and professor develops experience in research methods and introduces fresh new ideas about real world problems into the formal training programs of water scientists and engineers. During the 1990 fiscal year, approximately 100 graduate students received over \$500,000 in research assistantships and completed some outstanding studies.

## **Center for Atmospheric and Space Sciences**

**Director:** Robert W. Schunk  
Office in SER 246  
**Dean of Science:** James A. MacMahon

The Center for Atmospheric and Space Sciences is recognized both nationally and internationally for its research programs. Through this interdisciplinary center, research is conducted by faculty and student teams in many widely varied areas of atmospheric and space sciences and associated disciplines.

Students are encouraged to actively participate in solving research related problems. Research assistantships are available to both undergraduate and graduate students (PhD and Masters level) under the direction of faculty members associated with the center. The degrees are awarded by the associated departments. These departments include: Chemistry and Biochemistry, Electrical Engineering, Physics, and Plants, Soils, and Biome-teology.

## **Space Dynamics Laboratory**

**President:** Bartell Jensen  
**Vice President:** Doran J. Baker  
**Division Directors:**  
**Systems Division:** Allan J. Steed  
**Science Division:** James C. Ulwick  
**Foundation Division:** Kent W. Henderson

Utah State University's Space Dynamics Laboratory (SDL) is recognized as one of the nation's unique and vital resources in space research, conducting programs which are

primarily directed toward increasing mankind's understanding of the nature of earth and space. This research presents students with unparalleled opportunities for hands-on training in state-of-the-art space research in conjunction with their academic studies, and provides the academic groundwork for the next generation of space engineers and scientists.

Areas of expertise at the Space Dynamics Laboratory include conception and design of cryogenically-cooled infrared sensors; engineering of instrumentation systems for operation aboard rockets, satellites, and aircraft; modeling of the dynamics of the mesosphere; measurement of upper atmospheric and space phenomena; processing and analysis of spectrally- and spatially-imaged, remotely-sensed optical data; and cooperative observation programs with visiting faculty/student and scientific teams from around the globe at remote sites and at USU's Bear Lake Observatory.

## ***Developmental Center for Handicapped Persons***

**Director:** Marvin G. Fifield

Office in Developmental Center for Handicapped Persons 111

The Utah State University affiliated Developmental Center for Handicapped Persons (DCHP) is one of approximately 53 such centers located in major universities throughout the United States. The mission of the DCHP is to improve the quality of life of persons with disabilities by (1) providing interdisciplinary training to personnel needed to provide the broad spectrum of services for individuals with disabilities; (2) demonstrating exemplary service and delivery systems in rural and remote areas; (3) conducting research projects which will provide additional knowledge and application of materials, strategies, and techniques for the developmentally disabled; and (4) providing technical assistance and training to the various service agencies to expand and improve the quality of service that they provide.

The DCHP is located on the University campus in a facility constructed specifically for the program. Various training and service activities are undertaken not only in the facility itself but in several affiliated service centers.

The faculty and staff of the DCHP consist of specialists from a variety of disciplines, including special education, psychology, social work, medicine, instructional technology, early education, and vocational rehabilitation. Students come to the center from a variety of university academic departments, and the center provides supplemental course work, research, and practicum experience to prepare students to better meet the needs of individuals with disabilities.

The center is governed by a Board of Directors appointed by the University President and is organized into seven divisions: Exemplary Services, Interdisciplinary Training, Outreach and Development, Biomedical Research and Service, Research and Evaluation, Technical Assistance, and Technology. The center employs approximately 200 professionals and classified employees in its many training, research, and service projects. Clients with disabilities (infants through adults) are served directly in day-service programs, and training is provided to more than 1,000 University students each year. Over 3,000 employees of service agencies in the state and region receive in-service training through workshops and seminars provided by the DCHP each year.

Major research activities include the application of artificial intelligence in decision making and services for individuals with developmental disabilities, early intervention services for preschool handicapped and at risk children, the effects of the immune system on Down syndrome and autism, development of staff training programs utilizing interactive videodiscs, and program development and research in Assistive Technology.

## ***Bureau of Research Services, College of Education***

**Chairman:** James P. Shaver

Office in Emma Eccles Jones Education 453

The College of Education maintains a Bureau of Research Services which (1) provides research assistance to faculty and graduate students in the College of Education; (2) assists faculty and students in locating off-campus funding for projects; (3) assists faculty and students in preparing research and other program proposals; (4) advises the dean and departments on research matters; and (5) represents the college on the University Research Council and on other research-related committees.

## ***Institute of Political Economy***

**Director:** Randy T. Simmons

Office in Main 342F

The Institute of Political Economy (IPE) is a research institute at Utah State University. IPE supports basic research and disseminates results through books, articles, seminars, and conferences.

The purpose of IPE is to promote a greater understanding of ideas and policies that advance and sustain a free society. This work is concentrated in three areas: the environment, private and public management, and political philosophy.

The audience for IPE's work is broader than academia. It includes the news media, politicians, government employees, think tanks, and the general public.

The outreach efforts of IPE contribute fresh insights to policy debates. IPE's research projects provide challenging opportunities for students, faculty, and researchers. In studying and promoting policies based on the principles of a free society, IPE searches out faculty and students with research interests and involves them in IPE projects.

## ***Economics Research Institute***

**Director:** Herbert H. Fullerton

Office in Business 607

The Economics Research Institute promotes and coordinates research on economic and related problems. The institute serves as a clearinghouse for ideas and methods related to research. Seminars and conferences stimulate faculty and student interest. Members of the Department of Economics and others who work in affiliated areas coordinate their work through the institute and receive assistance in planning research and in seeking financial support from agencies interested in their areas of research. A research study papers series is produced by the institute reporting on research, conferences, and seminars sponsored by the institute.

## ***Ecology Center***

**Director:** Frederic H. Wagner

Office in Natural Resources 110B

The function of the Ecology Center is to promote and coordinate research and graduate study in the science of ecology, and to provide professional ecological advice to decision makers. Its participating faculty members hold tenure in the Colleges of Agriculture, Natural Resources, and Science, and the Departments of Biology, Fisheries and Wildlife, Forest Resources, Geography and Earth Resources, Geology, Plants, Soils, and Biometeorology, and Range Science.

Development of the Ecology Center recognizes that ecology is a multidisciplinary field, requiring the coordination of biology and earth sciences. The objectives of the center are to (1) promote and support ecological research; (2) coordinate course instruction and graduate training in ecology; (3) provide an interdisciplinary focus for graduate majors in ecology; and (4) provide information and professional ecological advice for decision makers in areas affecting the environment.

About 60 faculty members actively associate with the center by participating in some aspect of ecological research or training. Although research and instruction take place in a number of states and foreign countries, the northern third of Utah provides the proximal outdoor laboratory. This includes such facilities as the Bear Lake Biological Laboratory, the USU School Forest and its supporting facilities, the Green Canyon Ecology Station, the Logan River Biology Laboratories, and the Snowville Ecology Station. It embraces a wide variety of habitat types ranging from the alpine zone to salt desert, and both aquatic and terrestrial systems.

## ***Utah Cooperative***

### ***Fish and Wildlife Research Unit***

**Leader:** John A. Bissonette

**Assistant Leader Fisheries:** Timothy C. Modde

**Assistant Leader Wildlife:** Thomas C. Edwards

**Fisheries Biologist:** Cheryl Courtney

Office in Natural Resources 115

The Utah Cooperative Wildlife Research Unit was initiated in 1935 through a memorandum of understanding among the University, Utah Division of Wildlife Resources, Wildlife Management Institute, and the U.S. Fish and Wildlife Service and was one of the first ten wildlife units established in the U.S. The Utah Cooperative Fishery Research Unit was established at USU in December of 1961, the first of 25 such units in the United States. In December of 1984, the two units were combined through a memorandum of understanding among all cooperators. A coordinating committee, composed of representatives from the Department of Fisheries and Wildlife, U.S. Fish and Wildlife Service, the Wildlife Management Institute, and Utah State Division of Wildlife Resources, provides general guidance on the research program.

The unit's objectives are to (1) conduct research basic to proper utilization of fish and wildlife resources; (2) train students in fish and wildlife management, research demonstration, and administration; (3) promote fish and wildlife education through demonstration, lecture, and publication; and (4) make results of investigations available to cooperators and the public.



At the present time the fishery research program emphasis is on (1) responses of fish populations to alterations of the aquatic environment; (2) behavior and habitat requirements of fish and aquatic invertebrates; (3) manipulation of undesirable fish populations; (4) genetic studies of fish populations; and (5) threatened and endangered species.

Wildlife emphasis is given to training in conservation biology; landscape ecology; responses of vertebrate populations to environmental perturbation; habitat requirements of nongame and threatened and endangered avian species; and conservation education. In addition to the regular cooperators, funding, equipment, and supervision are obtained from other state conservation agencies, as well as from U.S. government bureaus and departments.

### *Institute for Land Rehabilitation*

**Co-directors:** J. P. Dobrowski and C. A. Call  
**Office in:** Biology-Natural Resources 181

The Institute for Land Rehabilitation provides a research service to public and private concerns in all aspects of land rehabilitation. It also works to increase interest and participation in land rehabilitation problems and research by University faculty and to increase off-campus visibility of the institute and its associates.

The institute currently has more than 50 associates from 15 departments campus-wide. Brochures summarizing their research are periodically updated and available from the co-directors. To further achieve its objectives, the institute sponsors workshops, symposia, and shortcourses with regional participation. It serves as a focal point for research efforts, and disseminates information to its associates about grants, meetings, and publications pertinent to reclamation. Finally, the institute serves students by seeking and providing information about jobs and graduate research funding.

The institute resides in the Department of Range Science, College of Natural Resources. It is administered by two co-directors and an advisory panel of institute associates.

### *USDA Forestry Sciences Laboratory*

**Office in:** Forestry Sciences Laboratory

The Forestry Sciences Laboratory is a research branch of the USDA Forest Service. At Utah State University, it is comprised of a Reclamation of Disturbed Lands Research Unit, scientists attached to other Forest Service units, and graduate students. A support unit containing a business manager and clerical personnel is housed at the laboratory to handle all of the business management activities of the laboratory.

General objectives at the laboratory are to perform research relevant to disturbed land reclamation, erosion and water quality, and plant/environmental relationships. Specific research includes studies in hydrology, plant physiology, cumulative watershed effects, ecological succession, revegetation, and soil and water chemistry.

The professional fields represented at the laboratory at Utah State University include plant physiologists, ecologists, hydrologists, and soil scientists.

### *Computer Services*

**Director:** Karl A. Fugal  
**Office in:** Computer Center 120

The Office of Computer Services (the Computer Center) provides computing facilities and services for teaching, research, and administrative uses. The centralized equipment provided for use by students, faculty, and staff includes two IBM 4300 series systems, a VAX 8650, and associated peripheral devices including a CalComp 1043GT eight pen plotter. More than 345 microcomputers located in six public areas are dedicated for student use.

In addition to the above equipment, other computers are provided for special uses. A Micro VAX II computer is dedicated to administrative computing, a Micro VAX III is dedicated to the English Writing Program, and a VAX 11/750 and a Harris 800 serve the Center for Atmospheric and Space Sciences. The Library's card catalog holdings are accessible on-line from a GEAC computer. All of these facilities are connected to a MICOM data switch, which in turn connects to 470 terminals and 30 dial-in modems.

Computer Services maintains network connections to major national and international networks. These facilities provide supercomputer access, data transfer, and electronic mail service to and from nearly every major research university in the free world.

A Computer Services staff of 31 full-time and 25 part-time employees serves diverse user needs. The center offers data entry, plotting and scanning services, and maintains two self-service terminal/microcomputer areas open to all students and staff. Canned computer programs for statistical data analyses, e.g., SAS, SPSS, MINITAB, and mathematical subroutines such as IMSL, are maintained and user consultation is available.

Computer Services periodically offers short courses on computer related skills—computer programming, using canned programs, and using peripheral equipment.

User guides and newsletters are published. All students are entitled to a computer account which, in most cases, is sufficient for meeting their yearly educational computing expenditures. The student pays a part of the costs incurred through a fee collected at registration time.

### *State Arboretum at Utah State University*

In 1961 the Utah State Legislature officially designated Utah State University as a state arboretum. The arboretum covers the entire campus and contains more than 3,000 trees. The arboretum also contains a collection of native and adapted plants located north of Old Main Hill and a native plant demonstration garden between the wings of the Edith Bowen Laboratory School. Various shrub species and colorful displays of bulbs, annuals, and perennials provide additional beauty as well as interest to the campus.

The USU campus serves as an educational resource for teaching programs of the University and the community at large.

Students studying biology, horticulture, agronomy, forestry, and landscape architecture utilize the arboretum year-round to further develop a knowledge and appreciation for plants in the landscape.

### *Institute for Social Science Research on Natural Resources*

**Leader:** Richard S. Krannich  
**Office in:** Main 216G

The Institute for Social Science Research on Natural Resources is a research unit established to facilitate and promote faculty and student research on a wide variety of social science research topics pertaining to the interrelations between human social systems and natural resource systems. Examples of recent and ongoing projects involving affiliated faculty and student researchers include studies of the social impacts of large-scale energy resource developments; social and cultural consequences of nuclear waste repository siting; community responses to a transfer of water resources from agricultural to industrial use; social factors influencing earthquake preparedness and response; and public perceptions and attitudes toward wildlife resources. Although the institute is housed within the Department of Sociology, Social Work and Anthropology, its goal is to encourage multidisciplinary research on human aspects of natural resource issues involving faculty and students from across the University.

### *Biotechnology Center*

**Director:** Steven D. Aust  
**Office in:** Biotechnology 105C

The Biotechnology Center was established in 1986 to serve the University with biotechnology services and laboratories to foster the development of biotechnology at USU. The center is supported by the Office of the Vice President for Research and the Agricultural Experiment Station. The center is advised by committees of department heads, the director of the Agricultural Experiment Station, and the deans of the Colleges of Agriculture and Science.

The center is housed in a new, modern building. It contains a monoclonal antibody service laboratory with associated animal rooms, a fermentation service laboratory, and a macromolecular synthesis and analysis laboratory. The latter contains instruments for peptide sequencing and synthesis, amino acid analysis, and oligonucleotide synthesis by phosphoramidite chemistry and polymerase chain reaction. The services are available for a modest fee. The building will also provide modern laboratory facilities for 12 scientists and approximately 80 technicians, graduate students, and postdoctoral fellows.

The Biotechnology Center also provides research funds for University scientists through a competitive Biotechnology Grant Program. The purpose of the Biotechnology Grant Program is to help researchers compete for external funding by providing support for initial research. The Biotechnology Center can also assist in technology transfer; the marketing of innovations developed at USU. Although any promising technology may be pursued, the University has considerable strength in the areas of plant biochemistry, animal viruses, and the environment.

The Biotechnology Center is staffed by the director, who is assisted by the center manager and various technical and staff assistants. Faculty pursuing biotechnology research projects at the center have their academic appointments at any of the various University departments.

The director, the service laboratories, and research faculty provide research and employment opportunities for undergraduate students who serve as laboratory aides. Undergraduates may also register for research problems in their curriculum and work in the Biotechnology Center.

# International Programs and Studies

**Director, International Programs and Studies:** Morris D. Whitaker  
Office in Military Science 216, telephone 750-1840

**Leader, International Extension Programs:** David L. Rogers  
**Director, International Institute of Range Management:** Charles W. Gay

**Director, International Irrigation Center:** Gaylord V. Skogerboe

Utah State University is one of the institutions of the federal system of land grant colleges in the United States. Much of its experience and development has made it a leader in the areas associated with arid and irrigated agriculture, forestry, range, plant, and animal science.

The University is recognized for its expertise, both nationally and internationally. In addition to its teaching, research, and dissemination of information functions, staff members have been and are presently involved as consultants to private industry, land development corporations, fertilizer companies, private consulting firms, government agencies, and research groups, both at home and abroad.

Utah State University has a history of involvement in international programs dating back to the early 1930's. University personnel have worked in development programs in many of the developing nations of the world. In recent years Utah State University has been involved with work in Bangladesh, Bolivia, Brazil, Cameroon, Cape Verde, Colombia, Ecuador, Egypt, El Salvador, Gambia, Honduras, Iran, Kenya, Morocco, Peru, Senegal, Somalia, Sudan, Tanzania, Upper Volta, and Venezuela. Current involvement includes: Brazil, Dominican Republic, Ecuador, Egypt, India, Lesotho, Morocco, Nepal, and Pakistan.

## USAID/USU Memorandum of Understanding (MOU) and Program Support Grant (PSG)

**Principal Investigator:** Morris D. Whitaker  
**Advisory Committee:** Joseph A. Chapman, Bartell C. Jensen, R. Paul Larsen, A. Bruce Bishop, Robert A. Hoover, Doyle J. Matthews, Val R. Christensen

USU and USAID entered into a special MOU in 1983 in which USU agrees to provide long-term support to USAID programs in water management and irrigation, natural resources, arid land agriculture and livestock, and development policy and administration. In return, USAID agrees to provide sustained support for 18 USU faculty in the above areas through other contracts and grants, and to provide a PSG of up to \$300,000 per year. The MOU and PSG each have a five-year life which is extended for one year after annual review.

## USAID/USU Foreign Participant Training

**Coordinator:** Lucy Ann Thompson

USU cooperates with FAO and USAID through the U.S. Department of Agriculture as well as with other sponsoring agencies to develop special academic and practical programs for foreign students nominated by these agencies.

For those foreign students who come to Utah State University through a contractual agreement (under auspices of a sponsoring agency) that requires Utah State University to provide administrative arrangements not provided to other students, an administrative fee is charged (currently \$175 per quarter).

## USAID/USU Rangeland Research for Increasing Small Ruminant Production (Morocco—SR-CRSP)

**Coordinator:** Brien E. Norton  
**Co-principal Investigator:** Frederick D. Provenza

The purpose of this project is rangeland research and training to increase productivity of sheep and goats and build scientific capabilities of researchers in developing countries (Morocco).

## USAID/USU/Dominican Republic Development of Technical Support Services for On-farm Water Management

**Coordinator:** Lyman S. Willardson  
**Team Leader:** Humberto L. Yap-Salinas

This project emphasizes development of farmer organizations and training of in-country personnel who will work directly with team members in data collection, analysis, and in pilot demonstrations for improved on-farm water management. The Dominican technical personnel will then use their experience in other existing irrigation projects that need organizational and water management improvement.

## USAID/USU/CID/Nepal Institute of Agriculture and Animal Science

**Coordinator:** James H. Thomas

USU is assisting the Tribhuvan University's Institute of Agriculture and Animal Science at Rampur in Chitwan Province to develop curriculum, faculty, and improved administrative procedures.

## Harza Engineering/USAID/USU/India Water Resources Systems Planning and Management

**Coordinator:** David S. Bowles

The purpose of this project is to provide assistance and practical training for water resource planners in India, technical assistance with applications of the systems approach to water resources planning, and some graduate work in the U.S.

## College of Engineering (International Irrigation Center)/ Institut Agronomique et Veterinaire Hassan II, Morocco; Centre de l'Irrigation International, Morocco

**Liaison:** Gaylord V. Skogerboe

A memorandum of understanding was signed by the president of USU and the director of IAV in 1985 to establish a center in Morocco and collaborate in providing irrigation short-courses and doing applied research. USAID/WMS II provided some institutional support. One course was provided in 1986, two were provided in 1987 (in conjunction with the XIII Congress of the International Commission on Irrigation and Drainage) and three courses were provided in 1988. Client focus is Africa and Near East/Asia.

## USU International Irrigation Center

**Director:** Gaylord V. Skogerboe

The Agricultural and Irrigation Engineering Department is engaged in an extensive program of international irrigation technology transfer and is contributing significantly

to the alleviation of the world hunger problem through multi-lingual training and research in irrigation and drainage. The International Irrigation Center has been organized to provide an appropriate entity within which to sponsor these ongoing training activities.

### **The USU Institute for International Rural and Community Development**

**Director:** Mark W. Lusk  
**Associate Director:** Brad W. Parlin

The institute coordinates the international development activities of Utah State University's social sciences faculty. Its main objective is to actively participate in overseas research, extension, teaching, and curriculum development. Acting as a funding center for over two dozen development specialists, the institute is able to design, execute, evaluate, or assist international development projects from an interdisciplinary base.

### **Consortium for International Development**

Utah State University is a member of the Consortium for International Development, which was incorporated in Utah in 1972 and is a continuation of the founding organization known as CUSUSWASH, which dates back to 1967. A legal nonprofit corporation, the consortium is concerned with the orderly development of increased world food production and nutrition.

The consortium brings together the expertise of 11 universities located in the western United States. In addition to USU, member universities are California State Polytechnic University/Pomona, Colorado State University, University of Hawaii, New Mexico State University, Oregon State University, Texas Tech University, University of Arizona, University of Idaho, Washington State University, and University of Wyoming.

The consortium is governed by a Board of Trustees, with two trustees appointed by the president of each member institution. The board defines the policy and guidelines and has delegated the implementation and management of the consortium to an executive director, secretary/treasurer, and appropriate staff.

### **AID/USU Joint Career Corps Agreement**

**Principal Investigator:** Morris W. Whitaker

USU has an agreement with the Agency for International Development which permits senior experienced personnel from USU and AID to be interchanged for periods

up to three years. Under mutual agreements, USU receives AID employees who serve as faculty and/or advisers, and AID receives USU faculty in Washington or USAID missions as technical, advisory, and administrative employees.

### **Egypt Water Research Center Project USAID/CID/CSU/USU**

**Coordinator:** David S. Bowles

The purpose of this cooperative project is to provide technical assistance and training at the 11 institutes for water research in Egypt. Degree and nondegree programs will be offered both in Egypt and in the U.S.

### **Harza Engineering/Egypt/USAID/USU Main Systems Management for Irrigation**

**Coordinator:** J. Paul Riley  
**Training Specialist:** C. Earl Israelsen

This project provides technical assistance, staff training, and expertise in hardware and software computer capabilities for a telemetry system for water management of the Main Systems of the Nile River in Irrigation.

### **Dames and Moore/Senegal/USU/USAID**

**Coordinator:** J. Paul Riley

USU is providing technical assistance to assist Senegal in providing schedules of user fees for the Senegal River Basin Development Scheme.

### **Thailand/USU/AID**

**Coordinator:** Loren R. Anderson

This research project in the use of reinforced steel configurations to retain soil and/or to prevent soil/fill movement will continue for several years as assistance is needed by the agency in Thailand.

# University Relations

## Vice President for University Relations and Development:

William F. Lye  
Office in Main 102

## Assistant to Vice President for University Relations: Janet L.

Appuhn

Good teaching, sound research, practical services performed well, and productive students and alumni are USU's chief means of public relations.

However, as a public, tax-assisted institution, the University has the responsibility of keeping the public informed as to its operation. The Office of University Relations assumes this responsibility and plans and executes a wide variety of programs and projects designed to maintain contact between the University and the various publics which it serves.

## USU Development Office

**Executive Director:** Thomas L. Allen, CFRE

**Associate Director:** Kerry R. Belnap, CFRE

**Director of Donor Relations and Records:** Shirley C. Keyes

**Director/Development, Annual Fund:** Thomas A. Dyson

Student tuition and fees pay only 10 percent of USU's operating budget and state support provides only 36 percent. The remaining 54 percent must come from other sources. Private contributions provide a small but very important part of the cost of an accessible education of high quality at "the people's University."

USU's Development Office was established in 1967 to seek private contributions. For many years the generosity of USU's alumni and friends has vastly enhanced USU's teaching, research, and service. Contributions to Utah State University are recognized through membership in various donor clubs, including the prestigious Old Main Society.

For further information on how to establish a scholarship, endow a program, make a planned gift, join the Pooled Income Fund, or contribute real or personal property to the University, contact: **The USU Development Office, Main 101, Logan, UT 84322-1420, tel. (801) 750-1320.**

The Development Office also maintains alumni and donor records. Any changes or corrections may be sent to the above address.

## University Alumni Association

**President:** Gary Blacker

**Director of Alumni Relations:** Jay Haws

Office in the Alumni House

The Utah State University Alumni Association now numbers more than 100,000 members. This membership includes all who have attended USU for one quarter or more or who have served on the staff of the University.

**Purpose:** It is the purpose of the Alumni Association to promote the interests and welfare of Utah State University.

**Government:** The governance of the association is vested in the Alumni Council, composed of at least 15 approved members and ex officio members. The president of the Associated Students organization is a member of the council. The president of the Alumni Association is a member of the Utah State University Institutional Council. Under the direction of the Alumni Council, the USU Emeriti, Golden Anniversary Club, a Young Alumni Committee, and a Student-Alumni Association sponsor activities for their various constituencies.

**Function:** The Alumni Association is the medium through which former students maintain contact with the University and are served after leaving the campus. Efforts are made to maintain a complete record of every former student throughout life, and his or her accomplishments and progress are recorded. Former students receive the *Outlook* newspaper, an official publication of USU, full of news and reports on the University. The association maintains alumni volunteers and chapter organizations in major areas where former students are located. Through the association, former students are kept in contact with each other, and they meet and participate in business and social activities. They likewise assist the University with special projects in their areas.

The Alumni Association takes the leadership in sponsoring such campus events as Homecoming, Distinguished Service Awards, Founder's Day, reunions, Aggie Lagoon Day, and Christmas Dinner at the Manor House, as well as aiding in athletic and other school events.

**Alumni Association-Library Trust Fund** is a special fund which has been established by the association. This fund was established from popular subscriptions. Earnings from the fund are given to the University library to aid in the purchase of books which ordinarily could not be bought from the regular library budget.

## Nora Eccles Harrison Museum of Art

**Director and Chief Curator:** Steven W. Rosen

The Nora Eccles Harrison Museum of Art, opened in 1982, is the center for the visual arts on the University's campus and in the Northern Utah Region. Permanent collections of American sculpture, ceramics, paintings, graphic arts, photographs, and Southwestern Indian arts emphasize the breadth of artistic expression and art history in the western United States during the last 100 years. Selections from the permanent acquisitions are always on view and changed periodically to reflect the growth of the collection. Regularly scheduled national and international temporary exhibitions, films, lectures, artist talks, and educational programs provide added dimensions to the museum's presentation and interpretation of the visual arts.

The Nora Eccles Harrison Museum was made possible through an insightful and generous donation from the Nora Eccles Treadwell Foundation. The landmark building which houses the museum was designed by the internationally acclaimed architect, Edward Larabee

Barnes, and includes 12,000 square feet for exhibitions and 15,000 square feet for storage, study, research, workshops, and offices.

As part of Utah State University, the museum provides professional educational opportunities for undergraduate and graduate students, through on-the-job training and independent study. Students participate in all aspects of museum management, collections' care, exhibition planning, public-program development, and other activities directly related to professional employment in a museum. Both scientific and historical research and publication are an integral part of the museum. Students, faculty, and other scholars pursue projects which are relevant to the museum's collections and exhibitions. Through its public programs, the museum also fulfills the need for broad-based education about the visual arts for a larger regional constituency.

For more information, write or call: Nora Eccles Harrison Museum of Art, Utah State University, Logan, Utah 84322-4020, (801) 750-1412.

## ***University Information Services***

**Director of Information Services:** J R Allred  
Office in Information Services 105

**Broadcast News Writer/Producer:** Robin Sterns  
**Feature Writer:** John S. Flannery  
**Fine Arts Writer and News Editor II:** R. Patrick Williams  
**Research/Science Writer:** Jillyn Carpenter  
**Writer/Editor of Outlook:** Clifford R. Cahoon  
**Writer/Editor of Staff News:** Linda E. Keith  
**Agricultural Information Specialist:** To be appointed  
**Consumer Information Specialist:** Dennis L. Hinkamp

Information Services disseminates information daily and weekly through the press, radio, and television. It includes articles on research and news of general campus events.

# ***Affirmative Action/Equal Opportunity Programs***

**Acting Director:** Patricia M. Constance  
Office in Main 255

It is the policy of Utah State University to ensure equal educational and employment opportunity regardless of race, color, religion, age, national origin, sex, marital, parental, handicapped, or veteran status. Beyond this, Utah State University is committed to the implementation of a vigorous Affirmative Action Program, as required by Executive Order 11246.

A major objective of the Affirmative Action/Equal Opportunity Programs is the achievement of an equitable distribution of ethnic minorities and women at all levels of faculty and staff employment. To accomplish this, the Affirmative Action/Equal Opportunity Office works with University departments, which are responsible for employing, recruiting, and promoting qualified members of pro-

Liaison between the University and the news media is maintained by this office.

Information Services publishes *Outlook* and *Staff News*. *Outlook* is a newspaper devoted to reporting information about Utah State University to alumni, parents, and other friends of the institution. *Staff News* is a weekly newsletter distributed to University employees.

## ***University Publications Editors***

**University Catalog Editor and Publication Specialist/Editorial:**  
Sheri E. Peterson

**University Extension Services Editor:** Donna Falkenberg

**Agricultural Experiment Station Editor:** Kurt W. Gutknecht  
**Media Specialist:** Gary L. Neuenswander

**USU Press and Scholarly Publications Director:** Linda Speth  
**Managing Editor:** Nikki Naiser-Hedlund

**Utah Water Research Laboratory Editor:** Colleen A. Riley

**Space Dynamics Laboratory Managing Editor:** Glenn D. Allred

**Sports Information Editor:** W. Craig Hislop

**Outlook Editor:** Clifford R. Cahoon

**Staff News Editor:** Linda E. Keith

**The Statesman Adviser:** Jay C. Wamsley

**Western American Literature Editor:** Thomas J. Lyon

**The Western Historical Quarterly Editor:** Clyde A. Milner, II

**Associate Editor:** Anne M. Butler

**Copy Editor:** Ona W. Siporin

**Journal of the Council of Writing Program Administrators**  
**Editor:** Christine Hult

**The Writing Center Journal Editor:** Joyce A. Kinhead

tected groups, and ensures that all University employment policies and practices are nondiscriminatory.

The Affirmative Action/Equal Opportunity Office is also responsible for equal educational opportunity in compliance with Title VI of the Civil Rights Act, Title IX of the Education Amendments Act, and Section 504 of the Rehabilitation Act. The Affirmative Action/Equal Opportunity staff works with all academic colleges and other major units on campus in furthering the University's goal of equal access to all educational programs.

Additionally, the Affirmative Action/Equal Opportunity Office is responsible for the preliminary investigation of equal opportunity and affirmative action complaints brought to it and for the resolution of these complaints whenever possible. Persons who feel they have been discriminated against are encouraged to call 750-1266.

Copies of the complete Affirmative Action Program are available in the Personnel Services Office and the Affirmative Action/Equal Opportunity Office.



# *Administration and Faculty*

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# Utah State Board of Regents

Douglas S. Foxley *Salt Lake City, Chairman*  
 Steven E. Snow *Washington, Vice Chairman*  
 Charles W. Bullen *Logan*  
 Aileen H. Clyde *Springville*  
 Ian M. Cumming *Salt Lake City*  
 John B. Goddard *Ogden*  
 Robert D. Hales *Salt Lake City*  
 Karen H. Huntsman *Salt Lake City*

Jon E. Jordan *Bountiful*  
 Michael O. Leavitt *Salt Lake City*  
 Evelyn B. Lee *Salt Lake City*  
 Clifford S. LeFevre *Clearfield*  
 Paul S. Rogers *Orem*  
 Fred H. Stringham *Bountiful*  
 Jay B. Taggart *Ogden*  
 Dale O. Zabriskie *Salt Lake City*

William Rolfe Kerr *Provo, Commissioner*

## USU Institutional Council

Kenneth G. Anderton *Vernal, Chairman*  
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 J. Clark Ballard *Hurricane*  
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 Gary Blacker *Ogden*

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 Frank Maughan, Jr. *Ogden*  
 Tad Sorenson *North Logan*  
 C. Booth Wallentine *Salt Lake City*

Lee H. Burke *Logan, Secretary to the Council*

## Administration

Stanford Cazier *President of the University*

Karen W. Morse *Provost*  
 Brian L. Pitcher *Associate Provost*  
 C. Blythe Ahlstrom *Assistant Provost*

Lee H. Burke *Assistant to the President for Government Relations*  
 Robert D. Barclay *Assistant to the President for Legal Affairs*

Evan N. Stevenson *Vice President for Administrative Affairs*  
 R. Paul Larsen *Vice President for Extension and Continuing Education*  
 Bartell C. Jensen *Vice President for Research*  
 Val R. Christensen *Vice President for Student Services*  
 William F. Lye *Vice President for University Relations and Development*

Doyle J. Matthews *Dean, College of Agriculture*  
 David B. Stephens *Dean, College of Business*  
 Oral L. Ballam *Dean, College of Education*  
 A. Bruce Bishop *Dean, College of Engineering*  
 Bonita W. Wyse *Dean, College of Family Life*  
 Robert A. Hoover *Dean, College of Humanities, Arts and Social Sciences*  
 Joseph A. Chapman *Dean, College of Natural Resources*  
 James A. MacMahon *Dean, College of Science*  
 Lawrence H. Piette *Dean, School of Graduate Studies*  
 James P. Shaver *Acting Dean, School of Graduate Studies (9/1/90 to 8/31/91)*



# Departments of Instruction

## Department

Accountancy, School of  
Aerospace Studies  
Agricultural and Irrigation Engineering  
Agricultural Education  
Animal, Dairy and Veterinary Sciences  
Art  
Biology  
Business Administration  
Business Information Systems and Education  
Chemistry and Biochemistry  
Civil and Environmental Engineering  
Communication  
Communicative Disorders  
Computer Science  
Economics  
Electrical Engineering  
Elementary Education  
English  
Family and Human Development  
Fisheries and Wildlife  
Forest Resources  
Geography and Earth Resources  
Geology  
Health, Physical Education and Recreation  
History  
Home Economics and Consumer Education  
Industrial Technology and Education  
Instructional Technology  
Intensive English Language Institute  
Landscape Architecture and Environmental Planning  
Languages and Philosophy  
Management and Human Resources  
Mathematics and Statistics  
Mechanical and Aerospace Engineering  
Military Science  
Music  
Nutrition and Food Sciences  
Physics  
Plants, Soils, and Biometeorology  
Political Science  
Psychology  
Range Science  
Secondary Education  
Sociology, Social Work and Anthropology  
Special Education  
Theatre Arts

## Head

Clifford R. Skousen  
Lt. Colonel Stephen B. Sniteman  
Wynn R. Walker  
Weldon S. Sleight  
Robert C. Lamb, acting  
Marion R. Hyde  
John R. Simmons  
Philip R. Swensen  
Lloyd W. Bartholome  
Vernon D. Parker  
William J. Grenney  
Scott A. Chisholm  
Thomas S. Johnson  
Donald H. Cooley  
Donald L. Snyder  
Richard W. Harris  
Jay A. Monson  
Jeffrey Smitten  
Jay D. Schvaneveldt  
Raymond D. Dueser  
To be appointed  
Derrick J. Thom  
Donald W. Fiesinger  
Robert E. Sorenson  
R. Edward Glatfelter  
Jane L. McCullough  
Maurice G. Thomas  
Don C. Smellie  
Susan J. Carkin  
Richard E. Toth  
Kent E. Robson  
John R. Cragun  
L. Duane Loveland  
Alma P. Moser  
Lt. Colonel Gary L. Tucker  
F. Dean Madsen  
Rodney J. Brown  
W. John Raitt  
H. Grant Vest  
William L. Furlong  
Michael R. Bertoch  
John C. Malechek  
Izar A. Martinez, acting  
Michael B. Toney  
Charles L. Salzberg  
Sidney G. Perkes  
Colin B. Johnson (acting 9/90 to 5/91)

## Office Building

Business 515  
Military Science 107  
Engineering Class 216  
Agricultural Science 218  
Agricultural Science 230  
Fine Arts Visual 120  
Biology-Natural Resources 119  
Business 811  
Business 711  
Maeser Laboratory 106  
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Science Engineering Research 250A  
Agricultural Science 322C  
Main 256  
Education 487E  
Natural Resources 210  
Education 330C  
Main 220  
Education 313A  
Fine Arts 232

# Faculty and Professional Staff

**ABDOU, WEDAD A.** (1986) Adjunct Asst. Prof., Physics. BS 1960 Alexandria University, DIC 1963 Imperial College (London), PhD 1967 Exeter University.

**ABOUMAHMOUD, REYAD** (1988) Visiting Prof., Nutrition and Food Sciences. BS 1970 University of Cairo, MS 1977 Brigham Young University, PhD 1981 Utah State University.

**ACKERMAN, NORLEEN** (1985) Asst. Prof., Home Economics and Consumer Education. BS 1956, MA 1971, PhD 1977 Michigan State University.

**ACSAI, JANINE** (1989) Postdoctoral Fellow, Biology. BS 1978, MA 1981 Humboldt State University, PhD 1987 Colorado State University.

**ADAMS, GENE W.** (1981) Research Prof., Center for Atmospheric and Space Sciences, Physics, Electrical Engineering. BS 1960 Texas A&M, MS 1962 University of New Hampshire, PhD 1973 University of Colorado.

**ADAMS, GERALD ROBERT** (1975) Prof., Family and Human Development. BS 1968 Midland College, MA 1971 University of Nebraska, PhD 1975 Pennsylvania State University.

**ADAMSON, KATHLEEN A.** (1975, 1979) Asst. Director, Career Placement and Cooperative Education. BS 1965 University of Utah, MS 1987 Utah State University.

**ADJIMANI, JONATHAN PARTT** (1990) Research Associate, Chemistry and Biochemistry. BS 1979 University of Science/Technology, MS 1984 Brock University (Canada), PhD 1987 Utah State University.

**AFLATOONI, KIAN** (1987) Adjunct Asst. Prof., Civil and Environmental Engineering. BS 1979, MS 1981 University of Nebraska.

**AGRAN, KRYSTAL A.** (1988) Supervisor—Media Services, Developmental Center for Handicapped Persons. BA 1985 Utah State University.

**AGRAN, MARTIN** (1982) Research and Training Specialist, Developmental Center for Handicapped Persons; Assoc. Prof., Special Education. BA 1969 City College of New York, MA 1971 University of Rochester, MS 1976 Western Oregon State College, PhD 1984 University of Illinois.

**AHLSTROM, C. BLYTHE** (1964, 1979) Assistant Provost; Adjunct Asst. Prof., History. BS 1958, MS 1961 Columbia University.

**ALBRECHTSEN, RULON S.** (1969) Prof., Plants, Soils, and Biometeorology. BS 1956, MS 1957 Utah State University, PhD 1965 Purdue University.

**ALDEN, MERIDITH** (1985) Adjunct Prof., Psychology. BA 1971 University of North Carolina, PhD 1976 University of Tennessee, MD 1979 Duke University.

**ALDER, JEAN M.** (1970) Ext. Asst. Prof. and Home Economics Agent, University Extension. BED 1964 University of Alaska, MS 1967 Utah State University.

**ALDONS, ADRIENNE** (1988) Adjunct Clinical Lecturer, Nutrition and Food Sciences. BS 1986 University of Utah, MS 1988 Case Western Reserve University.

**ALLAN, STEPHEN J.** (1986) Assoc. Prof., Computer Science. BS 1973 Utah State University, MS 1976, PhD 1979 Iowa State University.

**ALLAN, VICKI H.** (1986) Asst. Prof., Computer Science. BS 1973 Utah State University, MS 1984, PhD 1986 Colorado State University.

**ALLEN, GEORGE J.** (1961) Budget Director, Budget Office. BS 1950 University of Utah, MBA 1963 Utah State University.

**ALLEN, GERALD L.** (1961) Supervisor, KUSU-FM Radio, Telecommunications; Assoc. Prof., Communication. BS 1960, MS 1965 Utah State University.

**ALLEN, J. WHORTON** (1964) Asst. Prof., Psychology; Director, Counseling Services, Student Services. BS 1955 Brigham Young University, EdD 1969 Utah State University.

**ALLEN, LEE NEIL** (1985) Research/Extension Engineer, Agricultural and Irrigation Engineering. BS 1979, MS 1980 Utah State University.

**ALLEN, MICHAEL FRED** (1988) Adjunct Asst. Prof., Biology. BS 1974 Southwestern College, MS 1977, PhD 1980 University of Wyoming.

**ALLEN, RICHARD G.** (1985) Asst. Prof., Agricultural and Irrigation Engineering. BS 1974 Iowa State University, MS 1977, PhD 1984 University of Idaho.

**ALLEN, RICKEY GENE** (1979) Director of Accounting and Financial Reporting, Controllers Office. BS 1974 Utah State University.

**ALLEN, ROSS R.** (1966) Prof., Secondary Education. BS 1952, MS 1955, EdD 1962 University of Utah.

**ALLEN, STANLEY D.** (1979) Prof., Animal, Dairy and Veterinary Sciences; Chairman, Committee on Experimental Animals. BS 1967 Utah State University, DVM 1971 Iowa State University.

**ALLEN, THOMAS L.** (1987) Program Consultant to the Mountain West Center for Regional Studies, History; Executive Director, Institutional Development. BJ 1969 University of Missouri.

**ALLRED, DOUGLAS M.** (1990) Specialist, Developmental Center for Handicapped Persons. BS 1984, MS 1988 Utah State University.

**ALLRED, GLENN D.** (1970) Managing Editor, Systems Division, Space Dynamics Laboratory. BFA 1968 University of Utah.

**ALLRED, JR** (1958) Director, Information Services; Asst. Prof., Communication. BA 1950 University of Utah, MS 1964 Colorado State University.

**ALLRED, MICHAEL D.** (1990) Ext. Instr. and Ext. Agent (Water Quality), University Extension. BS 1990 Utah State University.

**AL-RASHID, NAZIH T.** (1988) Director of Special Services, Academic Support Services; Adjunct Asst. Prof., Sociology, Social Work and Anthropology. BA 1965 Baghdad University, MS 1979, PhD 1984 Utah State University.

**ALSOP, TED J.** (1984) Assoc. Prof., Geography and Earth Resources. BS 1973, MS 1976 University of Utah, PhD 1980 Oregon State University.

**ALSTON, DIANE G.** (1989) Asst. Prof. and Ext. Specialist (Entomology), Biology. BS 1982 University of California (Riverside), MS 1985, PhD 1989 North Carolina State University.

**ALTHOUSE, RICHARD BRAD** (1987) Knowledge Engineer, Developmental Center for Handicapped Persons; Adjunct Instr., Computer Science. BS 1981, BS 1982 Pennsylvania State University, MS 1986 Utah State University.

**ALVORD, JACK RAY** (1987) Adjunct Assoc. Prof., Psychology. BA 1966 University of Missouri, MS 1968, PhD 1969 Utah State University.

**AMANO, GARY** (1975) Asst. Dept. Head and Prof., Music. BS 1971, MA 1972 Julliard School of Music.

**ANDERSEN, JAY C.** (1964) Prof. and Ext. Specialist, Economics. BS 1953, MS 1958 Utah State University, PhD 1962 Iowa State University.

**ANDERSON, ALAN** (1989) Specialist, Auxilliary Enterprises, Administrative Affairs.

**ANDERSON, ANNE J.** (1979) Prof., Biology. BS 1967 Bedford College, PhD 1979 University of Leicester.

**ANDERSON, DAVID M. "ANDY"** (1983) Senior Lecturer, Biology. BA 1971 University of Pacific, MS 1975 Iowa State University, PhD 1983 Creighton University.

**ANDERSON, GALE R.** (1985) Director of Intercollegiate Athletic Development, Development Office and Athletics. BS 1968 Brigham Young University.

**ANDERSON, GARY L.** (1983) Ext. Asst. Prof. and Sanpete County Agent (Agriculture), University Extension. BS 1971 Utah State University.

**ANDERSON, IAN MacDONALD** (1979) Prof., Mathematics and Statistics. MMath 1974 University of Waterloo (Ontario), PhD 1976 University of Arizona.

**ANDERSON, J. LAMAR** (1961) Prof., Plants, Soils, and Biometeorology. BS 1955 Utah State University, PhD 1961 University of Wisconsin.

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**ANDERSON, JANET ELAINE ALM** (1986) Asst. Librarian, Library Services, Merrill Library and Learning Resources Program. BS 1975 Bemidji State University, MA 1981, MSLS 1982 Western Kentucky University.

**ANDERSON, JAY** (1985) Prof., History and English; Director, Ronald V. Jensen Living Historical Farm. BA 1963 Hamilton College, MA 1969, PhD 1971 University of Pennsylvania.

**ANDERSON, JON I.** (1964) Prof., Art. BPA 1955 Art Center School, MFA 1968 Utah State University.

**ANDERSON, LOREN RUNAR** (1974) Assoc. Dean and Ext. Program Leader, College of Engineering; Prof., Civil and Environmental Engineering. BS 1964, PhD 1972 Utah State University, PE.

**ANDERSON, MELVIN J.** (1986) Research Assoc. Prof., Animal, Dairy and Veterinary Sciences. BS 1950 Utah State University, MS 1957, PhD 1959 Cornell University.

**ANDERSON, OWEN A.** (1989) Acting Supervising Teacher, USU Children's House, BA 1987, MS 1989 Utah State University.

**ANDRA, THEODORE** (1961) Asst. Prof. and Director of Undergraduate Studies, English. BS 1961, MA 1963 Utah State University, DA 1973 University of Oregon.

**ANDRUS, J. MILO** (1985) Adjunct Prof., Psychology. BS 1965 Stanford University, MD 1970 George Washington Medical School.

**APPUHN, JANET L.** (1989) Asst. to Vice President for University Relations. BS 1969, MS 1973 Southern Illinois University.

**ARAMBEL, MICHAEL J.** (1982) Assoc. Prof., Animal, Dairy and Veterinary Sciences. BS 1977, MS 1979 Washington State University, PhD 1982 Kansas State University.

**ARAVE, CLIVE WENDELL** (1965) Assoc. Prof., Animal, Dairy and Veterinary Sciences. BS 1956, MS 1957 Utah State University, PhD 1963 University of California (Davis).

**ARAVE, LARRY E.** (1981) Director, University Police.

**ARBUTHNOT, JEANETTE J.** (1988) Asst. Prof., Home Economics and Consumer Education. BS 1980 Florida International University, MS 1984 Colorado State University, PhD 1990 Oklahoma State University.

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**ARMSTRONG, VAHN** (1987) Adjunct Assoc. Prof., Music. BS 1979, MS 1982 Juilliard School of Music.

**ARNETT, DAVID B.** (1988) Asst. Prof., English. AB 1972 Kenyon College, MA 1973 University of Virginia, PhD 1987 University of Michigan.

**ARROWOOD, MICHAEL JAMES** (1989) Postdoctoral Fellow, Animal, Dairy and Veterinary Sciences. BS 1980 Southern Arkansas University, MS 1982 Louisiana Tech. University, PhD 1988 University of Arizona.

**ASCIONE, FRANK R.** (1973) Assoc. Prof., Psychology and Developmental Center for Handicapped Persons; Adjunct Assoc. Prof., Family and Human Development. BS 1969 Georgetown University, PhD 1973 University of North Carolina.

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**ASHURST, CHARLES A.** (1987) Electrical Engineer, Range Science. BS 1980 Utah State University.

**ASTON, D. CRAIG** (1983) Lecturer, Plants, Soils, and Biometeorology. BS 1981, MS 1982 Utah State University.

**ATKIN, THOMAS E.** (1986) Adjunct Asst. Prof., Psychology. BA 1976, MS 1980 Utah State University, PsyD 1985 Indiana State University.

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**ATKINSON, SHERWIN J.** (1958) Research Assoc., Animal, Dairy and Veterinary Sciences. BS 1955 Utah State University.

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**AUST, ANN E.** (1987) Research Asst. Prof., Chemistry and Biochemistry. BS 1970 University of Houston, PhD 1975 Michigan State University.

**AUST, STEVEN D.** (1987) Director, Biotechnology Center; Prof., Chemistry and Biochemistry, Nutrition and Food Sciences. BS 1960, MS 1962 Washington State University, PhD 1965 University of Illinois.

**AUSTIN, ANN M. BERGHOUT** (1980) Assoc. Prof., Family and Human Development; Adjunct Assoc. Prof., Psychology. BS 1971, MS 1977 Utah State University, PhD 1981 Iowa State University.

**AUSTIN, JOSEPH WELLS** (1974) Assoc. Prof., Animal, Dairy and Veterinary Sciences; Supervisor, Southwest District, University Extension. BS 1958 Utah State University, MS 1961 University of Tennessee, PhD 1967 Texas A&M University.

**AUSTIN, LEE M.** (1980) Director, KUSU-FM News, Radio Broadcasting, Telecommunications. BS 1978 University of Wisconsin (Oshkosh).

**AUSTIN, LLOYD HALE** (1985) Adjunct Assoc. Prof., Civil and Environmental Engineering. BS 1967, MS 1970 Utah State University.

**AUTRY, JOANN** (1987) Program Administrator, Student Health Services.

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**BABCOCK, WARREN EUGENE** (1981) Assoc. Librarian, Librarian-Reference, Merrill Library and Learning Resources Program. BA 1966, MLS 1968 Brigham Young University, MA 1972 Washington State University.

**BACHELLER, FRANKLIN I.** (1987) Senior Lecturer, Intensive English Language Institute. BA 1965 University of Wisconsin, MA 1977 Southern Illinois University.

**BACHMANN, ROSE MARIE A.** (1979) Secretary to President, President's Office. BA 1970 Utah State University.

**BAER, HELMUT** (1986) Adjunct Prof., Physics. BA 1961 Franklin and Marshall College, MS 1963, PhD 1967 University of Michigan.

**BAER, RICHARD D.** (1976) Specialist—Evaluation/Research, Developmental Center for Handicapped Persons; Lecturer, Special Education; Adjunct Asst. Prof., Psychology. BS 1968 Towson State College, MS 1975, PhD 1978 Utah State University.

**BAER, SHERWIN C.** (1980) Manager, Technical Services, Service Enterprises.

**BAGLEY, CALVIN F.** (1988) Research Associate, Animal, Dairy and Veterinary Sciences. BS 1984, MS 1987 Utah State University.

**BAGLEY, CLELL V.** (1975) Assoc. Prof., Animal, Dairy and Veterinary Sciences; Veterinarian, University Extension. BS 1965 Utah State University, DVM 1968 Colorado State University.

**BAGLEY, JAY M.** (1954) Prof., Utah Water Research Laboratory and Civil and Environmental Engineering. BS 1952, MS 1953 Utah State University, PhD 1964 Stanford University, PE.

**BAGLEY, RANDALL TODD** (1986) Supervisor, Dairy Products Laboratory, Nutrition and Food Sciences. BS 1986 Utah State University.

**BAGLEY, ROYAL A.** (1974) Adjunct Research Prof., Animal, Dairy and Veterinary Sciences. BS 1948, MS 1949 Utah State University, DVM 1953 Colorado State University.

**BAGLEY, VERL L.** (1974) Ext. Asst. Prof. and Wayne County and Piute County Agent, University Extension. BS 1969 Southern Utah State College, MS 1980 Utah State University.

- BAGNELL, KENT W.** (1990) Landscape/Planning Coordinator, Grounds, Roads, and Walks, Physical Plant. BS 1988 Utah State University.
- BAILEY, DEEVON** (1983) Assoc. Prof. and Ext. Specialist, Economics. BA 1979, MA 1980 Utah State University, PhD 1983 Texas A&M University.
- BAILEY, JOHN CHARLES** (1982) Adjunct Assoc. Prof., Biology. BS 1967, MD 1970, MSCM 1976 University of Utah.
- BAKER, DALE C.** (1986) Adjunct Research Prof., Animal, Dairy and Veterinary Sciences. DVM 1973, PhD 1977 Colorado State University.
- BAKER, DORAN J.** (1959) Prof., Electrical Engineering; Adjunct Prof., History. BS 1953, PhD 1956 University of Utah.
- BAKER, FREDERICK ANTHONY, Jr.** (1984) Assoc. Prof., Forest Resources. BS 1975, PhD 1981 University of Minnesota.
- BAKER, KATHY R.** (1987) Executive Assistant, Space Dynamics Laboratory.
- BAKER, KAY D.** (1969) Prof., Electrical Engineering and Physics. BA 1956, MS 1957, PhD 1966 University of Utah.
- BAKKER, JAN** (1977) Assoc. Prof., English. BA 1958, MA 1961 University of Virginia, PhD 1975 University of Tennessee. LWOP spring quarter 1991.
- BALDWIN, JUDY** (1981) Administrative Nurse, Student Health Services. LPN 1963 Utah Trade Tech.
- BALDWIN, MELVIN PAUL** (1983) Supervisor, Business Office, Physical Plant.
- BALLAM, MICHAEL L.** (1987) Assoc. Prof., Music. BA 1972 Utah State University, MM 1974, DM 1976 Indiana University.
- BALLAM, ORAL L.** (1963) Dean, College of Education; Prof., Elementary Education. BS 1949, MS 1955 Utah State University, EdD 1961 University of California (Los Angeles).
- BALLANTYNE, JUDITH M.** (1986) Adjunct Asst. Prof., Geology. BS 1970 University of Canterbury (New Zealand), PhD 1981 University of Utah.
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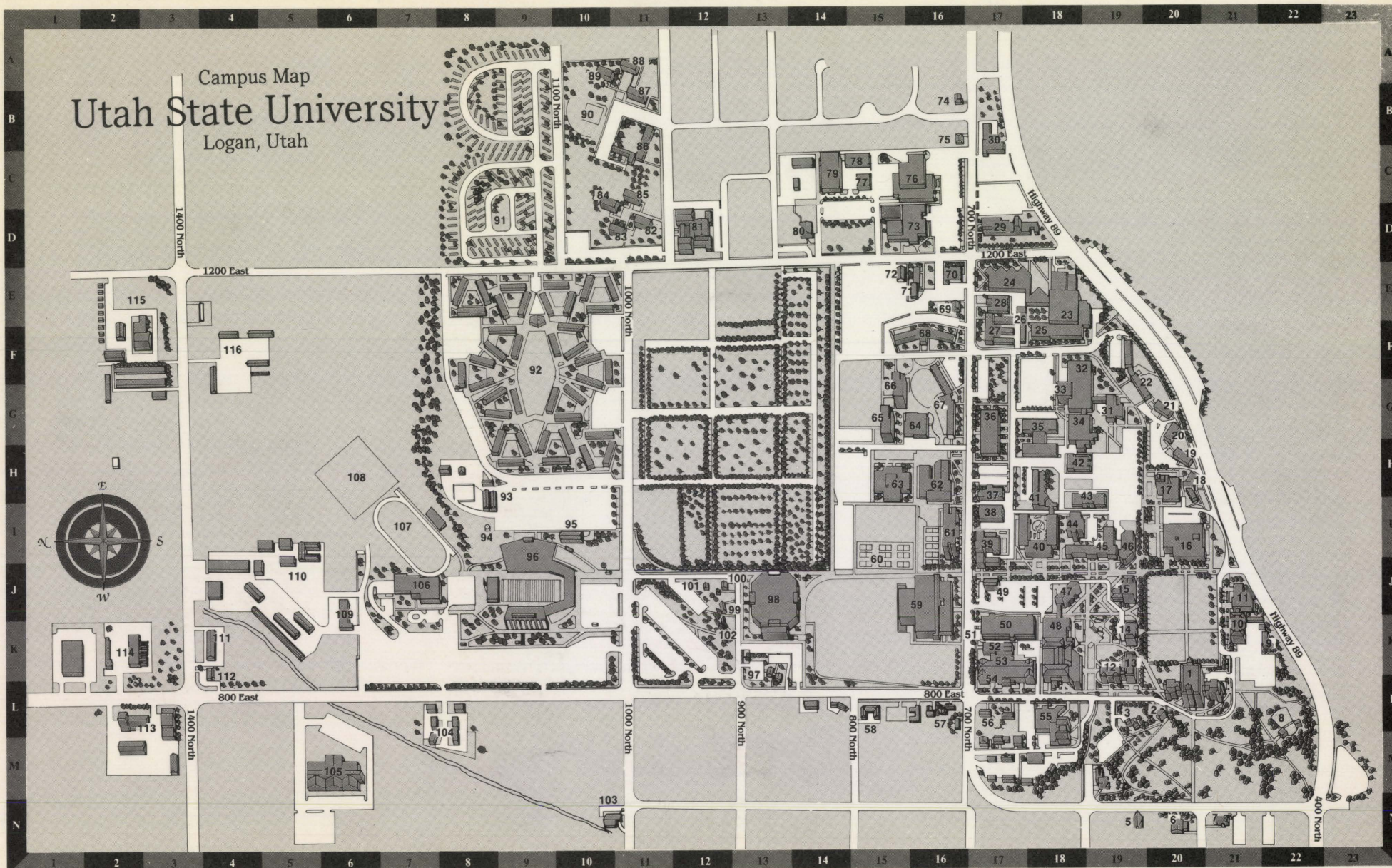
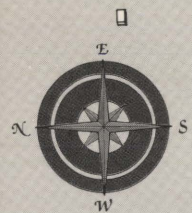
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 Animal Husbandry Experiment Farm-3580 South Highway 89-91  
 Dairy Center (George B. Caine)-4300 South Highway 89-91  
 Drainage Experiment Farm, West Logan  
 Evans Experiment Farm, Nibley  
 Greenville Farm, 1800 North 800 East  
 Historical Farm (Ronald V. Jensen)-4025 South Highway 89-91  
 Horse Arena-1550 North 600 East  
 Lyric Theatre-28 West Center Street  
 Navajo Sheep Project-1600 East 3200 North  
 Poultry Farm-1475 North 800 East  
 Publication Design and Production-1301 North 600 West  
 Richmond Experiment Farm, Richmond  
 USU Research and Technology Park-1780 Research Parkway  
 Utah Water Research Laboratory (George D. Clyde)-1800 Canyon Road



Campus Map  
**Utah State University**  
Logan, Utah







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High School / College Relations Office

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