1966

General Catalog 1966

Utah State University

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UTAH STATE UNIVERSITY

Founded at Logan in 1888

1966-67 Catalog
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Utah State University

Utah State University was founded in 1888 as a part of the public educational system of Utah. It operates under the constitution and laws of the state.

USU belongs to a great family of institutions known as Land-Grant universities, which had their origin in 1862. As a Land-Grant school, it is a university in the fullest and best sense of that word. It offers a rich curriculum in the arts and sciences, in both undergraduate and graduate programs. Degrees granted include the Bachelor of Arts (BA), the Bachelor of Fine Arts (BFA), the Bachelor of Science (BS), the Master of Arts (MA), the Master of Science (MS), several other Master's degrees, Specialist in Educational Administration, the Doctor of Education (EdD), and the Doctor of Philosophy (PhD).

USU includes eight resident colleges with fifty-two departments, a school of graduate studies, extension services, research programs, and one branch college: Snow College at Ephraim. It participates in educational aid to several foreign countries.

The University and all of its departments are fully accredited by the Northwest Association of Secondary and Higher Schools. It is on the accepted list of the Association of American Universities and of the American Association of University Women. It is a member of the American Council on Education and is listed by other accrediting agencies.

A fourteen-member Board of Trustees is the governing body of the University. Twelve are appointed by the Governor and ratified by the State Senate. Two others serve ex-officio: the Secretary of State and the President of the University Alumni Association. The Board elects its chairman and vice-chairman. All members serve without pay.

Dr. Daryl Chase is the tenth president of USU. He was appointed in 1954. Previous presidents, and the year of their appointment, have been as follows: J. W. Sanborn, 1890; J. H. Paul, 1894; J. M. Tanner, 1896; W. J. Kerr, 1900; John A. Widtsoe, 1907; E. G. Peterson, 1916; Franklin S. Harris, 1945; Louis L. Madsen, 1950; and Henry Aldous Dixon, 1953.
Calendar, 1966-67

Summer Quarter, 1966, June 13 to August 19

June 13, 1966, Monday
June 14, Tuesday
July 15, Friday
July 18, Monday
August 19, Friday

Registration
Classwork begins
First session ends
Registration — second session
Summer Quarter ends

Fall Quarter — 1966-67

September 12, Monday
September 21, Wednesday
September 22, Thursday
September 23, Friday
September 24, Saturday
September 26, Monday
October 29, Saturday
November 24, 25
December 9, Friday
December 12, 13, 14, 15
(Monday, Tuesday, Wednesday, Thursday)

Faculty Meeting
Testing for entering freshmen and foreign students English placement
Orientation
New student registration
Former student registration
Classwork begins
Homecoming
Thanksgiving recess
Classwork ends
Final examinations

Winter Quarter — 1966-67

January 3, 4, 1967, Tuesday, Wednesday
January 5, Thursday
March 14, Tuesday
March 15, 16, 17, 18
(Wednesday, Thursday, Friday, Saturday)

Registration
Classwork begins
Classwork ends
Final examinations

Spring Quarter — 1966-67

March 21, 22, Tuesday, Wednesday
May 30, Tuesday
May 29, 31, June 1, 2
(Monday, Wednesday, Thursday, Friday)
June 3, Saturday

Registration
Memorial Day Holiday
Final Examinations
Commencement

Summer Quarter — 1967

June 12, 1967, Monday
June 13, Tuesday

Registration
Classwork begins
### Tuition and Other Fees

The University reserves the right to alter any of these charges without notice.

#### FEES PER QUARTER

<table>
<thead>
<tr>
<th><em>Summer, Fall, Winter, and Spring Quarters</em></th>
<th>Resident</th>
<th>Non-Resident</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tuition and.Registration</strong></td>
<td>$70</td>
<td>$189</td>
</tr>
<tr>
<td><strong>Other Fees</strong></td>
<td>24</td>
<td>24</td>
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<tr>
<td><strong>Total Fees</strong></td>
<td>$94</td>
<td>$213</td>
</tr>
</tbody>
</table>

*Non-Resident (Non-Utah) students pay the Resident Schedule Summer Quarter.

#### SPECIAL FEES

**Health and Accident Insurance:** Students will be required to participate each quarter in a health and accident insurance program unless a written request for exemption is submitted to the University prior to registration. Approximate cost of the insurance will be $6 per student per quarter.

**Excess Registration Fee:** For each excess hour (except two hours of Military Science, Aerospace Studies, or one hour of Physical Education) $10.00. Students may register for 19 hours per quarter without paying excess registration fees.

**Automobile Parking Permit:** $7.50 per year.

**Out-of-State Student Auto Permit:** 50¢

**LATE REGISTRATION FEE:** $5 beginning day following Commencement exercises, $1 per day up to a maximum of $10. A student whose check is dishonored by his bank will be charged the late fee in effect when the check is redeemed.

**Change in Course of Study List:** No charge for the first week of the Quarter. $1 for each change made thereafter.

**Final Deadline for Course Changes:** Course changes, adds or drops, may be made through the third week of the Quarter.

**Special Students—Registration fee** $10.00

- Plus $6 per credit hour (maximum 6 credits)
- Visitor Fee—Registration as listener or visitor in lecture course only in which no credit is desired, per quarter, per subject $10.00

**Special Examination Fee—Per Credit Hour** $4.00

**Qualifying Examination—Graduate School**

<table>
<thead>
<tr>
<th>Part</th>
<th>Fee</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>3.50</td>
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<tr>
<td>2</td>
<td>5.50</td>
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</tbody>
</table>

**Graduation Fee** $5.00

**Late fee of $2 after January 15.**

**Student Teaching Fee** 25.00

**Teacher Placement re-registration** 5.00

**Locker Rental—Fall, Winter and Spring** 1.50

Fifty Cents of this fee is refunded to students upon returning the key accompanied by receipt, prior to the first Friday following Commencement exercises.

**Transcript of Credits.** Each student is entitled to one transcript free. Additional transcript (Extra copies 25c) $1.00

**Transcripts will not be issued unless the money accompanies the order.**

**Progress Report.** Adviser furnished one copy free. Additional copies $25c to 50¢

**Note fee, on individual loans** 2.00

**Cap and Gown Rental—**

- Bachelor of Science 3.00
- Master of Science 6.50
- Master's Degree Fee for binding and proofing thesis 5.00

**College of Humanities and Arts—Students using the language laboratory equipment are required to pay a fee of $2 per course per quarter except Summer Quarter, which is $5.**

**College of Business and Social Sciences—** Students using business machines will be required to pay a fee of $2 per quarter.

**College of Natural Resources—**

- Senior Field problems:
  - Forestry 146 35.00
  - Range 190 30.00
  - Wildlife Management 171 35.00

A minimum excess breakage fee of $5 may be required for Laboratory classes.

**Military Uniform Fee** 5.00

**Music—Individual Instruction with members of the College Staff:**

- Nine lessons per Quarter (1 credit) 30.00

Fees must be paid at beginning of quarter before instruction begins.

**Individual instruction with additional authorized teachers is registered for at the college and given like credit, but paid for by private arrangement with the teacher concerned.**

**Practice Fees:**

- Practice Room with Piano, 1 hour per day per Quarter 2.50
- Practice Room without Piano, 1 hour per day per Quarter 1.75
- Organ, 1 hour per day per quarter 5.00

**Speech—The fee for Speech 112 is $20 per credit hour per quarter, consisting of 10 private lessons. Authorized instructors are:**

- Burrell F. Hansen, Floyd T. Morgan, Gwendella Thornley.
Registration is not complete until students have presented the fee card at the Cashier's Window, office of the Controller, and have paid fees, and filed the registration cards with the Registrar's Office.

Refunds. All fees paid, with the exception of the $10 registration fee, may be refunded to any student in residence who withdraws from school before the end of the seventh week, in proportion that the number of instructional weeks subsequent to withdrawal bears to the number of instructional weeks in the period covered by the fees paid.

Alumni Fees. After a student has paid a total of $30 in Alumni fees he becomes a Life Member of the USU Alumni Association. Graduate Students or students attending more than 12 quarters, and who have been assessed more than the $30 in Alumni fees, may receive a refund of the excess amount upon sending a written request to the USU Alumni Association within 30 days from the registration day of the quarter in which the additional money was paid.

According to the constitution of the Associated Students, a regularly enrolled student must obtain, at time of registration, a Student Body card which will admit him to all activities controlled by the Associated Students: athletic events—football, basketball, tennis and track—dramatics and musical entertainments, socials, lectures, etc. will give him a copy of the yearbook if student body fee was paid for all quarters, and a subscription to the University newspaper. The system has been found to be a great saving to the students and an excellent means of fostering proper interest in student activities.

Information on Scholarships, Fellowships, and Assistantships can be found in the section on Student Services and Activities in this Catalog.

(For Housing Fees see Catalog section on Student Services and Activities.)

(For a more detailed list of Summer Quarter fees consult Summer Quarter Catalog.)
Officers of Administration

Daryl Chase, President
Alan A. Matheson, Assistant to the President
M. R. Merrill, Vice President, Academic Affairs
D. Wynne Thorne, Vice President, Research
Dee A. Broadbent, Vice President, Business
J. Stewart Williams, Dean, School of Graduate Studies
Vearl R. Smith, Dean, College of Agriculture
Robert P. Collier, Dean, College of Business and Social Sciences
John C. Carlisle, Dean, College of Education
Dean F. Peterson, Jr., Dean, College of Engineering, and Chairman, Utah Water Resources Center
Phyllis R. Snow, Dean, College of Family Life
Carlton F. Culmsee, Dean, College of Humanities and Arts
J. Whitney Floyd, Dean, College of Natural Resources
Eldon J. Gardner, Dean, College of Science
Kenneth W. Hill, Director, Agricultural Experiment Station
W. H. Bennett, Director, Extension Services
Vaughn E. Hansen, Director, Utah Water Research Laboratory
Clayton Clark, Director, Engineering Experiment Station
Milton C. Abrams, Librarian
Claude J. Burtenshaw, Dean of Students
L. Mark Neuberger, Dean, Admissions and Records
Sylvan Erickson, Controller
LeRoy A. Blaser, Director, Public Services and Information
Ellvert H. Himes, Director, Summer Quarter
Helen Lundstrom, Dean of Women
B. Austin Haws, Coordinator of Latin American Affairs
Frank Williams, Director of Athletics
## Departments of Instruction

<table>
<thead>
<tr>
<th>Accounting</th>
<th>Norman S. Cannon</th>
<th>Main 131</th>
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<tbody>
<tr>
<td>Aerospace Studies</td>
<td>Roland H. Taylor</td>
<td>Military Science 107</td>
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<tr>
<td>Agricultural Economics</td>
<td>George T. Blanch</td>
<td>Ag Science 230</td>
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<tr>
<td>Agricultural Education</td>
<td>Stanley S. Richardson</td>
<td>Ag Science 110</td>
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<tr>
<td>Agricultural and Irrigation Engineering</td>
<td>A. Alvin Bishop</td>
<td>Engineering C-213</td>
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<td>Animal Science</td>
<td>James A. Bennett</td>
<td>Animal Industry 201</td>
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<td>Applied Statistics and Computer Science</td>
<td>Rex L. Hurst</td>
<td>Main 14</td>
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<tr>
<td>Art</td>
<td>Harrison T. Groutage</td>
<td>UA 205A</td>
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<td>Audiology-Speech Pathology</td>
<td>Samuel G. Fletcher</td>
<td>Mechanic Arts 202</td>
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<td>Bacteriology, Public Health</td>
<td>W. Whitney Smith</td>
<td>Plant Industry 310</td>
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<td>Botany</td>
<td>Orson S. Cannon</td>
<td>Plant Industry 204A</td>
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<tr>
<td>Business Administration</td>
<td>Robert P. Collier (acting)</td>
<td>Main 138A</td>
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<td>Business Education and Office Administration</td>
<td>Ted Ivarie</td>
<td>Main 347</td>
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<td>Chemistry</td>
<td>Melvin C. Cannon</td>
<td>Widtsoe 112</td>
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<td>Civil Engineering</td>
<td>Irving Dunn (acting)</td>
<td>Engineering L-162</td>
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<tr>
<td>Clothing and Textiles</td>
<td>Norma H. Compton</td>
<td>Family Life 303A</td>
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<td>Dairy Science</td>
<td>George E. Stoddard</td>
<td>Animal Industry 106</td>
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<tr>
<td>Economics</td>
<td>Evan B. Murray</td>
<td>Main 322</td>
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<td>Educational Administration</td>
<td>Homer M. Johnson</td>
<td>Education 206C</td>
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<tr>
<td>Electrical Engineering</td>
<td>Larry S. Cole</td>
<td>Engineering L-150</td>
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<td>Elementary Education</td>
<td>E. Malcom Allred</td>
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<td>English and Journalism</td>
<td>King Hendricks</td>
<td>Library</td>
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<td>Family and Child Development</td>
<td>Don C. Carter</td>
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<td>Ethelwyn B. Wilcox</td>
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<tr>
<td>Forest Science</td>
<td>J. Whitney Floyd</td>
<td>Forestry and Zoology 104</td>
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<td>Geology</td>
<td>J. Stewart Williams</td>
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<td>Health, Physical Education and Recreation</td>
<td>H. B. Hunsaker</td>
<td>Gym 306</td>
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<tr>
<td>History</td>
<td>J. Duncan Brite</td>
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<td>Homemaking Education</td>
<td>Virginia H. Harder</td>
<td>Family Life 318</td>
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<td>Household Economics and Management</td>
<td>Edith Nyman</td>
<td>Family Life 314B</td>
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<td>Industrial and Technical Education</td>
<td>Carl R. Bartel</td>
<td>Mechanic Arts 104</td>
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<tr>
<td>Landscape Architecture and Environmental Planning</td>
<td>Burton Taylor</td>
<td>Main 1</td>
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<td>Languages</td>
<td>Austin E. Fife</td>
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<tr>
<td>Manufacturing Engineering</td>
<td>Karl Somers</td>
<td>Mechanic Arts 126</td>
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<td>Mathematics</td>
<td>Neville C. Hunsaker</td>
<td>Engineering C-327</td>
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<td>Mechanical Engineering</td>
<td>Reynold K. Watkins</td>
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<td>Military Science</td>
<td>Bert Perrin</td>
<td>Military Science 102</td>
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<tr>
<td>Music</td>
<td>Max F. Dalby</td>
<td>Music 102A</td>
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<td>Physics</td>
<td>W. Farrell Edwards</td>
<td>Engineering L-154</td>
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<tr>
<td>Plant Science</td>
<td>Frank B. Salisbury</td>
<td>Ag Science 322</td>
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<td>Political Science</td>
<td>M. Judd Harmon</td>
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<td>Psychology</td>
<td>Helmut Hofmann</td>
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<td>Range Science</td>
<td>L. A. Stoddart</td>
<td>Forestry and Zoology 159</td>
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<tr>
<td>Secondary Education</td>
<td>Kenneth Farrer</td>
<td>Education 206B</td>
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<td>Sociology, Social Work and Anthropology</td>
<td>Therel Black</td>
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<td>Soils and Meteorology</td>
<td>Sterling Taylor</td>
<td>Ag Science 148</td>
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<td>Special Education</td>
<td>Helmut Hofmann (acting)</td>
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<td>Speech</td>
<td>Rex E. Robinson</td>
<td>Main 33</td>
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<tr>
<td>Theatre Arts</td>
<td>Twain Tippetts (acting)</td>
<td>Main 305</td>
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<td>Veterinary Science</td>
<td>Merthyr L. Miner</td>
<td>Veterinary Science 104</td>
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<td>Wildlife Resources</td>
<td>William F. Sigler</td>
<td>Forestry and Zoology 163</td>
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<tr>
<td>Zoology</td>
<td>Datus M. Hammond</td>
<td>Forestry and Zoology 117</td>
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</tbody>
</table>
Explanation of

Catalog Numbering System:
Courses, Quarters, Credits

USU operates on a quarterly system—four quarters or periods of classwork: Fall, Winter, Spring, and Summer. Each quarter is of ten to twelve weeks duration. Summer quarter is divided into two sessions, first and second. The other three quarters are not so divided.

Most classes give either one, two, three, four or five credits for successful completion of the course. These credits are frequently referred to as "quarter hours." For example, a class offering five credits is said to be "five quarter hours." As a general rule, a class is attended the same number of times per week as the credits or quarter hours offered. For example, a three-credit or three-hour class generally meets three times a week; a one-hour class, once a week; a five-hour class, five times a week.

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:

4. Elements of Grammar.
That means the course, Elements of Grammar, is English 4. The numbers are useful for reference and records.

Courses numbered 1 through 99 are Lower Division courses; that is courses ordinarily taken either the Freshman or Sophomore year. Courses numbered 100 through 199 are Upper Division courses; that is, courses ordinarily taken either the Junior or Senior year. Courses numbered 200 or above are Graduate courses; that is, courses taken by Graduate students.

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. He may take an Upper Division course if he obtains in advance the consent of the instructor and his adviser.

A Junior or Senior may take any Lower or Upper Division course. Any prerequisites to a course will be mentioned in the course description. He may take certain Graduate courses if he obtains in advance the consent of the instructor and his adviser.

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, the quarter/s it will likely be taught, and the name of the instructor. 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. (5F, W, Sp, Su) indicates that the course offers five credits and will likely be taught all four quarters: Fall, Winter, Spring, and Summer. It does not mean that a student has to take the class all four quarters, but rather
that he has his choice of any quarter. In some cases, such as (3F, W, 3Sp) 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, one should refer to the Class Schedule published early in the fall. It contains the schedule for the fall, winter, and spring quarters.

All catalog listings are subject to change.

Occasionally two or more closely related courses will be listed under one entry, such as English 1, 2, 3. Basic Communication. The credit entry will read: (3F, 3W, 3Sp). That means that each of the three courses, 1., 2., and 3., offers three credits.

Where a single course, for example Music 133. Choir. has such an entry: (1F, 1W, 1Sp) it indicates that the same course may be taken for credit more than just one quarter. Choir, for example, could be taken all three quarters, giving one credit each quarter. Such courses, however, are the exception. The great majority of courses can be taken only once for credit.

In some classes the amount of credit for which students register can be individually arranged. One student may take two hours credit, another student three hours, etc. On such courses the notation appears (Cr. Arr.), meaning the credit is individually arranged, between student and instructor, the amount of credit depending upon the amount of time and effort one wishes to devote to it. Five is the maximum number of credits that may be earned except for a thesis course or unless otherwise specified.

Preceding the number of some courses will be either a single asterisk (*) or a double asterisk (**). Such courses are taught only on alternate years. Those with a single asterisk are taught during the current catalog year; those with a double asterisk are taught the following year. Again, it should be remembered that this may only be tentative; it is well to check the Class Schedule or to consult the course instructor or department head for verification.
UNIVERSITY LIBRARY
The University Library maintains programs consistent with the growth and demands of the University. It is administered independently of any College or sub-division of the University, but it is responsible for uniform services over the entire campus. The organization of the Library is built on a service concept supported by an "open stack" arrangement and a divisional organization. In addition to its divisions, the Library maintains a branch Library which houses the Anne Carroll Moore Collection. A brief description of the divisions of the Library follows:

**Divisions of the Library**

(A) **Science and Engineering.** This division houses both the journal and book collections to serve the Colleges of Science, Engineering, Agriculture, Family Life, and Natural Resources.

(B) **Social Science, Business and Education Division:** Within this division of the Library, are located the library materials which support the programs offered by the College of Business and Social Sciences and the College of Education.

Included within this division is a special library composed of curriculum materials, textbooks and guides, used in the elementary and secondary schools. Although useful to the other colleges, this program is designed primarily to assist the College of Education in teacher preparation.

(C) **Humanities and Fine Arts.** The Division of Humanities and Fine Arts consists of the books and serials that support the departments which make up the College of Humanities and Arts. In addition, the College of Humanities and Arts is responsible for the Liberal Studies program which in turn uses a high percentage of the collection housed in the Humanities Division.

(D) **Public Documents Division.** Utah State University Library is a regional depository of the United States Government Publications. It receives all government publications designated as depository items. In addition to depository items, the Division houses such special government research report series as Joint Publications Research Service Publications, Office of Education Co-operative Research Reports, National Aeronautics and Space Administration Publications, and U.S. Government translations in selected subject areas. The Library can also draw upon the services of many government information services such as those offered by the Library of Congress, National Library of Medicine, and the National Referral Center for Science and Technology.

(E) **Special Collections Division.** The Special Collections Division of the University Library has been created to meet the needs of a continually expanding collection of a variety of related materials. The library is in possession of a sizable...
collection of works which fall into the following categories: first-edition collections of literary authors, rare books, notable authors' complete works, local histories, diaries, manuscripts, Utah State University Archives, and collected works of a special nature. These materials have been acquired over the period of years of the existence of the Library by gift, purchase, and publication by the University. A program is being planned to vigorously pursue the acquisition of further materials for these collections.

The special collections will be housed in closed stacks adjacent to the American Room, where facilities will be provided for research in these materials, and near the Hatch Room which will be administered under the Special Collections Division of the Library as a seminar room. These facilities will be completed as part of the second phase construction of the University Library.

Special Libraries

(A) Anne Carroll Moore Library, in the Edith Bowen Elementary School. A special collection of children's books and a working laboratory for the training school.

Resources of the Library

(a) Approximately 400,000 volumes; (b) 3,000 periodical subscriptions; (c) Regional Depository for United States Government documents; (d) Selective depository for United Nations publications; (e) Exchange holdings of state, territorial, and foreign documents; (f) A growing collection of documentary micro-films and micro-cards.

Teaching Program

The library instructional program serves two functions: (A) It stresses the use of Library resources through cooperation with all teaching and research programs. (B) It provides courses in a separate curriculum in the College of Education. Under this latter program the requirements for a Library certificate issued by the Utah State Department of Public Instruction may be filled. A Library minor may be completed in connection with a major in any field and the courses may be used to meet the Library requirements of the Northwest Association of Secondary and Higher Schools.

Man and His Bread Museum. The history of agriculture is in many ways the history of mankind. The purpose of Man and His Bread Museum is to tell the story of agriculture and the effect that changes in agricultural technology have had on man.
ADMISSIONS AND RECORDS
Office of

Admissions and Records

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Office of Admissions and Records

Dean L. Mark Neuberger; Records Officer Asa L. Beecher; Admissions Counselor Thelma B. Waddoups.
Office in Main 104

The Office of Admissions and Records is the official guardian of all permanent academic records of the University. It performs the following academic services:

1. **Admission of Students**: Interviewing prospective students; evaluation of freshman credentials; evaluation of advanced standing credentials; processing permanent records; student deferments; reports to government agencies.

2. **Registration**: Preparation of registration material (packets); registration procedures.

3. **Records**: Processing registration material; course changes; recording grades; progress reports; transcripts; microfilming.

4. **University Records IBM**.

5. **Scheduling**: Schedule bulletin; assignment of rooms; record of approved courses.

6. **Graduation**: Checking and summarizing graduation requirements.

7. **Veterans' Affairs**.

8. **Statistics**: Periodical reports; special reports.
Admission to Utah State University is granted upon the basis of an official application which includes transcripts of credit from schools previously attended. The Uniform Application for Admission to Utah Collegiate Institutions may be obtained upon request from any Utah high school principal, or from the Office of Admissions and Records of Utah State University.

Students will not be permitted to register until all admission requirements have been met.

Applications for admission and credentials from schools previously attended must be received not later than September 1 for Fall Quarter; December 1 for Winter Quarter; and March 1 for the Spring Quarter.

The standard minimum requirement for admission to any college of the University is graduation from an approved high school in the United States or equivalent training in a country whose educational systems differ from that in the United States.

Testing. All freshmen, including transfer students with less than 45 quarter hours of credit, and all other transfer students who have not completed one full year of freshman English must present the results of the American College Testing Program Examination (ACT) as part of their application for admission to the University.

Test scores may be used as one of the criteria for admission, and they are always used to assist deans, heads of departments, and advisors in placing students in appropriate class sections, advising them concerning course loads, and in helping them with other similar academic decisions. Therefore, test results must be part of the students' application records before they will be issued permits to register.

Testing dates and general information about the ACT Examination may be obtained from high school counselors or by writing to ACT Central Registration Unit, 519 West Sheridan Road, McHenry, Illinois.

In addition to the ACT Examination, new students may be required to complete other types of testing after they arrive on campus. Notification of such specialized tests will be given at freshman orientation.

Graduates of Utah high schools will be admitted to the University if they are entering Utah State directly from high school. Students with grade point averages between 2.0 and 2.2 will be referred to the dean of the college of their choice for consideration. If the dean accepts such students, they will be placed on warned status or probation. Students not acceptable to a college will be admitted to general registration, but such students will be placed on warned status or probation.

Graduates of non-Utah high schools will be accepted in full standing if they present a grade point average of 2.2 or above and are entering Utah State directly from high school. Students who present a grade point average below 2.2 will be referred to the Admissions Committee and will be accepted or rejected on the basis of approved test scores and other information. Required test scores must be provided by the student.

Admission to the University does not imply permission to register for
any course for which there is insufficiency preparation. Deans and department heads may require prerequisites for certain courses.

A candidate for any degree or diploma from any of the colleges of the University must include among the units presented those preparatory courses specified as prerequisites to beginning University courses in the various fields. Students are urged to give serious thought to the selection of a major field of interest. In this regard, they, in cooperation with parents, high school principal or other school adviser, should plan their school program so as to meet the specific requirements for admission. Failure to do this may delay starting work at Utah State University until the prerequisite courses are made up. Not all of the colleges and departments of the University have specified prerequisites, but those which do, have listed them in their college and departmental sections in this catalog.

Even though a student is not a high school graduate, if he is over the age of 18, he may be admitted by presenting satisfactory evidence of ability to do university work. This evidence may be demonstrated by scores on the American College Testing Program (ACT).

General Registration. Students who have been admitted by the University but who do not have permission to enter one of the professional colleges or specialized departments may, with the approval of the Admissions Committee, enroll in the General Registration Unit of the Counseling Service. (See "Low Scholarship and Probation")

Acceptance by the Office of Admissions and Records does not automatically guarantee housing accommodations. Application for University housing should be made to the Student Housing Office, Main 105, or, in the case of LDS accommodations, to David O. McKay Student Living Center, 10th North and 13th East, Logan.

Advanced Placement. USU participates in a program of Advanced Placement with students who graduate from high school and present Advanced Placement Examinations under the following conditions:

(1) Students may receive 12 quarter hours of credit and advanced placement for a composite score of 5, 4, or 3 on any Advanced Placement Examination taken at the completion of a full year course, with class meetings held each day of the school year, organized according to the description published by the Committee on Advanced Placement of the College Entrance Examination Board.

(2) Students who present a composite score of 2 on both parts of an Advanced Placement Examination taken at the completion of a full year course, with class meetings held each day of the school year, organized according to the description published by the Committee on Advanced Placement of the College Entrance Examination Board may be given consideration for Advanced Placement with credit, Advanced Placement without credit, or neither of the above.

(3) USU will recognize Advanced Placement with credit only for those areas which have been established by the College Entrance Examination Board. The basis of consideration shall be the Standardized College Entrance Examination Board Advanced Placement Test.

Transfers from other Colleges. The University does not grant
collegiate credit for high school work in excess of graduation requirements. Transcripts of credit must accompany applications for admission when submitted by students who have attended other collegiate institutions. Transcripts submitted for evaluation become the property of the University, and are not returned. A student who fails to submit transcripts from all institutions, previously attended, is liable to suspension from the University.

Credit will be granted for work of satisfactory grade done in other accredited institutions. Transferred credit may be accepted for satisfaction of specific requirements if satisfactory evidence is presented that the work completed is equivalent to the work to be substituted.

The University accepts transfer credit from junior college programs up to and including 108 quarter hours. A transfer student who presents an associate degree from an accredited junior college which requires essentially the same general education program as Utah State University, and who satisfied those general education requirements, will be considered to have fulfilled the institutional group requirements. (Some curricula, as in the professional colleges, do not include these group requirements). He must still comply with the specific requirements of the college and major department in which he expects to earn his bachelor's degree and must complete not fewer than 60 quarter hours of upper division work.

Students who transfer to Utah State University after having had one or more quarters of college work at another accredited institution will be accepted in good standing if they have a cumulative grade point average of 2.2 or better.

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 will be admitted to general registration if they have earned fewer than 135 quarter hours of credit.

Exceptions may be made by the Admissions Committee. ACT test scores, the recommendations of Counselors, and the student's experience in non-academic pursuits will be considered. Students who have a grade point average below 2.0 will be admitted only upon recommendation of the Admissions Committee.

All subjects taken, whether in high school or in college, will be considered in determining the eligibility of students applying for admission to Utah State University. The Office of Admissions and Records will establish the grade point in all questionable cases.

Readmission. Former students of the University returning after an absence of one or more quarters are required to file applications for readmission not later than September 1 for Fall Quarter; December 1 for Winter Quarter and March 1 for the Spring Quarter.

Exception: Students who were in attendance the previous Spring Quarter are not required to reapply for Fall Quarter unless they have been suspended.
Registration and Credits

Quarter Credits Definition: A quarter hour credit is the credit given for one hour of lecture or three hours of laboratory work each week for 12 weeks. Hereafter, for brevity, this unit will be known as a “credit.”

Class Standing. Forty-five credits of approved college work in addition to the prescribed entrance requirements are required for Sophomore rank; 90 credits for Junior and Upper Division rank; and 135 credits for Senior rank. These figures include the required credits in Physical Education, Military Science, or Air Science.

Assignment of Adviser. When students have been admitted to USU and have indicated their proposed major field of study, their name is forwarded to the dean of the college concerned. He will assign an adviser who will assist in registration and vocational planning. Students remain with the same adviser throughout their university program unless in consultation with their dean a new adviser is assigned or unless their major field is changed.

Registration. On each registration day, students are permitted to register according to an alphabetical schedule to be announced later.

In case a student cannot call for his registration materials at the hour scheduled for their release, he may receive them at a later hour. But in fairness to other students, registration materials cannot be released earlier than the time scheduled. Observance of this fact and respect for the rights of others will greatly facilitate registration procedures for all concerned.

Registration is not complete until the fee card is presented at the cashier’s window, office of the Controller, and fees have been paid and registration cards filed with the Office of Admissions and Records. Students will not receive credit for resident work unless they are officially registered for the specific courses involved.

The program of courses listed on the registration card, approved by the dean and filed in the Office of Admissions and Records, is the official registration for the quarter. Students are held responsible for the satisfactory completion of the entire program unless an official change-of-registration form is filed with the Office of Admissions and Records. An “F” grade will be recorded in case of failure to obtain a passing grade or an incomplete in any course for which students are registered, regardless of the reason for the failure.

Penalties for Late Registration and Late Registration Fee. $5 beginning the second day after specified Registration Days; additional $1 for each additional day, up to a maximum of $10.

The amount of work for which students are allowed to register will be reduced by one and one-half credits for each week, or fraction thereof, that they are late in registering.

Changes in Registration. Any change in original registration, deletions or additions, must be recorded and appropriately approved on the official change-of-registration form.

During the first three weeks of any academic quarter, registration may be changed on the student’s own initiative. He may add classes up to and including the end of the second week of each quarter.
and he may be permitted to drop classes up to and including the end of the third week of each quarter—by obtaining the approval of the teacher concerned, the faculty adviser, and the dean of his college, so indicated by their signatures on the change-of-registration form. (These forms are available at the Office of Admissions and Records.)

The dean of the college in which a student is registered considers each case on its merits. The signature of approval from the dean, in addition to the signatures of the instructor and the adviser, must appear on the change-of-registration form before it is accepted at the Office of Admissions and Records.

After the third week, changes in registration may be made only for extraordinary reasons beyond the control of the student and upon initiation of the dean of the college in which the student is registered. Students who have valid reasons for changing registration after the third week should discuss them with the dean. Students who withdraw or drop a class after the third week of the quarter, will have grades of WF (failing) or WP (passing) recorded on their official records.

In the event students register for a class which is later cancelled, it is the responsibility of the teachers to notify the Office of Admissions and Records so that the students may be properly withdrawn from the class.

Change-of-Registration Fee. No charge for the first five days; $1 for each class change made thereafter.

Withdrawal from the University.

(1) Obtain withdrawal forms from the Office of Admissions and Records. (2) Report to the Office of Student Services for termination interview. (3) Obtain the following signatures on Withdrawal Interview Record card: (a) faculty adviser (b) dean of college. (4) Take Withdrawal Permit, and Withdrawal Notice to the Office of Admissions and Records. (5) Take Withdrawal Notice to Controller's Office for refund.

Visitor's Permit (Auditors). If students wish to attend regularly any class for which they are not registered, they must obtain a visitor's permit from the Office of Admissions and Records. No credit will be allowed for such attendance and a fee of $10 per class is charged. The official forms, properly executed, must be submitted to the Office of Admissions and Records before attendance at a class is permitted.

Importance of Submitting Forms to the Office of Admissions and Records. The special change-of-registration form, properly executed, must be filed at the Office of Admissions and Records before any change becomes effective. Withdrawal from a class without adhering to the regulations specified above and before the deadline makes it mandatory upon the instructor and the Dean of Admissions to record an “F” grade. Attendance at classes without proper approval and without official registration as defined above, and before deadline as specified above, will result in forfeiture of any credit for such attendance.

Responsibility of Instructors. Instructors are charged with the responsibility of denying students the privilege of attending classes if they have not complied with regulations for admission to classes.

Normal Registration. Fifteen credits, exclusive of two credits in basic Military Science or Air Science or one credit in Physical
Education, is the normal registration for any quarter.

**Maximum Registration.** The student's adviser and dean of the college in which he is registering must approve his registration regardless of the amount of credit. Whether it should be lower or higher than the so-called "Normal Registration" will depend upon several factors, such as part-time employment, extracurricular activities, the student's capacity or aptitudes, his amount of preparation for specific courses, and his degree of progress or scholastic status. A student is not allowed to register for less credit than that listed for a course in order to bring the total registration within the maximum limit as herein defined. No credit arranged may exceed five credits unless otherwise specified. The registration is construed to include any extension, correspondence, institute, or other work carried for credit, or for removal of high school deficiencies, during the period of the school year.

**Minimum Registration for a Full-Time Student.** The minimum registration for a full-time student load is considered to be twelve credit hours. To be eligible for studentbody offices students are required to be registered for twelve quarter hours or more. Veterans are required to be registered for fourteen quarter hours or more to qualify for full subsistence. Students deferred by the Selective Service system under 1 SC status are required to carry fifteen credits per quarter. *Note:* Students who take more than six quarter hours of credit will be charged full fees for the quarter. (See pages 6 and 7 on Special Fees.)

**Incomplete Work.** Students are required to complete by the end of the quarter all courses for which they have registered. This includes correspondence courses for which he may be concurrently registered. Incomplete grades can be granted by an instructor only when permission is granted by the dean of the college in which the course is offered, before the close of the quarter. The necessary petition form may be obtained at the Office of Admissions and Records or the dean's office. Incomplete work must be finished, and a passing grade given in the course, within one year of the close of the quarter; otherwise the "Inc." will be changed to a grade of "F."

**Low Scholarship and Probation.** If a student has not maintained an average grade of "C" or better, or if he failed to obtain passing grades in twelve or more credits during the preceding quarter, he may be placed in the low scholarship group. No person in the low scholarship group shall be eligible to be elected, appointed, or to hold office in the studentbody organization.

A low scholarship student shall be placed on "warned status" at the end of the first quarter in which his average is below "C." If a student does not then attain a "C" average in the next succeeding quarter he will be placed on probation. He may also be placed on probation at the discretion of his dean if the dean feels his overall achievement is unsatisfactory. Parents or guardians will be notified of the probational status by the Dean of Students' Office. Notation of probation shall be entered on the transcript of credits by the Office of Admissions and Records.

If a student does not maintain a "C" average during the next succeeding quarter after being placed on probation, he will be suspended from his academic college. If a student is denied permission to re-
register in any college of the University after two successive quarters of "warned" and "probationary" status respectively, he will be officially dropped from the University and will be required to remain out of the institution for a period of one full quarter before an application from him for permission to re-register will be considered. A student who feels that certain extenuating circumstances precipitated his low scholarship, and who can show some evidence that he may do better academically in succeeding quarters may petition to the Admissions Committee for permission to continue in the General Registration Unit without the intervening one quarter discontinuance. In the event that a student is granted permission to register, he must register in the General Registration Unit, and will be considered on a probationary status.

After a student who has been dropped for low scholarship has been out of the Institution for one quarter or more, he may apply for re-admission. Such application is made to the Admissions Committee. If permitted to register, he may register in the General Registration Unit on probationary status.

A student on probation in the General Registration Unit who does not maintain a "C" average may be denied permission by the Admissions Committee to re-register in that unit. In such cases the Chairman of the Admissions Committee will recommend to the President that the student seems unable to profit from the University experience and should be dropped from the University.

If a student is admitted on "Warned" status and fails to maintain a satisfactory grade point average for two quarters, he may be suspended at the end of the second quarter. Students who are admitted on probation, may have only one quarter in which to remove probational status.

Students in the low scholarship group may not register for more than 15 credits per quarter exclusive of one hour of Physical Education, or two hours of Military Science or Air Science.

Credit by Special Examination. In special cases, students may be permitted to obtain university credit by passing examinations in subjects not taken in classes. Credit for a subject taken in a course for which a grade other than passing has been received cannot be acquired by means of special examination. This privilege does not permit the combination of "visiting" or "auditing" a class with a request for a special examination as a means of acquiring credit. Neither does it contemplate outside assignments or outlines on the part of the instructor being combined with an examination to acquire credit. This privilege is intended to measure information and training gained from practical experience that may be considered the equivalent of the experience and training received by students in an organized course given in the University.

A maximum of 18 quarter hours' credit can be acquired by special examination. None of the last 30 credits presented for a Bachelor of Science degree may be obtained in this manner. Unless the examination is taken prior to the close of the second week of any quarter for which a student enrolls, the credits gained will be included as part of the load for the quarter.

Special examinations are given only to students regularly registered in residence at the time the request for examination is made.
Credits earned by special examination cannot be used for satisfying the requirements for a graduate degree nor for certification.

Request for permission to take special examinations should be made to the Office of Admissions and Records.
Lower Division Requirements

The Lower Division is composed of courses taken in the Freshman and Sophomore years. The main purposes of this division are to provide a broad and integrated background in the principal fields of human knowledge, and to prepare for the major work upon which a student will concentrate in the Junior and Senior years.

Provision is made in several departments for the issuance of Certificates of Completion for two years of work as prescribed by these departments.

To become a candidate for the Bachelor of Science degree a student should plan courses with great care through consultation with faculty adviser, major professor, and dean.

To complete the work of the Lower Division the following requirements should be satisfied:

I. Complete 90 credit hours (quarter hours) of work with an average of "C" or higher.

II. Prepare a foundation of at least 15 credits for the field of specialized study in the Upper Division.

III. Completion of Basic Communication (English 1, 2, 3) or equivalent. Beginning Freshmen are required to take Basic Communication 1 and to continue through Basic Communication 2 and 3. Students who enter with transfer credits should consult with the English Department concerning the Basic Communication course that they may be required to take.

Enrollment for Basic Communications may be waived or deferred by agreement between the student's academic dean and the head of the English Department, if extenuating circumstances exist.

Withdrawal from enrollment in a Basic Communications course may be authorized by the same procedure. Special students (those registering for six or fewer credits) need not register for BC. Such waiver or withdrawal does not affect the BC requirements for graduation.

Note: For graduation all students must present nine hours in Basic Communication or its equivalent.

IV. A minimum of 43 credit hours must be completed in general education distributed according to the following plan.

A. Natural Sciences: 18 credit hours selected from the following:
   Biological Sciences (5 credit hours required) Biology 1; Bacteriology 10, 70, 71; Entomology 13; Physiology 4.
   Physical Sciences (5 credit hours required) Chemistry 3, 4, 5, 10, 11, 12, 31; Geology 1, 3, 4, 5, 31; Mathematics 20, 30, 34, 35, 44, 46, 97; Meteorology 17; Physics 6, 17, 18, 19, 20, 21, 22.

Note: At least one course must include a lab.

No more than 5 credit hours of Mathematics can count toward fulfillment of this group.

If a student can demonstrate adequate preparation, permission can be obtained to use more advanced courses to fill this group requirement.

B. Social and Behavioral Sciences: 10 to 15 credit hours. Credit hours must be selected from at least two of the following department offerings:

   Agricultural Economics 71, 72, 73 (not more than three hours to apply); Economics 51, 52, 150, 170,
Upper Division Requirements

Sixty credit hours of upper division work are required for graduation. The completion of the group requirements in any accredited collegiate institution having a similar pattern of general education will substitute for the completion of the group requirements at this institution, as prescribed in the section Lower Division above. This does not apply to students who have been pursuing prescribed courses of the instructor and department head.

Theatre Arts—1, 2, 10; also 100, 102, 104 with approval of instructor and department head.

A minimum total of 25 credit hours is required in Humanities and Social and Behavioral Sciences.

Note: Some majors such as Engineering and Education have recommendations and modifications to these requirements. Students interested in these majors should refer to the description of the intended major in this catalog.

V. Physical Education—All students under the age of 31 are required to complete three quarters of Physical Education. Men may meet this requirement by taking Aerospace Studies or Military Science. This requirement should be completed by the end of the sixth quarter of residence work. The required courses are: Physical Education 1, 16 or 52 and one course selected from the following activity groups: Aquatics, Dance, Dual activities, Team Activities, Individual Activities.

If a student takes and passes the waiver tests administered by the Department, he may select one course from three of the five activity groups listed above in lieu of the required courses.

VI. Classes used to satisfy the above requirements are not to be counted toward the major or minor.
which do not include the group requirements. If they change from a prescribed course to a major under the group elective system they must complete the basic group requirements as specified in the section on the Lower Division. Transfer students who continue in a prescribed course will be held for the completion of the Lower Division courses as prescribed at USU, except as equivalent courses may be accepted as substitutes for our own courses.

A Freshman or Sophomore may register for upper division classes and receive credit toward senior college requirements, if such courses are recommended by his adviser and approved by the instructor. Courses so taken will count in the 60 credit hours of upper division 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 in the Upper Division. As soon as the major subject has been selected, he should consult the head of the department in which he has decided to major. The head of the department will assign an adviser. Registration in each succeeding quarter should be carefully checked and approved by the adviser (called the major professor) to assure proper selection and sequence of courses for satisfying institutional and departmental requirements.

**Major** departments have the authority to prescribe not fewer than 30, and not more than 50, credits in the major subject (exclusive of any courses which may have been used to satisfy Lower Division requirements in any of the groups). Major departments and the deans of the colleges shall also prescribe such other related courses as may be considered desirable, provided always that free electives may not be reduced below 36 credits.

Special consideration is granted students who pursue prescribed pre-medical, pre-dental, pre-veterinary, pre-osteopathy, pre-legal, and child development programs for three years at this University. If students successfully pursue further prescribed work in one of these fields for an additional year at an approved institution, they may be granted a Bachelor of Science degree by this University. Students need not comply with general major-minor requirements as previously outlined.

**Minor Subjects.** Students are permitted to choose their own minor. The minor consists of 18 credits either in one department or in two departments closely related in subject matter, provided that a minor taken in more than one department has the approval of the dean and the major professor.

Courses used to satisfy the English composition, the basic groups, Military Science, Air Science, or Physical Education, and Freshman orientation requirements as specified under the Lower Division, cannot be counted in the minimum 30 credits for a major or 18 credits for a minor.

**Graduation Requirements**

The University offers Certificates of Completion for two years of study in certain departments; the degrees of Bachelor of Arts, Bachelor of Fine Arts, Bachelor of Science, Master of Arts, Master of Fine Arts, Master of Science, Master of Business Administration,
Master of Education, Master of Forestry, Master of Industrial Education, Civil Engineer, Irrigation Engineer, Specialist in Educational Administration, Doctor of Education, and Doctor of Philosophy; and gives work to fulfill the requirements for all professional certificates issued by the State Board of Public Instruction.

The University reserves the right to change at any time the requirements for graduation, and candidates for a certificate, a diploma, or a degree, are held to compliance with such changes, so far as the uncompleted part of the course is affected.

Students are expected to familiarize themselves with institutional rules and regulations. The responsibility for satisfying the requirements for graduation rests upon them.

If students do not graduate in the class with which they entered they are held to the requirements, including entrance, of the class with which they do graduate.

Two-Year Certificate

The Colleges of Agriculture, Engineering, and Humanities and Arts offer two-year courses in practical studies leading to a Certificate of Completion for those who are not interested in the regular four-year course leading to the Bachelor’s degree.

In most cases the courses are arranged so that, at a later date, the four-year course can be completed with a minimum loss of time. While these short courses are designed to develop a broader understanding of the science underlying these fields and to lay the foundations for good citizenship, they offer a considerable range of selection of practical courses in both the Lower and Upper Division.

(1) Complete 96 credits, including the required work in Physical Education, Military Science, or Air Science.

(2) Complete a major of 30 credits in one or more closely related departments of the college in which the Certificate is granted.

(3) Complete a minor of 15 credits closely related or basic to the major subject. This need not be in the same college.

(4) Complete 29 credits in the basic groups, as follows: Language, five; Basic Communications, 1, 2, 3, nine; Exact Science, five; Biological Science, five; and Social Science, five.

(5) Complete 21 credits of elective work.

For additional information, see description of work in the college concerned.

In the College of Engineering definite programs of study are prescribed leading to Certificates of Completion within definite fields of applied industrial work. These curricula may be found in the catalog section on College of Engineering.

Bachelor 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, Engineering and Natural Resources are awarded the Bachelor of Science Degree.

Graduates of the Colleges of Business and Social Sciences, Education, Family Life, 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 and Arts may be awarded the Bachelor of Science Degree, the
Bachelor of Arts degree, or the Bachelor of Fine Arts 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 General Education groups, in English Composition, and in Physical Education or in Military or Air Science. All students who receive the Bachelor of Arts degree must have completed two years' training or equivalent in a foreign language.

If a student is planning to graduate at the next Commencement he should consult his major professor and jointly prepare the "Admission to Candidacy" form not later than the fourth week of the fall quarter. He is admitted to candidacy when the plan of course work presented is found to fulfill all remaining requirements for graduation.

Summary of Graduation Requirements

For students who will graduate at the next commencement, the following additional requirements must be met. Responsibility for satisfying the requirements for graduation rests upon the student.

(1) All graduates of the state universities of Utah 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: (a) History 20, History of American Civilization (5 credits), (b) Political Science 10, American National Government (5 credits), (c) Economics 51, General Economics (5 credits); (E) Transfers evidencing work equivalent to any one of the above.

(2) Women must complete three quarters of Physical Education.

(3) Men must complete three quarters of either Physical Education, Military Science or Air Force ROTC. If exempt from Air Force ROTC, Military Science and Physical Education, they must present one credit of other work for each quarter they have been exempt.

ROTC is a four-year program consisting of two two-year courses: Basic and Advanced. Entrance into the Basic Course is elective, admission to the Advanced Course is both elective and selective. Upon entering either course, completion thereof becomes a prerequisite for graduation, unless one is discharged in accordance with the provisions of Army Regulation 145-350 or Air Force Regulation 45-48 and AFROTC Manual 46-1.

(4) One hundred eighty-six credits of acceptable collegiate work, including the required credits in Physical Education, Military Science or Air Science, of which a minimum of 150 credits must be "C" grade or better.

(5) Sixty credits of Upper Division work.

(6) The completion of a major, a minor, and related work as outlined under Upper Division.

(7) The completion of the group requirements and of nine hours in Basic Communication or its equivalent.

(8) The maximum amount of home study credit which can be
applied toward a Bachelor's degree is 45 credits.

(9) Applicants for degrees who have taken courses for credit through extension classwork or home study courses are subject to the regular University admission requirements and must file transcripts of credit with the Office of Admissions and Records.

(10) Candidates for a Bachelor's degree must complete at least 45 credits in residence at Utah State University, fifteen of which must be included within the last 60 credits presented for the degree.

With the approval of the dean of the college from which the student graduates, fifteen credits in courses, approved for this purpose, taken in designated centers may be counted towards the residence requirements for the Bachelor's degree.

For the Master's degree at least 27 credits taken in residence are required; thesis credit counts toward the residence requirement. For the Master's degree not requiring a thesis, nine credits in course work approved for this purpose taken in designated centers may be counted toward the residence requirement.

(11) No more than 108 hours of transfer credit from junior colleges will be accepted toward graduation.

(12) Four passing grades, "A," "B," "C," and "D" are employed in reporting credit. No credit with a grade lower than "D" can count toward satisfying credit requirements.

Grade points have been assigned to grades as follows: 4 grade points for each credit of "A," 3 for each credit of "B," 2 for each credit of "C," 1 for each credit of "D," and 0 for each credit of "F." For graduation, one must have twice as many grade points as he has credits for which grades of "A," "B," "C," "D," and "F" have been assigned. Credits of "P" grade are disregarded in computing grade point averages.

(13) The candidate should file an application for graduation with his academic dean at the beginning of his Senior year. This application must show the course of study to be followed in order to complete all requirements for graduation and must be approved by: (a) the professor in charge of the major subject; (b) the dean of the college in which the major work is done.

(14) He should obtain a diploma fee card at the Office of Admissions and Records and pay the $5.00 fee at the Cashier's Office prior to January 15 of the year in which he expects to graduate. A late fee will be charged if the diploma fee is paid after January 15.

(15) The candidate must have discharged all University fees.

(16) Attendance at Commencement Exercises is expected of all candidates. If unable to attend, one must notify the dean of his college and be officially excused in advance.

(17) Second Bachelor's Degree. A student who wishes to qualify for a second Bachelor's degree must complete a minimum of 45 credit hours beyond those required for the first degree. He must, also, meet the requirements of the major department.
Honors Courses

The University sponsors honors courses supervised by a University-wide committee representing the academic deans. Enrollment is limited. Students may be admitted on the recommendation of their department head, or upon direct application to one of the instructors. The courses will ordinarily be taught by two or more instructors from different academic fields. The aim is to give superior upper-division students from several departments opportunity to read, discuss, and write about significant facts and ideas, approached from a broader point of view than is ordinarily possible in advanced departmental work.

111. Perspectives of Contemporary Thought. Senior Colloquium 1. (2F) Staff
112. Roots of Modern Educational Thought. Senior Colloquium 2. (2W) Staff
113. Far Eastern Thought. Senior Colloquium 3. (2Sp) Staff
114. The Utopian Ideal in Literature. Senior Colloquium 4. (2W) Staff

Under general policies established by the University Honors Committee, the College of Engineering offers honors courses for selected upper division students in Engineering.
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Agriculture

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Degrees Offered:
  Bachelor of Science
  Master of Science
  Doctor of Philosophy
College of Agriculture

Vearl R. Smith, Dean
Doyle J. Matthews, Assistant to the Dean
Office in Agricultural Science 223A

Agriculture today is a dynamic, rapidly changing industry. There are few fields of work that can offer such interesting and challenging opportunities. Agriculture includes much more than farming or producing food and fibre. It includes all the occupations connected with the production, processing and distribution of farm products.

Agriculture is the nation's largest industry. Of the 65 million people employed in the United States, about 26 million (40 percent) work in agriculture: nearly eight million (12 percent) work on farms, seven million produce for and service farmers, and 11 million process and distribute farm products. In addition, about a half million scientists serve agriculture directly or indirectly. The agricultural industry is the biggest buyer, seller and borrower in the U.S.—and it has the biggest investment. It uses more steel, rubber, petroleum, trucks, tractors and more electricity than any other industry.

Today's agriculture offers students unlimited opportunities. But it is highly competitive and to be fully successful one must be well trained.

Utah State University, Utah's Land-grant institution, is equipped to help one qualify for special positions as well as to gain a broad general education in the basic sciences and in the humanities. Its staff and facilities provide an opportunity for preparation for an interesting and profitable career.

Staff members of the Agricultural Experiment Station are devising better methods of feeding and cropping and are developing more valuable strains of fruits, crops, and livestock, and more remunerative systems of marketing agricultural products. These activities are studied by the student first hand, and student employment enables many to take active part in the research work of the Experiment Station. This arrangement gives a clear insight into scientific methods and valuable practical experience. Attention is given to improved methods in farming operations, in use of tools and machinery, and in management of livestock and crops.

The great practical value of the various curricula of the College of Agriculture is shown by the records of graduates who have gone back to the farm, or have become specialists and teachers or investigators, and have become leaders in their chosen work.

Facilities and Equipment

The Agricultural Science Building houses the administrative offices of the College of Agriculture, the Agricultural Experiment Station, and the Extension Services. The Departments of Agricultural Economics, Plant Science, Agricultural Education and Soils and Meteorology are also housed in this building.

The Animal Science and Dairy Science Departments are housed in
38 College of Agriculture

the Animal Science Building. Veterinary Science occupies a separate building.

The various departments in the College of Agriculture are well equipped and have up-to-date facilities for teaching and conducting research in modern scientific agriculture. Animal Science provides modern chemical laboratories, an animal metabolism building, a new meats and physiology laboratory, and a new livestock pavilion, combined with outstanding groups of beef cattle, sheep, swine, poultry and horses to offer real advantages to students in relating natural sciences to efficient production of livestock, poultry, and the processing of their products. Dairy Science operates a dairy products plant and a dairy farm for student instruction, experience and research. Students gain experience in these facilities and most are employed for a portion of the time in these or in the research and teaching laboratories associated with them. Plant Science is noted for its modern well-equipped laboratories, growth chambers, greenhouses, and a pilot food processing plant complemented by eight experimental farms located throughout the state to give students unique opportunities to learn. It provides students with opportunities to apply knowledge of physical and biological science to the growth and production of plants and food processing. Soils and Meteorology is recognized for the excellence of its laboratories for studying soil and water conservation and utilization. The influence of soil and atmospheric environment on plants and animal growth and behavior is intensively studied. Controlled environmental chambers, flame photometers, atomic adsorption spectrophotometer, gas chromatograph, geiger counters, meteorological equipment, potentiometer, bridges, controller, and recorders are examples of modern equipment which students learn to build, maintain, and use. Veterinary Science has equipment and facilities which are available for teaching and research in histopathology, in physiologic pathology, in the use of embryonating eggs for bacterial and viral culture and toxicology, and in tissue culture techniques. These endeavors are supported by necropsy, diagnostic, and experimental animal laboratories. Agricultural Economics is outstanding in its training of students desiring economic or business orientation in agriculture. Students are provided with calculators and electronic computers are made available through arrangement with the University Computer center. Through such facilities students may become acquainted with the modern methods of data analysis such as linear programming which can be used in various ways in studying the effects of a variety of factors on the economic outcome of problems. Agricultural Education involves students in modern agricultural science and also cooperates with teachers of Vocational Agriculture in 43 high schools in the preparation of teachers and in furnishing classrooms, shops and laboratories.

Curricula in Agriculture

Students may work toward the Bachelor of Science degree in the departments of Agricultural Economics, Agricultural Education, Animal Science, Dairy Science, Plant Science, and Soils and Meteorology. Pre-veterinary training is given in the Veterinary Science department.

Three basic curricula that may
be offered by departments are: (1) Science, (2) General or Production, (3) Business. Departmental listings detail the requirements for these curricula.

Science

Students who choose the science curriculum are taught the fundamentals of physical and biological sciences that are significant to agriculture. They gain a solid base of science courses that prepares them for graduate work and eventually research and teaching careers in the natural sciences. Graduates in this curriculum are also prepared to do research or technical work in agriculturally oriented fields such as the chemical industry, as related to fertilizers and pesticides, livestock health, feed industry, crop breeding, water use, and technical aspects of food processing. Science curricula must meet the following minimum requirements:

<table>
<thead>
<tr>
<th>Hours</th>
<th>Exact Science</th>
<th>Biological Sciences</th>
<th>Humanities</th>
<th>Social and Behavioral Science</th>
<th>Basic Communications</th>
<th>MS or PE</th>
<th>Basic Communications</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>23</td>
<td>15</td>
<td>10-15</td>
<td>10-15</td>
<td>9</td>
<td>3</td>
<td>9</td>
</tr>
</tbody>
</table>

A science curriculum is offered in the departments of Animal Science, Dairy Science, Plant Science, Soils and Meteorology and Veterinary Science.

General or Production

This curriculum is designed to educate young people to meet the special demands of today's farming. Successful modern agricultural production requires an understanding of the latest relevant scientific knowledge and an ability to apply the information in the field. A student who plans to farm, or to be a farm manager, or to work directly with farm operators as a businessman or as a government or farm organization employee, will probably satisfy his needs by taking the production curriculum. General curricula must meet the following minimum requirements:

<table>
<thead>
<tr>
<th>Hours</th>
<th>Exact Sciences</th>
<th>Biological Sciences</th>
<th>Humanities</th>
<th>Social and Behavioral Science</th>
<th>Business</th>
<th>MS or PE</th>
<th>Basic Communications</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>15</td>
<td>10-15</td>
<td>10-15</td>
<td>10-15</td>
<td>10-15</td>
<td>3</td>
<td>9</td>
</tr>
</tbody>
</table>

This curriculum is offered in the departments of Agricultural Economics, Agricultural Education, Animal Science, Dairy Science, Plant Science, and Soils and Meteorology.

Business

The businesses and industries that buy from and sell to farm people are expanding and need men and women trained in agriculture. These enterprises include feed, fertilizer, machinery, and chemical firms that supply the farmer's needs and marketing firms that assemble, process, ship, and merchandise his 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 choose the Business option. Business curricula must meet the following minimum requirements:

<table>
<thead>
<tr>
<th>Hours</th>
<th>Exact Sciences</th>
<th>Biology</th>
<th>Social and Behavioral Sciences including Business</th>
<th>Humanities</th>
<th>MS or PE</th>
<th>Basic Communications</th>
</tr>
</thead>
<tbody>
<tr>
<td>23</td>
<td>15</td>
<td>10</td>
<td>10-15</td>
<td>10-15</td>
<td>3</td>
<td>9</td>
</tr>
</tbody>
</table>

This curriculum is offered in the departments of Agricultural Economics, Animal Science, Dairy Sci-
A Minor in International Agriculture

Students interested in foreign assignments in agriculture have an opportunity to take a minor in International Agriculture, provided they complete a satisfactory major in Agriculture. Those who plan to minor in International Agriculture should carefully select general education classes from among the following: Anth 90, 92; Econ 51; Foreign Language (to meet needs); Geog 5, 6, 7; Hist 1, 2, 3, 4, 5; Pol Sci 10, 25; Psych 53; and Soc 70.

The upper division courses selected for a minor in International Agriculture should be made from suitable agricultural courses to be selected at the counselor's discretion. Eighteen hours are required for a minor. The following courses are also recommended: Anth 162, 165, and Principles of Anth; Bus Admin 155; Econ 140, 150, and Comparative Econ Systems; Geog 135, 145, 146, 147; Hist 166, 167, 168; Pol Sci 101, 102, 110, 128, 150, 170, 171, 172, 173; Soc 154, 156.

Seminar Courses.

Graduate Work. Graduate work is available in all departments of the College of Agriculture.

Department of

Agricultural Economics

Head: Professor George T. Blanch
Office in Agricultural Science 230


1On assignment in Bolivia.
Agricultural Economics is a study of economic and business principles and problems involved in producing and marketing agricultural products. A well trained agricultural economist becomes familiar with major scientific principles and practices of crop and livestock production and principles of economics and business practices. With this training a wide range of employment will be open. This will include the successful operation of a farm, professional farm manager, teacher, research and extension worker at either state or federal level; foreign service specialist, or owner-operator or employee of any business that buys, sells, or processes agricultural products or provides supplies or services for agriculture.

Bachelor of Science Degree. The requirements for the BS degree may be satisfied under either the Agricultural Business or the General Agriculture Curriculum. The choice of the curriculum to follow need not be made before the beginning of the Junior year since the courses recommended for the Freshman and Sophomore years are the same for both.

Freshman and Sophomore Years

The courses suggested for the first two years are intended to satisfy two basic objectives: (1) to fill the group requirements, and (2) to lay a broad and solid foundation for the more specialized and advanced courses that will be taken during the last two years. Agricultural Economics 71, 72 and 73 or their equivalents, are prerequisites to all other courses in Agricultural Economics.

A. Freshman Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>English 1, 2, 3</td>
<td>9</td>
</tr>
<tr>
<td>Math 34, 35</td>
<td>8</td>
</tr>
<tr>
<td>Ag Econ 71, 72, 73</td>
<td>9</td>
</tr>
</tbody>
</table>

B. Sophomore Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry 3, 4, 5 or 10, 11, 12</td>
<td>15</td>
</tr>
<tr>
<td>Humanities</td>
<td>10</td>
</tr>
<tr>
<td>Economics 51, 52</td>
<td>10</td>
</tr>
<tr>
<td>Ag Econ 56</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>5</td>
</tr>
<tr>
<td>Zool 16 or Bact 70</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
</tr>
</tbody>
</table>

Junior and Senior Years

The student and his adviser will select from the following areas the specific courses that will best satisfy the particular goals of the student.

C. Junior Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ag Econ 105, 121, 122, 155, 163</td>
<td>17</td>
</tr>
<tr>
<td>Animal Science 10, 110 or</td>
<td>13</td>
</tr>
<tr>
<td>Dairy 110</td>
<td></td>
</tr>
<tr>
<td>Plant Science 7, 8, 103</td>
<td>10</td>
</tr>
<tr>
<td>Soils 56</td>
<td>4</td>
</tr>
<tr>
<td>Ag &amp; Irr Eng 10 or 110</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
</tr>
</tbody>
</table>

D. Senior Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ag Econ 102, 112</td>
<td>17</td>
</tr>
<tr>
<td>Ap St 131, 132, 106 or 186, 145, 170, or 180</td>
<td>16</td>
</tr>
<tr>
<td>Econ 106, 107, 108, 165</td>
<td>16</td>
</tr>
<tr>
<td>Electives</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
</tr>
</tbody>
</table>

E. Course Credit

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ag Econ 102, 112, 146, 170, 180</td>
<td>17</td>
</tr>
<tr>
<td>Econ 106, 107, 108, 165</td>
<td>16</td>
</tr>
<tr>
<td>BA 182, Econ 171</td>
<td>10</td>
</tr>
<tr>
<td>Electives</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
</tr>
</tbody>
</table>
Graduate Study

Master of Science Degree. The Department offers the Master of Science degree with emphasis in any one of several divisions such as: Agricultural Business Management, Farm or Ranch Management, Resource Economics, Agricultural Finance, and Agricultural Marketing. Research in these areas is conducted by Department staff and Federal Collaborators, with the assistance of graduate students. The MS degree is accepted by other universities as one year’s work done toward the PhD degree.

Doctor of Philosophy Degree. The Department in cooperation with the Department of Economics, and the support of the Department of Applied Statistics and other related departments offers the Doctor of Philosophy Degree. The degree can be had with emphasis in the areas of Resource Economics, Farm Management or Agricultural Marketing.

Agricultural Economics Courses

56. Agricultural Business Records. Methods of keeping and analyzing physical input-output and financial records for Agricultural business firms. (3F) Christensen

71, 72, 73. Fundamentals of Agricultural Economics. A basic introduction to the field and principles of agricultural economics. (3F, 3W, 3Sp) Staff

102. Intermediate Farm Management. Principles and practices associated with the successful operation of farms. (3F) Morrison

105. Agricultural Credit. Principles of agricultural credit. Emphasis on problems and methods of financing agriculture. (3W) Staff

*106. Land Economics. Economic principles underlying utilization, valuation and tenure of land and water. Attention given prevailing policies, methods and techniques involved in dealing with economic problems of land and water use. (3Sp) Wennergren

112. Agricultural Cooperatives. Principles of cooperation; organization, operation and management of cooperative sales, purchasing, and service associations. (3Sp) Anderson

116. Livestock Economics. Application of farm management and agricultural marketing principles to the economic production of livestock and livestock products. (3F) Lamborn

**121, 122. Agricultural Statistics and Research Techniques. An introduction to the research process in solving problems in Agricultural Economics. Emphasis will be placed on basic techniques used in collecting, analyzing and presenting research data. (4F, 4W) Davis

145. Agricultural Businesses. Application of economic and management principles to farm related firms that market and process farm products and provide farms with supplies and services. (8Sp) Christensen

150. Special Readings. Directed readings on selected problems for undergraduates. Credit arranged. (F, W, Sp, Su) Staff

155. Law on the Farm. A non-technical consideration of some legal rights, responsibilities and liabilities associated with the operation of a farming business. (3W) Morrison

163. Intermediate Agricultural Marketing. Principles and functions of marketing and their application to the marketing of agricultural products. (3W) Lamborn

170. Farm and Ranch 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. (8Sp) Davis

180. Government and Agriculture. A study of government in relation to selected economic problems, past and present, in agriculture. Emphasis is on the problems, the objectives of government action, the alternative proposals for action, action taken, and the results, so far as they can be interpreted. (8Sp) Blanch

**186. Land and Water Problems. The application of economic principles and techniques to the development, use and conservation of land and water resources. (8Sp) Wennergren

202. Advanced Farm Management. Economic principles and their application to specific production functions in agriculture. (5F) Davis

214. Thesis. Credit arranged. (F, W, Sp, Su) Staff

*220. Production Economics. Theory of economic decision making as applied to production problems. Static and stochastic models. Effects of different decision criteria on optimization procedures. (8Sp) Staff

*Taught 1966-67
**Taught 1967-68
235, 236, 237. Seminar. Required of all senior and graduate majors. (1 F, 1 W, 1 Sp) Staff

240. Research Methodology. Philosophy of research and importance of application of scientific method to solution of research problems. (2 F) Gardner

241. Research Methodology. Introduction to the similarities between statistical methods and the system by which scientists establish hypothesis and test hypothesis by means of experimental data. The relation of statistical theory to the design of experiments will be emphasized. Prerequisites: Applied Statistics 171, 172, 173. (2 Sp) Gardner

250. Special Problems. Directed study on selected problems for graduates. Credit arranged. (F, W, Sp, Su) Staff


263. Advanced Marketing. Economic principles applied to the solution of agricultural marketing problems. (6 W) Lamborn

265. Agricultural Price Analysis. Application of statistical techniques to derivation of agricultural supply and demand functions. Time series and cross sectional analysis, single and simultaneous equation estimation. (3 W) Staff


Department of

Agricultural Education

Head: Professor Stanley S. Richardson
Office in Agricultural Science 110

Associate Professor Von H. Jarrett.

The program offered in Agricultural Education, is for students who are preparing for positions in vocational agriculture, agricultural missions, or other agricultural careers. It is also designed to prepare individuals for agricultural education work in agricultural industries, commercial agriculture, and public relations.

Preparation in Agricultural Education includes technical agriculture as well as principles and techniques of teaching. Advanced students will be placed with teachers for practical experiences.

Students interested in teaching ornamental horticulture, agricultural business, agricultural mechanics or other phases of agriculture will be guided into areas of their major interest. Agricultural backgrounds or agricultural experiences are desirable, but not mandatory.

Suggested Course of Study—Ag Ed

Courses | FRESHMEN | Credit
--- | --- | ---
Basic Comm | | 9
Math 30 or 34, 35 or 46 | 8-10
Biological Science — Biol 15, Bact 70, Bot 26 | | 15
Animal, Dairy, or Vet Science | 6-8
Plant Science | 4-5
MS or PE | 3
Total | 45-50

Courses | SOPHOMORES | Credit
--- | --- | ---
Chemistry 3, 4, & 5 or 10, 11, & 12 | 15
Ag Econ 71, 72, 73 (may be taken first year in lieu of Animal or Plant Sc) | 9
Animal, Dairy, or Vet Science | 3
Plant or Soil Science | 3-4
Humanities — Psych 53, LA 3 | 8
Ag Ed I | 5
Social Science — Hist 20, PS 10 | 10
MS | 3
Total | 53-54

Courses | JUNIORS | Credit
--- | --- | ---
Ag Ed 101, 102, 103 | 15
Biological Science — Zool 112 | 5
Psychology 100 & 106 | 6
Education 126 — 150 ........................................... 6
Animal, Dairy, or Vet Science .................................. 6-8
Plant or Soils Science ........................................... 6-8
Ag Econ .................................................................. 3
Total .................................................................. 47-51

Courses SENIORS Credit
Humanities (Lit, Speech, Music or Art
Soils & Met 117, Pl Sci 118, etc.) ...................... 3-5
Social Science — Econ 51 ................................. 5
Ag Ed 124, 125, 126 ........................................... 17
Public Health 155 ............................................... 3
Plant or Soils Science .......................................... 3-7
An or Dairy Science ............................................. 1-5
Extension Methods ............................................... 3
Ag or Ed electives ................................................ 3
Total ................................................................. 41-45

Total hrs. — 196 as follows: Institutional and
general 77; Agriculture 84; Education 32;
MS or PE 3.

Graduate Study
Opportunity is offered for re-
search and graduate study in
Agricultural Education. See the
Graduate Catalog.

Agricultural Education
Courses

1. Agricultural Mechanics. Selection, care,
and use of power tools and equipment. Sheet
metal, hot and cold metal, agricultural draft-
ing, and shop safety. Three lectures, two labs.
(5F, W)
101. Agricultural Construction. Especially
for agricultural students. Planning, estimat-
ing, layout construction materials, painting,
wiring, plumbing, concrete and masonry as
related to farm structures. Three lectures, two
labs. (5Sp) Jarrett
102. Farm Power. Operation, care, and
maintenance of tractors and farm engines.
Diesel, L.P.G., 4-cycle and 2-cycle engines and
electric motors. Three lectures, two labs.
(5W, Sp) Jarrett
103. Agricultural Machinery. Selection, opera-
tion, maintenance, repair and management of
farm machinery, including materials or con-
struction, mechanics, transmission of power,
adjustment of tillage, planting, spraying, dust-
ing, forage, and harvesting equipment, brazing
cast iron, hard facing, and use of the carbon
arc torch. Three lectures, two labs. (5F)
104. Senior Project. Involves scaled draw-
ing, cost estimating, construction and formal
report on student-selected project. (5Sp)
Jarrett

112. Principles of Vocational Education.
Fundamentals in general and vocational edu-
cation. Social and economic basis for voca-
tional education. (2W) Richardson

124. Methods of Teaching Agricultural Me-
chanics. Scope of mechanics in agriculture, les-
son planning, course of study preparation, shop
equipment and management, skill requirements,
and supervised practice. (3F) Richardson

125. Methods of Teaching Agriculture. Funda-
mental principles and practices of teaching.
Special attention is given to selection, organi-
zation, and teaching agriculture and super-
vision of agricultural activities on the farm.
(5W, Sp) Richardson

126. Directed Teaching in Agriculture. Stu-
dents observe and teach under supervision in
approved vocational agriculture departments.
Students will leave the campus to teach for
five or six weeks. (4-9W, Sp) Richardson

151. Extension Methods. For prospective
home demonstration and county agricultural
agents. History, objectives, organization and
accomplishments of extension work in the
United States. Farm and home problems,
youth and adult education, and extension meth-
do s. (3Sp) Staff

225. Special Problems in Agricultural Educa-
tion. A consideration of needs and special
types of service in FFA, Young Farmer and
Adult programs. For upper division and
graduate students. (2-5F, Sp) Richardson

(F, W, Sp, Su) Staff

281. Seminar. Studies and reports on re-
search and new developments. One quarter
required for all majors in Ag Ed. One credit.
(F, W, Sp)

290. Special Problems. For teachers of voca-
tional agriculture who desire to develop a more
practical program for future, young, and adult
farmers. (3Su) Staff

291. Special Problems for Agriculture Teach-
ers. For teachers who participate in the
Annual Summer Conference for Teachers of
Vocational Agriculture. (2-6Su) Staff
Department of Animal Science

Head: Professor James A. Bennett
Office in Animal Science 201

Professors Jay O. Anderson, Carroll I. Draper, Extension Poultry, Lorin E. Harris; Professor Emeritus George R. Henderson; Associate Professors John E. Butcher, C. Elmer Clark, Warren C. Foote, Russell R. Keetch, Extension, Milton A. Madsen, Darrell H. Matthews, Doyle J. Matthews, Assistant Dean of College of Agriculture, Hyrum Steffen, Joseph C. Street; Assistant Professors Alice Denney, Donald C. Dobson, Arlin D. Knight; Research Associates Sherwin Atkinson, Donald C. Tomlin, David O. Williamson; Research Assistant Robert E. Warnick.

A student majoring in Animal Science may obtain a Bachelor of Science degree under one of three curricula viz. science, production or business.

The science curriculum will prepare you for graduate work or technical employment in research, teaching or extension work in a university, in industry or in government, or for the positions listed under the production curriculum. If you have high scholastic standing and marked ability in the fundamental sciences you will find excellent opportunities in this area.

The production curriculum will prepare you to be a farm or ranch operator or manager in livestock or poultry, a county agent, or to take a position related to livestock or poultry raising with various other commercial state and federal agencies.

The business curriculum will train you in the business phases of livestock and poultry production and also prepare you for employment with commercial companies associated with these enterprises.

Suggested Course of Study for the First Two Years for ALL Curricula.

Course FRESHMAN Credit
An Sci 2 or 3, 50 ........................................... 3 or 4
English 1, 2, 3 ........................................... 9
Math, 34, 35, 44, or 46 1 .................. 11 or 13
Ag Econ 71, 72, 73 or equiv .................. 9
Social Sciences or Humanities (group) .. 10
Biological Science (group) .................... 5
MS or PE ........................................... 3

50-53

Course SOPHOMORE Credit
An Sci 41, 42 ........................................... 2
Chem 3, 4, 4 1, 5 1 or 10, 11, 12 ........ 15
VS 20 ........................................... 5
Social Sciences or Humanities (group) .. 15
Biological Science (group) .................... 10
MS or electives ................................... 3

50

1These courses are required in the Science Curriculum. They are recommended but not required in the other curricula.

Suggested course of study for the junior and senior years in the SCIENCE Curriculum.

Course JUNIOR Credit
An Sci 142, 150, 151, 152, 155 or .............. 15
An Sci 142, 150, 151, 107, 155
Soils 56 ........................................... 4
Chem 121, 122 ........................................... 8
Zoology 112 ........................................... 5
Exact Science to be selected from
Math 96, 97, 98, 99; Physics 17, 18,
19 or 20, 21, 22 .................................. 20

52

Course SENIOR Credit
An Sci 110, 120, 125, 160, 175, 185, or 18 18
An Sci 104, 123, 126, 185 .......................... 11

1On assignment in Bolivia
Suggested course of study for the junior and senior years in the PRODUCTION Curriculum.

**Course JUNIOR Credit**
- An Sci 142, 150, 151, 152, 155, 165 or An Sci 142, 150, 151, 107, 155, 105, 126: 18
- Soils 56: 4
- Zoology 112: 5
- Plant Science 103 or Range Management: 4 or 6
- Dairy Science: 3
- Library Science 50: 3
- Irrigation and Drainage 10 or 110: 3
- Electives: 12

52

Suggested course of study for the junior and senior years in the BUSINESS Curriculum.

**Course SENIOR Credit**
- An Sci 110, 120, 125, 160, 175, 185 or An Sci 104, 123, 126, 185: 18
- VS 120, 150: 7
- Entomology 108: 5
- Applied Statistics 51: 4
- Range Management 160, 161: 6
- Business 20 or 147, 63: 8
- Ag Econ 151: 3
- Electives: 16

54-61

Two-year Program in Animal Science

A two year course in Animal Science leading to a Certificate of Completion is offered. This course is available to train students for efficient livestock production who do not wish to complete the four year course leading to the Bachelor of Science degree.

Additional information concerning required courses can be obtained from the department.

Graduate Study

Course work and research leading to the Master of Science and the Doctor of Philosophy degrees are offered. Specialized fields of study for the Master of Science and Doctor of Philosophy degree include: Animal Breeding, Nutrition, Physiology, and Management. Facilities are available to conduct research with farm animals, poultry, and laboratory animals. In cooperation with other depart­ments the Master of Science and Doctor of Philosophy degrees are offered in Animal Nutrition and Biochemistry (See Interdepartmental Curriculum in Animal Nutrition and Biochemistry).

Detailed information on graduate programs in Animal Science may be obtained from the department or from the Dean of the School of Graduate Studies.

Animal Science Courses

1. **Fundamentals of Animal Husbandry**. Livestock production in relation to other phases of agriculture in the United States and Utah, influence of geographical location and conditions, various types of farm animals and functions performed or products produced, and introduction to important factors in successful livestock production. (3F) **Steffen**

2. **Animal Husbandry Laboratory**. Exercises in judging, marketing, classification and practical problems. Should be taken at the same time as AS 1. Two labs. (2F) **Steffen**

3. **Poultry Production**. A study of breeds of chickens and turkeys, incubation, brooding.
feeding, selection, marketing, and problems of production of chickens and turkeys. (3F) Staff

4. Laboratory Exercise in Poultry Production. Laboratory exercises in practical problems of incubation, brooding, feeding, selection and marketing of chickens and turkeys. (1F) Staff

10. Feeds and Feeding. Differences in digestive tracts of farm animals: physiology of digestion and feed utilization; composition of feeds; the balancing of rations; and feeding of farm animals. Four lectures, one lab. (5W) Steffen

30. Horse Husbandry. Breeding, feeding, care and management of horses. (2Sp) Bennett

41, 42. Livestock Practicum. Development of skills in the feeding, care, fitting and showing of beef cattle, sheep and swine. Two labs. (1W, 1Sp) Madsen

50. Current Developments in Animal Husbandry. Review and discussion of recent developments in the field of Animal Husbandry. Required of all students during the first quarter in attendance. (1F) Bennett

**104. Poultry Physiology and Incubation. A study emphasizing general morphology and function of physiological systems characteristic of the avian class with consideration given to principles of incubation and embryological development. Two lectures and one lab. (3Sp) Clark

**105. Poultry Management. Problems of locations of poultry farm, farm planning, renewing the flock and management problems of the growing, laying and breeding flocks. Prerequisite: AS 1. (2W) Draper

107. Applied Poultry Nutrition. A study of the nutritive requirements of poultry, the composition of poultry feedstuffs, methods of feeding and formulation of rations for special needs. Prerequisites: AS 150, 151 (3Sp) Anderson

108. Poultry Products. Problems in processing, grading, packaging, transporting, labeling, storing and marketing poultry products. (1F) Draper

119. Beef Production. Factors involved in economical production of beef cattle, including organization of the enterprise, breeds of cattle, selection of breeding stock, production of maximum calf crop, handling and feeding animals of different ages on the range and in the feed lot, and marketing of surplus stock. Prerequisite: AS 152. (3F, 3Sp) Madsen

121. Swine Production. Systems of production, with emphasis on those suited to western conditions. Breeding, management and feeding of the breeding herd, and of market swine. Prerequisite: AS 152. (3W) Steffen

123. Special Readings in Animal Science. Selected readings to meet student needs. Available to upper division majors and by permission of department head and instructor. Credit arranged. (F, W, Sp, Su) Staff

125. Sheep Production. Range and farm sheep, with emphasis on range production. Methods of production of lambs and wool, grading and marketing practices, feeding and studies of the breeds and their adaptation to the different husbandry practices. Prerequisite: AS 152. (3Sp) Madsen

126. Seminar. Current literature studies, assigned problems and special topics. (1W) Staff

142. Physiology of Reproduction. See Zoology 142. (3W) Foote

150, 151. Principles of Nutrition. Basic principles of the metabolism of nutrients and nutrient requirements of farm animals; nutritional diseases; and a consideration of investigational methods. Prerequisite: Chemistry 12 or concurrent registration. (3F, 3W) Street

152. Applied Animal Nutrition. Compositions of feeds and adaptability to different species of farm animals; nutrient deficiencies and their correction through feeding, feeding systems for farm animals and feed formulation. Prerequisite: AS 151. (3Sp) Butcher

155. Animal Breeding. Application of genetics to improvement of farm animals. Breeding systems, inheritance problems, fertility and sterility in larger farm animals. Prerequisite: Vet Sci 20, Zoology 112. Three lectures. (3Sp) Bennett

160. Livestock Production Problems. Attention is given various problems in livestock production, especially in Utah. Prerequisites or concurrent registration: AS 152 and 155. (3Sp) Staff

165. Livestock Judging and Selection. Animal form and its relation to function. Emphasis on evaluation of live animals in terms of their probable value of production of meat, wool or work. Emphasis on judging for both commercial and show ring purposes. The Livestock Judging Team is selected from students taking this course. Prerequisite: AS 2. Three labs. (3F) Madsen

175. Wool Technology. Marketing and manufacturing of wool and laboratory techniques used in studying wool. Methods of grading, scouring and measuring length, diameter, crimp, density, tensile strength and other characteristics. Prerequisite: AS 125. (3W) Madsen

*Taught 1966-67
**Taught 1967-68
185. Meats. Cutting, selection, and identification of wholesale and retail cuts of beef, pork, and lamb, with references to prices, relative economy, uses, nutritive value, chemical composition, and palatability. Preparation of meats for the home freezer is emphasized. (3W)

Matthews

**210. Techniques in Nutrition Research.** An original project is completed with the primary objective being to orient one on how to plan, conduct, and summarize research in animal nutrition. Prerequisite: AS 151. (2-8F, W, Sp)

Harris

**214. Advanced Animal Nutrition.** The measures for nutritional value of feed, nutrient requirements of animals, and the cause, detection, treatment and prevention of nutritional diseases. Prerequisite: AS 151. (3W)

Harris

*215. Nutritional Laboratory.** Review and practice in laboratory techniques used in nutrition research. Two labs. (2F)

Street

220. Special Problems in Animal Science. Selected readings, discussions, lectures, literature reviews and research problems dealing with animal breeding, nutrition, physiology and management. Available to students of graduate standing and by permission of the instructor. Credit arranged. (F, W, Sp, Su)

Staff

250. Research and Thesis. Research connected with problems undertaken in animal science for partial fulfillment of requirements for the Master of Science or Doctor of Philosophy degree. Credit Arranged. (F, W, Sp, Su)

Staff

261. Animal Nutrition Seminar. Special emphasis will be given to discussions of topics related to animal nutrition. May be repeated. (1F, 1W, 1Sp)

Staff

262. Animal Breeding Seminar. Special emphasis will be given to discussion of topics related to animal breeding. May be repeated. (1W)

Staff

263. Animal Management Seminar. Special emphasis will be given to discussion of topics related to the management of livestock. May be repeated. (1Sp)

Staff

264. Animal Physiology Seminar. Special emphasis will be given to discussion of topics related to reproductive physiology. May be repeated. (1F, 1W, 1Sp)

Staff

270. Nutrition and Biochemistry Seminar. Reports and discussion of topics of current interest and importance by students, staff, and guest speakers. Philosophy of research and technical information are included. Area of coverage rotates each quarter. Course enrollment may repeat each quarter. (1F, W, Sp)

Staff

*Taught 1966-67

**Taught 1967-68

Department of

Dairy Science

Head: Professor George E. Stoddard
Office in Animal Science 106

Professors C. A. Ernststrom, Lloyd R. Hunsaker, Associate Director Extension Services, Vearl R. Smith, Dean, College of Agriculture; Professors Emeritus George Q. Bateman, A. J. Morris, Extension; Associate Professors John J. Barnard, Extension, Paul B. Larsen; Assistant Professors Clive W. Arave, Charles H. Mickelsen; Research Assistant LaMon Perkes; Collaborators Melvin J. Anderson, Robert C. Lamb.

Students in Dairy Science may choose their training either in dairy production or dairy manufacturing. In each, training is provided in a science, business or general curriculum. Within the curricula students may develop a course of study with other areas of interest such as teaching, pre-veterinary, bacteriology, chemistry, economics or other specialties, offered at the University.
Majors in Dairy Science should have practical experience on a dairy farm or in a dairy manufacturing plant before graduation with a Bachelor of Science degree.

Dairy Production

In the Science curriculum, specialized training is provided in nutrition and in breeding. Those completing a science training prepare themselves for such opportunities as laboratory technicians, industry consultants and further training as graduate students.

The business curriculum provides training in business methods and economic principles in preparation for managing personally owned or commercial dairy farms and the many allied businesses such as equipment and supply companies, feed mills and artificial insemination units.

A general curriculum provides training for those who plan to manage a dairy farm or work with those who manage a dairy farm. Fieldmen, Extension employees and artificial insemination specialists are typical positions for those trained within the general curriculum.

Dairy Manufacturing

Training in the science curriculum emphasizes the scientific principles which are essential in quality control, new product development, laboratory analysis and research. Most of the principles included apply to all food products as they are processed and merchandised. Opportunities for students trained in this curriculum include research, development, product control, inspection and continued schooling toward advanced degrees.

To prepare students to manage dairy and food plants, a business curriculum is available. Technology is strongly supplemented with courses in business management, economics, and accounting.

Opportunities are available in the food industry for urban-reared students as well as those with rural experience. The food industry is one of the most basic in our world society and the need for trained personnel has never been as acute.

Suggested Course of Study for the First Two Years for DAIRY PRODUCTION Curricula.

<table>
<thead>
<tr>
<th>FRESHMAN</th>
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<tbody>
<tr>
<td>English 1, 2, 3</td>
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<tr>
<td>Biology 15</td>
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<td>Zoology 16</td>
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<tr>
<td>Humanities or Social Science (group)</td>
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<tr>
<td>Electives</td>
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<tr>
<td>Mathematics 34, 35, 46</td>
<td>8-13</td>
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<tr>
<td>Bacteriology 70, 72</td>
<td>5</td>
</tr>
<tr>
<td>Biology 15 or Physiology 4</td>
<td>5</td>
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<td>Physical Education or Military Science</td>
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<tr>
<td>Electives</td>
<td>8-3</td>
</tr>
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<td>Total</td>
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Suggested Course of Study for the First Two Years for DAIRY MANUFACTURING Curricula.

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<td>Bacteriology 70, 72</td>
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<tr>
<td>Electives</td>
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</table>

1These courses are required in the science curricula. They are recommended but not required in the other curricula.

2This course is required only in the business curriculum.
Suggested Course of Study for the Junior and Senior Years in the SCIENCE Curriculum.

Dairy Cattle Nutrition Option

<table>
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<tbody>
<tr>
<td>Zoology 112</td>
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<tr>
<td>Animal Science 150, 151</td>
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<tr>
<td>Dairy Science 110, 112**, 120**, 121*, 122, 190, 215</td>
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<tr>
<td>Bacteriology 104*</td>
<td>3</td>
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<tr>
<td>Chemistry 115, 121, 122, 180</td>
<td>17</td>
</tr>
<tr>
<td>Physics 6 or 17, 18, 19 or 20, 21, 22</td>
<td>5-15</td>
</tr>
<tr>
<td>Veterinary Science 120</td>
<td>4</td>
</tr>
<tr>
<td>Electives</td>
<td>33-23</td>
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Dairy Cattle Breeding Option

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>Zoology 112, 118</td>
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<tr>
<td>Animal Science 150, 151</td>
<td>6</td>
</tr>
<tr>
<td>Dairy Science 110, 112**, 120**, 121*, 122, 215</td>
<td>24</td>
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<tr>
<td>Bacteriology 104</td>
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<td>Chemistry 121, 122</td>
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<td>Math 96, 97, 98</td>
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<td>Applied Statistics 51</td>
<td>4</td>
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<tr>
<td>Veterinary Science 120</td>
<td>4</td>
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<tr>
<td>Veterinary Science 150 or Physiology 142</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
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Dairy Manufacturing Option

<table>
<thead>
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<tbody>
<tr>
<td>Bacteriology 104*, 105*</td>
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</tr>
<tr>
<td>Chemistry 115, 121, 122, 180, or 190</td>
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<tr>
<td>Physics 17, 18</td>
<td>10</td>
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<tr>
<td>Electives</td>
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</table>

Suggested Course of Study for the Junior and Senior Years in the BUSINESS Curriculum.

1These courses are required only in the science curriculum.
2This course is required only in the business curriculum.

Suggested Course of Study for the Junior and Senior Years in the DAIRY PRODUCTION General Curriculum.

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
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<tbody>
<tr>
<td>Zoology 112</td>
<td>5</td>
</tr>
<tr>
<td>Animal Science 150, 151</td>
<td>6</td>
</tr>
<tr>
<td>Dairy Science 110, 112**, 120**, 121*</td>
<td>22</td>
</tr>
<tr>
<td>Bacteriology 104*</td>
<td>4</td>
</tr>
<tr>
<td>Veterinary Science 120</td>
<td>7</td>
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<tr>
<td>Plant Science 103, 119</td>
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<tr>
<td>Soils 56</td>
<td>4</td>
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<tr>
<td>Agricultural Engineering 10 or 110</td>
<td>3-5</td>
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<tr>
<td>Entomology 108</td>
<td>5</td>
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<tr>
<td>Directed Electives</td>
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</tr>
<tr>
<td>Electives</td>
<td>15</td>
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</tbody>
</table>

Two-year Program in Dairy Science

A two-year course in Dairy Science leading to a Certificate of Completion is offered. This course is available to train students for efficient dairy production who do not wish to complete the four year

1Directed electives to be selected in consultation with Head of the Department to meet projected employment plans of each student.

*Taught 1966-67
**Taught 1967-68
course leading to the Bachelor of Science degree.

Additional information concerning required courses can be obtained from the department.

Graduate Study

The Dairy Science Department offers a Master of Science degree in Dairy Production and in Dairy Manufacturing. The Master of Science degree is acceptable by other universities toward further study on a PhD degree. Students may work on a Master of Science or a PhD degree in the Nutrition and Biochemistry Interdepartmental Curriculum as outlined in this catalog under School of Graduate Studies.

Dairy Courses

2. Introductory Dairying. Considers the history of the dairy industry. An introductory study is made of starting dairy herds; breeds of dairy cattle; cow testing associations; herd records, calf feeding, and general feeding. Composition of milk, factors that affect it; practical composition and quality tests; farm dairy machines; production of quality milk; dairy arithmetic. Practical skills emphasized. (4W) Larsen, Arave

5. Judging Dairy Products. Methods and practice in judging and grading dairy products for market and show. (2Sp) Larsen


51. Dairy Cattle Judging and Evaluations. Types of various breeds of dairy cattle, judging individual animals, showing, type classification, type and production relations. Visits to dairy farms. (2Sp) Larsen

100. Analysis of Dairy and Food Products. Application of quantitative and qualitative techniques to the determination of composition and quality of dairy and food products. Prerequisite: Chemistry 5 or 12. (6F) Larsen

**101. Manufacture of Ice Cream and Ices. Purchase of raw materials. Chemical and physical structure of an ice cream mix and its relation to the finished product. Standardizing, processing, and freezing of standard commercial ice cream, sherbets, and iccs. Merchandising and selling are included. (6Sp) Ernstrom

**103. Manufacture of Cheese. Factors involved in making cheddar and other varieties of cheese. Classification, statistics, curing, marketing, and factory organization. (6F) Ernstrom

*104. Concentrated Milks and Butter. Factors involved in the manufacture of concentrated milk products and butter. Consideration is given to plant processes, equipment and the chemical, physical and bacteriological aspects relating to quality. (6F) Larsen

105. Management and Operation of Dairy Manufacturing Plants. Personnel problems, advertising, selling, managerial use of records, and other principles underlying successful management and operation are considered. All operations of the creamery are conducted by this class. (6F, W, Sp) Larsen

110. Dairy Production. Growth and development of dairy heifers; herd management systems; housing and equipment; disease control; sanitation and quality milk production, economy in dairy farming; sire and heifer management. (6W) Larsen

**112. Feeding Dairy Cattle. Characteristics of standards and feeding systems. Economy and comparative value of feeds on irrigated farms. Prerequisite: AS 150, 151. (3W) Stoddard

**120. Dairy Cattle Breeds and Breeding. Studies of the inherited characteristics of dairy cattle to be considered in selecting breeding stock. Breeding programs and systems in use. Breeds of dairy cattle, breed organizations and their programs, testing plans, pedigree analysis, record keeping and study of breeding establishments. Prerequisite: Zoology 112. (5W) Arave


122. Dairy Herb Management and Operation. Dairy herd management, land-livestock balance, operational efficiencies, herd improvements, new developments and trends, and critical analysis of dairy literature. Student discussions and reports. (Open to seniors in Dairy Production or by permission of instructor.) (3Sp) Stoddard

*Taught 1966-67  
**Taught 1967-68
52 College of Agriculture

130. Dairy Chemistry. A study of the composition, structure, and properties of milk and its constituents, and the chemistry of changes that occur during the processing of milk for utilization as food. Prerequisite: Chem 12 or 122. (5W) Staff

215. Seminar. Discussions and reports of current literature and research reports by students. At least three quarters required of all dairy students. (1F, 1W, 1Sp)

220. Research in Dairy Industry. Credit arranged. (F, W, Sp, Su) Staff

254. Special Problems in Dairy Industry. Credit arranged. (F, W, Sp, Su) Staff

Ernststrom

Nutrition and Biochemistry Seminar. (See Animal Science 270.)

Department of

Plant Science

Head: Professor Frank B. Salisbury
Office in Agricultural Science 322


Study and research in Plant Science focus upon problems of crop production in arid regions. Course offerings include studies of the inter-relationships of plants grown under a variety of conditions with particular emphasis on factors contributing to production of maximum quality and yield. Opportunity is provided for basic studies of these complex relationships in addition to application of increased knowledge to modern agriculture.

Bachelor of Science degrees are offered under a Science Curriculum, a General Curriculum, and a Business Curriculum.

Science Curriculum

The science curriculum offers the following options: Crop Nutrition and Physiology, Plant Breeding, Food Science, and Weed Science. It is designed for students who are capable and have the desire to continue their education beyond the Bachelor's degree. It provides an

¹On assignment in Bolivia.
excellent background in science supplemented with selected courses in production and management. By choosing one of the options, students may take courses during their senior year that will better prepare them for graduate work in their field of specialization. In addition, students graduating in the Science Curriculum are qualified for positions in industry, education, or with the federal or local governmental organizations.

Science Curriculum. Students in any of the three science options take the courses outlined.

**Freshman Year**
- **Plant Science Courses**\(^1\) .......................... 9
- English 1, 2, 3 ............................................. 9
- Mathematics 34, 35, 46 ................................... 13
- Biology 15 ...................................................... 5
- Botany 26 ....................................................... 5
- Bacteriology 70 & 72 ........................................ 5
- Physical Education (or Military Science) .......... 3

**Sophomore Year**
- Plant Science Course ..................................... 3
- Chemistry 3, 4, 5 ......................................... 15
- Physics 6 ...................................................... 5
- Soils 56 ......................................................... 4
- Geology 3 ....................................................... 6
- Social Science electives (see group requirements) ............................................. 8
- Humanities electives (see group requirements)\(^2\) ......................................................... 12

**Junior Year**
- Plant Science\(^1\) ............................................. 11
- Mathematics 96, 97, 98 .................................... 15
- Chemistry 121, 122 ....................................... 10
- Soils 105 & 106 ............................................. 4
- Zoology 112 .................................................... 5
- Botany 120 .................................................... 5
- Social Science electives (see group requirements) ......................................................... 3

**Senior Year**
- **Crop Nutrition and Physiology**
  - Plant Science 109, 131 .................................. 10
  - Plant Science 112, 112, 112 .......................... 3
  - Statistics 131, 132 ....................................... 8
  - Botany 130 ..................................................... 5

\(^1\)Agricultural Economics 71, 72 or 73 may be taken in place of one Plant Science course.

\(^2\)Should include Landscape Architecture 3 or Plant Science 118.

**Food Science.** The science curriculum will be followed for the first 3 years with the following changes:

- **Freshman Year:** Physiology 4 and Industrial Education 15 will substitute for two Plant Science courses.
- **Sophomore Year:** Dairy Science 2 or 6 will substitute for the Plant Science course.
- **Junior Year:** Agricultural Economics 163, Economics 170, Food and Nutrition 107 and 140 will be scheduled instead of Soils, Zoology and certain electives.

**Weed Science.** Weed Science majors will follow the Crop Nutrition and Physiology Curriculum except that Botany 102 will be taken in the junior year and Range Management 126 will be taken in the senior year.

**General Curriculum**

Students interested in the General Curriculum will follow the plan...
of courses outlined below. With some modification in the plan they can qualify in either Agronomy, Horticulture, or Food Technology.

Special training can be taken in the areas of field crop production and management, weed control, turf management, fruit crops, vegetable crops, and ornamental plants.

This curriculum prepares a student for positions in farming, as a farm manager, farm planner, or as a field man in industry, in the agricultural extension service, or with federal, state or local governmental organizations.

General Curriculum:

**Freshman Year**

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<tr>
<th>Plant Science Option Courses¹</th>
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<tbody>
<tr>
<td>English 1, 2, 3</td>
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<tr>
<td>Biology 15</td>
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<td>Botany 25</td>
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<td>Ag Economics 72, 73</td>
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**Sophomore Year**

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<td>Bacteriology 70 &amp; 72</td>
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**Junior Year**

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<thead>
<tr>
<th>Plant Science Option Courses¹</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entomology 108</td>
<td>5</td>
</tr>
<tr>
<td>Ag Engineering 110</td>
<td>3</td>
</tr>
<tr>
<td>Soils 56</td>
<td>3</td>
</tr>
<tr>
<td>Botany 120</td>
<td>5</td>
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<tr>
<td>Group Electives</td>
<td>24</td>
</tr>
</tbody>
</table>

**Senior Year**

<table>
<thead>
<tr>
<th>Plant Science 112, 112, 112</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant Science 131</td>
<td>5</td>
</tr>
<tr>
<td>Plant Science Option Courses¹</td>
<td>33</td>
</tr>
<tr>
<td>Zoology 112</td>
<td>5</td>
</tr>
<tr>
<td>Botany 190</td>
<td>5</td>
</tr>
</tbody>
</table>

¹Plant Science Option Courses:

* Agronomy. Plant Science 1 or 4, and 7, 8, 103, 109, 119, 120; Soils 105, 106, 155, 156, 114; and 1 additional animal course.

* Horticulture. Options in Horticulture will be selected from the following courses: Plant Science 1, 4, 11, 17, 100, 101, 102, 105, 116, 118, 119, 122, 130, 139; Meteorology 17; Soils 107; Entomology 120; Landscape Architecture 3; and Botany 102.

* Food Technology. General requirements for a degree in Food Science and Technology are presented on pages 63-64 as an Interdepartmental Curriculum. The major professor and chairman of the program can provide the detailed information and graduation requirements.

**Business Curriculum**

Students desiring a Plant Science Business major will take the general curriculum. The following classes will be taken in place of certain electives or optional courses:

| Economics 51 |
| Business 20, 63, 100, 147 |
| Agricultural Economics 105, 145, 180 |

**Two-year Program in Plant Science**

A two-year course in Plant Science leading to a Certificate of Completion is offered. This course is available to train students for efficient crop production who do not wish to complete the four year course leading to a Bachelor of Science degree.

Additional information concerning required courses can be obtained from the department.

**Graduate Study**

* Master of Science Degree. The Department, in cooperation with related departments, offers Master of Science programs in Plant
Breeding, Crop Physiology, Crop Production and Management, Weeds and Weed Control, Food Technology, and Plant Nutrition. A Master of Science degree in the Department is accepted by most other universities as equivalent to a year's work toward a Doctor of Philosophy degree in the major subject.

Upper division courses acceptable for graduate credit toward the Master of Science degree in Plant Science are: Plant Science 109, 120, 130, 151, and 140.

**Doctor of Philosophy Degree.** The Department, in cooperation with related departments, offers the degree of Doctor of Philosophy in Plant Nutrition, Crop Management, Food Technology, Plant Breeding and Physiology. Detailed information may be obtained from the Department or from the Dean of the School of Graduate Studies. (Also see Catalog, School of Graduate Studies.)

**Plant Science Courses**

1. **Fruit Production.** Principles and practices underlying production of trees and small fruits. Varieties, soils, sites, fertilizers, culture, pest control, harvesting, storage, propagation and stocks. Three lectures. (3F) Anderson

4. **Vegetable Production.** Principles and practices underlying production of vegetable crops, varieties, fertilizers, pest control, harvesting, storage, and processing of vegetables. Three lectures. (3Sp) Hamson

7. **Grain Crops.** The classification, history, and cultural methods involved in the production of grain crops. Two lectures, one lab. (3W) Dewey

8. **Root and Miscellaneous Crops.** Cultural methods, market grades and commercial possibilities of sugar beets, potatoes, tobacco, and other crops are studied. (3F) Allred

11. **Garden Flowers.** Identification, culture and landscape use of bulbs, annuals and perennials. (3Sp) Wesenberg

17. **House Plant Care.** Identification, propagation, cultural requirements and pests of house plants. (1F) Wesenberg

100. **Pruning and Grafting.** A practical course for all students in the University, dealing with the science and art of pruning and grafting of horticultural plants. Special emphasis is placed on fruit trees, but the small fruits and ornamental trees and shrubs are also included. (2W) Walker

**101, 102. Advanced Horticulture.** Fundamental principles relating to horticultural practices; growth and development, nutrition, water relations, temperature, light, fruit setting, and growth regulators. Course 101 deals primarily with vegetable crops and 102 with fruit crops. These courses may be taken separately or in any sequence. Prerequisites: Botany 24, 25 (Botany 120 may be taken concurrently): Chemistry 12 or 121; Soils 56: Plant Science 1 or 4. Three lectures, one lab. (4W, 4Sp) Hamson, Walker

103. **Forage Crops.** Alfalfa, clovers, grasses and other farm forages; classification and methods of production, harvesting and storage; meadow and pasture management. The place of forage crops in rotations and soil conservation is considered. Three lectures, one lab. Prerequisite: Botany 24. (4Sp) Allred

105. **Turf Management.** Kinds of turf grasses, their fertility and management, for home lawns, golf courses, and athletic fields. (2Sp) Allred

109. **Plant Breeding.** Principles, techniques, and practices in breeding improved varieties of crop plants. Prerequisite: Zoology 112. (6W) Dewey

112. **Seminar.** Review and discussion of current agronomic problems, practices, and available employment. Required of all seniors in department. One lecture. (1F) Staff

115. **Dry Farming.** Principles of dry farming from practical and scientific standpoints; a survey of agricultural work in the Great Plains and the mountain regions; an analysis of the possibilities in typical climatic areas and on important soil types. Prerequisites: Plant Science 7 and Soils 56. (2W) McAllister

**116. Greenhouse Management.** Use of greenhouses to provide partially controlled environment. Production of florist crops. Prerequisite: Botany 24. (3W) Wesenberg

118. **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) Wesenberg

119. **Weeds and Weed Control.** Identification of weeds, the weed problems in agriculture, and methods of control. Three lectures, one lab. (4F) Anderson

*Taught 1966-67
**Taught 1967-68

**
120. Field Crop Seed Production. Methods, problems, and commercial possibilities of field crop seed production in the Intermountain West. Prerequisite: Botany 24. (2F) McAllister

121. Seed Analysis and Grading. Impurities of crop seeds; methods of analysis and testing; seed inspection; application of federal standards in the grading of field crops. Two labs. (2W) McAllister

*122. Nursery Management. Production of ornamental nursery stock, including shrubs, trees, and evergreens. Layout and operation of commercial outlets. Prerequisite: Botany 24. (3W) Wesenberg

**130. Vegetable and Flower Seed Production. Methods and commercial possibilities of vegetable and flower seed production. A required field trip is taken into seed-producing areas in southern Idaho. Three lectures, one lab. (4F) Pollard

131. Agricultural Sprays and Dusts. Preparation, properties, and uses of agricultural chemicals used in disease, insect, and weed control; application of fruit thinning, growth regulator, and nutritional sprays. Design, operation, and care of the application equipment. Jointly administered by the Departments of Botany, Plant Science, and Zoology. Prerequisites: Botany 130, Entomology 108 or special permission. Three lectures, two labs. (5Sp) Anderson, Cannon, Davis

*139. Food Technology I. Storage and transportation of horticultural crops. Will give emphasis to post harvest physiology and storage diseases of fruits and vegetables. Will include discussions of hydrocooling, air control, antibiotics, radiation, transportation, and distribution. Prerequisites: Bacteriology 10 or 70 and 71; Chemistry 3, 4, 5, or 10, 11, 12; Botany 24, 25, 130; Plant Science 1, 4; or special permission. Three lectures, one lab. (4F) Salunkhe

**140. Food Technology II. Processing of horticultural crops. History and methods of commercial preservation of fruits and vegetables by canning, freezing, drying, pickling, and radiation, juices, concentrates, and syrups; packaging, organoleptic appraisal, quality control, and sales promotion. Prerequisites: Bacteriology 10 or 70 and 71; Chemistry 3, 4, 5, or 10, 11, 12; or by special permission. Three lectures, one lab. (4F) Salunkhe

150. Special Problems. Conferences or laboratory investigations. Subject and credit arranged. Staff

201. Hays and Pastures. Recent advances in current problems related to the production and use of hays and pastures. Prerequisite: Plant Science 103 or equivalent. (3Sp) Allred

**208. Advanced Field Crops. Recent advances in the improvement and production of cereal, potato and sugar beet crops. Prerequisites: Plant Science 7 and 8. (3W) McAllister

213. Graduate Seminar. Oral and written reports by graduate students. Registration required for all departmental graduate students. (1F, W, Sp) Staff


241. Food Technology III. Biochemistry and Microbiology of Horticultural Products. The basic composition, structure, and properties of fruits and vegetables. Nutritional and biochemical changes occurring subsequent to harvest and during transit, storage, and processing of fruits and vegetables. Relationship of habitat to occurrence of micro-organisms on harvested, stored, and processed fruits and vegetables. Environmental factors influencing the growth of micro-organisms on fresh and processed horticultural crops. Interpreting and integrating published data in the area with basic principles of biochemistry and microbiology. Prerequisites: Food Tech I, II, Chemistry 190, Bact 120, Botany 160. Three lectures, one lab. (4Sp) Salunkhe

250. Special Problems. Any quarter. Credit arranged. Registration by permission only. Staff

*Taught 1966-67
**Taught 1967-68
Department of

Soils and Meteorology

Head: Professor Sterling A. Taylor
Office in Agricultural Science 148

Professors Paul D. Christensen, Extension, R. L. Smith, D. Wynne Thorne, University Vice President; Associate Professors Ben L. Grover, Raymond W. Miller, James P. Thorne, Le Moyne Wilson; Assistant Professor Gaylen L. Ashcroft; Collaborators J. L. Haddock, E. Arlo Richardson, Ronald K. Tew.

The Soils and Meteorology research laboratories are world-renowned in soil chemistry, soil physics, soil testing and micro meteorology. Latest equipment and facilities for studying the composition of soil and plant materials, the retention and movement of water and other materials through soils and plants, the reactions of pesticides in the soil, plant nutrition, the influence of soil and atmospheric environment on plants and animals, fertility, requirements, water quality, trace elements, and the use and conservation of soil and water resources are available. Advanced undergraduate students are given the opportunity to work with staff members and graduate students on original research projects. Emphasis is upon problems connected with arid to semi-humid soil and climate complex that is characteristic of the intermountain and Great Basin region of western U.S.A. Bachelor of Science majors are offered in Soil Science, Soil and Water Conservation, Soils and Irrigation, General Soils, and Industrial Soils and Agricultural Chemistry.

Science Curriculum

The science curriculum affords choices in either Soil and Water Conservation, Soils and Irrigation (administered jointly with the Department of Agriculture and Irrigation Engineering), or Soil Science. A student graduating with either of the three soil science options is well equipped to do either applied or graduate work, and to assist in soil and water research and utilization programs. He meets the requirements of the Soil Science Society of America for certification as a Soil Scientist and can qualify for Civil Service positions as a soil scientist or conservationist. In addition, a student graduating with the Soil and Water Conservation option is well trained in hydrology and equipped for positions with a number of federal, state and local governmental and civic organizations in planning and supervising the use of soil and water for a multitude of uses. A student selecting the Soils and Irrigation option is trained to manage and operate irrigation systems and installations and to work for extension and conservation organizations as irrigation specialists. The opportunities for foreign service are particularly good for this option.

Students selecting Soil Science are prepared for all kinds of soil science positions in connection with agriculture, forestry, range science, engineering and education.

All students in the Science Curriculum take the first 3 years in common.
58 College of Agriculture

FRESHMAN YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>English 1, 2, 3</td>
<td>9</td>
</tr>
<tr>
<td>Met. 17</td>
<td>3</td>
</tr>
<tr>
<td>Social Science electives (see group req)</td>
<td>3</td>
</tr>
<tr>
<td>Mathematics 35, 46, 96</td>
<td>15</td>
</tr>
<tr>
<td>Chemistry 3, 4, 5</td>
<td>15</td>
</tr>
<tr>
<td>PE or MS electives</td>
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SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Mathematics 97, 98 and 99</td>
<td>15</td>
</tr>
<tr>
<td>Soils 56</td>
<td>4</td>
</tr>
<tr>
<td>Biology 15</td>
<td>5</td>
</tr>
<tr>
<td>Botany 26</td>
<td>5</td>
</tr>
<tr>
<td>Bacteriology 70, 72</td>
<td>4</td>
</tr>
<tr>
<td>Social Science electives (see group req)</td>
<td>3</td>
</tr>
<tr>
<td>Humanities electives (see group req)</td>
<td>15</td>
</tr>
</tbody>
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JUNIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Soils 105, 106, 155, 156, 114</td>
<td>13</td>
</tr>
<tr>
<td>Physics 17, 18, 19 or 20, 21, 22</td>
<td>15</td>
</tr>
<tr>
<td>Geology 3</td>
<td>5</td>
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<tr>
<td>English 111 or 113</td>
<td>3</td>
</tr>
<tr>
<td>AE 110 or 143</td>
<td>3</td>
</tr>
<tr>
<td>Electives 3</td>
<td>12</td>
</tr>
</tbody>
</table>

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The following options are suggested for the Science Curriculum:

SENIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soils and Irrigation Option</td>
<td></td>
</tr>
<tr>
<td>Soils 165, 166, 111</td>
<td>5</td>
</tr>
<tr>
<td>Met 175</td>
<td>3</td>
</tr>
<tr>
<td>AE electives 3</td>
<td>9</td>
</tr>
<tr>
<td>Electives 4</td>
<td>25</td>
</tr>
<tr>
<td>Biological science electives 3</td>
<td>9</td>
</tr>
</tbody>
</table>

51

Soil and Water Conservation Option

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Soils 165, 166, 111</td>
<td>5</td>
</tr>
<tr>
<td>Met 135</td>
<td>3</td>
</tr>
<tr>
<td>Forestry and Range electives 1</td>
<td>11-21</td>
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<tr>
<td>Botany 120 or 108, 102</td>
<td>14-5</td>
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<tr>
<td>CE 173</td>
<td>3</td>
</tr>
<tr>
<td>Electives 2</td>
<td>15</td>
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Soil Science Option

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soils 165, 166, 111</td>
<td>5</td>
</tr>
<tr>
<td>Met 175</td>
<td>3</td>
</tr>
<tr>
<td>Chemistry 115</td>
<td>4</td>
</tr>
<tr>
<td>Biological Science electives 5</td>
<td>11</td>
</tr>
<tr>
<td>Exact science electives 6</td>
<td>15</td>
</tr>
<tr>
<td>Electives 6</td>
<td>13</td>
</tr>
</tbody>
</table>

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General Curriculum

General Soils Option. A major in General Soils prepares the student for positions in the Agricultural Extension Service, and as a farm planner, field man or farm manager with commercial companies or as a Conservationist in the U.S. Civil Service.

The following schedules by quarters are guides to help the student fill his required courses.

Freshman Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Communications</td>
<td></td>
</tr>
<tr>
<td>(English) 1, 2, 3</td>
<td>9</td>
</tr>
<tr>
<td>Biology 15</td>
<td>5</td>
</tr>
<tr>
<td>Botany 26</td>
<td>5</td>
</tr>
<tr>
<td>Mathematics 34, 35, 44</td>
<td>11</td>
</tr>
</tbody>
</table>

1Forestry and Range electives should be chosen from Range Science 180, 131, 132; Forestry Science 141, 114, 115.
2Electives should include at least 5 hours chosen from upper division courses in Mathematics, Chemistry, Physics or Applied Statistics 131 and 132. Other suggested electives are Geology 115 and 117.
3Biological science electives should include Botany 125 and any other upper division courses in Botany or Plant Sciences.
4Exact science electives should be chosen from upper division courses in Mathematics, Chemistry, Physics, or Applied Statistics 131 and 132.
5Electives should include Geology 115 or 117 and Applied Statistics 131, 132 and 134.
Soils and Meteorology 59

Business Curriculum

Industrial Soils and Agricultural Chemistry Option. The degree in Industrial Soils & Agricultural Chemistry will equip the graduate to handle jobs with commercial companies as general field man, managers and as technicians. The training will prepare the graduate for employment in industries concerned with the manufacture and distribution of fertilizers, herbicides, fungicides and insecticides.

The following outline will guide the student in the preparation of his course schedule.

Freshman Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Communications (English) 1, 2, 3</td>
<td>9</td>
</tr>
<tr>
<td>Biology 15</td>
<td>5</td>
</tr>
<tr>
<td>Botany 26</td>
<td>5</td>
</tr>
<tr>
<td>Mathematics 34, 35, 46</td>
<td>13</td>
</tr>
<tr>
<td>Meteorology 17</td>
<td>3</td>
</tr>
<tr>
<td>Agriculture Economics 71, 72, 73</td>
<td>9</td>
</tr>
<tr>
<td>Chemistry 3, 4, 5 or 10, 11, and 12</td>
<td>15</td>
</tr>
<tr>
<td>Meteorology 17</td>
<td>3</td>
</tr>
<tr>
<td>Physical Education (or Military Science)</td>
<td>3</td>
</tr>
<tr>
<td>Humanities or Social Sciences groups</td>
<td>3</td>
</tr>
<tr>
<td>Soils 105, 106, 155, 156, 114</td>
<td>13</td>
</tr>
<tr>
<td>English 111 or 113</td>
<td>3-6</td>
</tr>
<tr>
<td>Upper division Biological Science electives</td>
<td>21</td>
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<tr>
<td>Bacteriology 10 or 70</td>
<td>5</td>
</tr>
<tr>
<td>Humanities or Social Science groups</td>
<td>5-6</td>
</tr>
<tr>
<td>Total has at least 49</td>
<td>49</td>
</tr>
</tbody>
</table>

Sophomore Year

Soils 165, 166, 111                           | 5       |
| Upper division Biological Sciences electives| 13      |
| Agri and Irri Engineering 110               | 3       |
| Electives                                   | 27      |
| Total has at least 48                      | 48      |

Junior Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Entomology 108</td>
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</tr>
<tr>
<td>Soils 105, 106, 155, 156</td>
<td>8</td>
</tr>
<tr>
<td>Botany 130</td>
<td>10</td>
</tr>
<tr>
<td>Business Administration 63</td>
<td>2</td>
</tr>
<tr>
<td>English 111 or 113</td>
<td>3</td>
</tr>
<tr>
<td>Meteorology 135</td>
<td>3</td>
</tr>
<tr>
<td>Plant Science 131</td>
<td>5</td>
</tr>
<tr>
<td>Chemistry 115</td>
<td>5</td>
</tr>
<tr>
<td>Social and Behavioral Science electives</td>
<td>10</td>
</tr>
<tr>
<td>Total has at least 50</td>
<td>50</td>
</tr>
</tbody>
</table>

Senior Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soils 165, 166, 111, 114</td>
<td>10</td>
</tr>
<tr>
<td>Plant Science 119</td>
<td>4</td>
</tr>
<tr>
<td>Chemistry 121, 189</td>
<td>10</td>
</tr>
<tr>
<td>Business Administration 183</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>21</td>
</tr>
<tr>
<td>Total has at least 48</td>
<td>48</td>
</tr>
</tbody>
</table>

12 hours of electives must be chosen from BA 100, 151, 171; Ag Econ 102, 116 and 145.
Some recommended electives to better train the student for his profession include Art 53 or 57 (photography); Soils 110, 167 and 177; Plant Sciences 1, 8, 105, 131, 139; AE 110 and courses in Animal Science, Veterinary Science or Dairy.

Graduate Study

Master of Science Degree. The Department, in cooperation with related departments, offers master of science programs in soil physics, soil chemistry, soil fertility, plant nutrition, soil genesis, soils and irrigation and biometeorology. A Master of Science degree in the department is accepted by most other universities as equivalent to a year's work toward a Doctor of Philosophy degree in the subject pursued.

Doctor of Philosophy Degree. The Department, in cooperation with related departments, offers the degree of doctor of philosophy in: soil physics, soil chemistry, soil fertility, plant nutrition, soil genesis, soils and irrigation and biometeorology. Detailed information may be obtained from the Department or from the Dean of the School of Graduate Studies.

Acceptance. Student applications, submitted to the School of Graduate Studies, for advanced study in Soils and Meteorology are reviewed by a departmental committee. The applicant may be accepted without reservation, accepted on probation, accepted as a non-candidate, or rejected. Students accepted on a probationary basis will not be assigned a research problem, given research credit, be assigned a graduate committee, or considered for an assistantship until such probation has been removed as a result of academic excellence. This probationary status cannot be indefinite and is limited to two quarters. A probationary student who does not maintain B grades or better will not be permitted to continue in the department.

Assistantships and Major Professors. Acceptance of a student to pursue graduate study does not grant him an assistantship or the right to study under a particular professor. Assistantships are awarded to accepted students by the professors having funds to cover specific research. Funds are not available to provide all students with assistantships. Some students who wish to do graduate work may be accepted if they do not desire financial assistance. Permission to study under a particular professor may be granted by the professor in question, after consultation with the student.

Program Direction. The graduate student's program is directed by a graduate committee consisting of his major professor and at least two other professors. The student and major professors may indicate a choice of committee members, but the final appointment is made by the Dean of the School of Graduate Studies.

Soils Courses


57. Introductory Soils Laboratory. Offers credit for the laboratory of Soils 56 for students who have had a general soils course without a laboratory. (IF, W) Miller

58. General Soils. Fundamentals of soils with emphasis on range and forest soil problems. Designed for students in forestry and range management. Prerequisite: Inorganic Chemistry. Four lectures, one lab. (5Sp) Miller

105. Soil Science. Nature and composition of soils; colloidal behavior, soil reaction, solubility, ionic behavior and nature and properties of the interface. Prerequisites: Soils 56, 58 or approval of the instructor. (3F) Staff
Soils and Meteorology

106. Soil Science Laboratory. Laboratory methods in Soil Science. Prerequisite: Prior or concurrent registration in Soils 105 or approval of instructor. (1F) Staff

107. Irrigated Soils. Soil salinity, soil-moisture-plant relationships, water supply and quality, irrigation water measurement, soil moisture movement, irrigation methods. Prerequisite: An introductory course in soils or approval of the instructor. (3W) Staff

110. Soil Microbiology. See Bacteriology 110.

111. Soil Seminar. Review and discussion of current soil problems and literature. Required of all seniors in the department. (1W) Staff


150. Special Problems. Conferences or laboratory investigations. Subject and credit arranged. Staff

155. Chemical Edaphology. Plant and soil relations with respect to environment: nutrient availability, absorption, toxicity, fertilizers, and plant nutrition. Prerequisite: Soils 105 or approval of the instructor. (3W) Smith

156. Chemical Edaphology Laboratory. Methods of analysis of soils and plants. Prerequisite: Prior or concurrent registration in Soils 155 or approval of the instructor. (1W) Smith

165. Physical Edaphology. The physical relationships of soil moisture, temperature, penetrability, and aeration to plant growth. Structural conditions, tillage, irrigation, and other soil management practices are considered as factors that affect these relationships. Prerequisite: Soils 165. (3F) Taylor

166. Physical Edaphology Laboratory. Methods of analysis of the physical properties of soils. Prerequisite: Prior or concurrent with Soils 165 or approval of the instructor. (1F) Taylor

167. Physical Analysis of Soils. A laboratory course in Soil Physics. Prerequisite: Soils 166. (2W) Taylor

177. Chemical Analysis of Soils. A laboratory course in chemical analysis of soils and plants. Emphasis will be on the theory of analytical techniques and the operation of instruments necessary for the more usual analyses done in plant and soil research. Two laboratory periods. Prerequisite: Permission of the instructor. (2W) Miller

Graduate Courses

212. Seminar. Review of current literature in soil science. Required of all graduate majors. (1F, W, Sp)

214. Soil Physics. A theoretical discussion of soil as a physical body. The structure of clay minerals and their relation to absorption and other surface phenomena; soil moisture and air relations; and soil stabilization are considered. Prerequisite: Soils 165. (3Sp) Taylor

218. Special Problems. Soils and meteorology. Students review literature on the problem and conduct experiments. Credit arranged. (F, W, Sp, Su) Staff


221. Genesis, Morphology and Mineralogy of Soils. A study of soil formation and alterations: Rates of chemical change, age-dating of soils, and unique soil formations. Prerequisite: Soils 114 or permission of the instructor. Three lectures. (3F) Miller

224. Soil Chemistry. Chemical nature of soils; surface chemistry and ionic equilibria, electrokinetic properties; chemical phenomena of individual elements in soils. Prerequisite: Soils 155 or approval of the instructor. (3Sp) Smith


Meteorology Courses

17. Introduction of Weather and Climate. A survey course which treats temperature, wind clouds, precipitation, storms, air masses, atmospheric circulation, and the impact of weather and climate upon human activities. (3F) Ashcroft

117. Weather and Climate. A course primarily designed to give teachers a basic knowledge of weather phenomena including their causes and effects, and to explain topographic and seasonal changes in weather and climate. Aids in teaching weather and climate will also be an important part of the course. Credit will not be given for both Met 17 and Met 117. (4Su) Richardson

135. Bioclimatology. Interrelations between living organisms, both plants and animals including man, and the physical and chemical factors of their atmospheric environment. (3W) Ashcroft

*Taught 1966-67
**Taught 1967-68
62 College of Agriculture

150. Special Problems. Conferences or laboratory investigations. Subject and credit arranged. Staff

175. Boundary-Layer Meteorology. A treatment of heat and moisture exchange between the earth’s surface and the air layer above. This exchange is considered from the energy balance and aerodynamic approaches in addition to several empirical and semiempirical techniques. Prerequisite: Mathematics 99. (3Sp) Ashcroft

218. Special Problems. Soils or meteorology. Students review literature on the problems and conduct experiments. Credit arranged. (F, W, Sp, Su) Staff


Department of

Veterinary Science

Head: Professor Merthyr L. Miner
Office in Veterinary Science Building

Associate Professors Joseph T. Blake, Jay W. Call, Ross A. Smart, Don W. Thomas, Extension; Assistant Professors Richard W. Jones, James A. Thomas; Research Associate Arland Olson; Research Assistants Robert Davis, Everett Fisher, Robert Thornley; Collaborators Wayne Binns, Lynn F. James, James L. Shupe.

The courses offered by the department help round out the training of students in related animal science courses. The advanced courses are for those in graduate studies in Animal Sciences, Biochemistry, Zoology, Bacteriology, Toxicology, and Wildlife.

If one desires to study toward a Degree in Veterinary Medicine (DVM), he can apply to one of the 18 schools of Veterinary Medicine in the United States. Enrollment into Veterinary Schools is limited. Prior to application to a Veterinary School, a student must complete the pre-veterinary courses outlined below. Many students complete these basic science courses by majoring in related science courses such as animal science, zoology, bacteriology, and chemistry. Such majors are eligible for entrance into any Veterinary School.

The State of Utah has entered into a Compact with the Western Interstate Commission for Higher Education whereby Utah will subsidize the training of at least five students in each of the four years, in Veterinary Schools operating under the Compact. This subsidy relieves the student of paying out-of-state fees. He has to pay all other fees that in-state students pay. If a student is a Utah resident and has completed the pre-veterinary requirements, he must apply to the Utah Commission for certification to the three western schools cooperating under the Compact. These applications are due December 1st of each year. He must also make independent applications to the schools of his choice. Acceptance is dependent on the choice of students by the Veterinary Schools.

Suggested Pre-Veterinary Courses

<table>
<thead>
<tr>
<th>Courses</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>English 1, 2, 3</td>
<td>9</td>
</tr>
</tbody>
</table>
Math 35, 46, 96 ............................... 15
Chem 3, 4, 5 ................................ 15
Soc Sci or Humanities .................. 9
MS or PE ................................... 3

Sophomore Courses Credit
Physics 17, 18, 19 ......................... 15
Biology 16 ................................ 5
Zoology 16 ................................ 5
Botany 26 ................................ 5
Ani Sci 10 ................................ 5
Soc Sci or Humanities .................. 10
Electives .................................... 9

Junior Courses Credit
Chem 115, 121, 122, 123 ................ 15
Zoology 112, 118 ......................... 10
Soc Sci or Humanities .................. 6
Electives .................................... 20

Electives could include subjects recommended by schools of Veterinary Medicine such as: statistics, biochemistry, foreign language, marketing, business.

Veterinary Science Courses

20. Anatomy and Physiology of Domestic Animals. A study of how the animal's body is constructed and functions. Each system is studied separately; emphasis on the digestive and reproductive systems. Four lectures, one lab. (5W) Blake

129. Animal and Poultry Hygiene. Principles of animal sanitation in relation to disease control. Federal and state disease control programs and the etiology, symptoms, and control measures of the more prevalent diseases are also studied with demonstrations of first aid and the common farm operations on animals. Three lectures, one lab. (4Sp) Call

146. Veterinary Parasitology. Detailed study of the scientific name, common name, class, range, pathogenesis, life cycle, methods of control, and treatment of common internal and external parasites of domestic animals. Four lectures, one lab. (5F) Miner

150. Artificial Insemination of Animals. A study of the basic concepts of the science of reproduction as related to artificial insemination, training in the art and the management of artificial insemination organizations. The course is for majors in the animal science field who have had courses in anatomy and physiology, bacteriology, nutrition and breeding. One lecture, two labs. (3Sp) Call

200. Special Problems. Open to upper division or graduate students majoring in subjects related to veterinary medicine and who wish to study a particular phase of disease in animals. (1-3F, W, Sp) Staff

210. Research. Outlining and conducting research on animal diseases. Any quarter. Credit arranged. Staff

**230. General Pathology. An introduction to the cause and mechanism of disease processes: degenerative changes, circulatory disturbances, inflammation, regeneration, neoplasms, and food deficiency alterations. Prerequisites: Zoology 118 and 128. Three lectures, two labs. (5W) Miner

**231. Systematic Pathology. A study of the diseases of the cardiovascular, blood and hematopoietic, respiratory, digestive, urinary, genital, endocrine, nervous, locomotor and tegumentary systems. Prerequisite: VS 230. Three lectures, two labs. (8Sp) Miner

*Taught 1966-67
**Taught 1967-68

Food Science and Technology

Ellis W. Lamborn, Agricultural Economics; Spencer H. Daines, Agricultural Engineering; L. E. Olson, Plant Science; James A. Bennett, Animal Husbandry; Lewis W. Jones, Bacteriology and Public Health; A. T. Tu, Biochemistry; C. A. Ernstrom, Dairy Science; Ethelwyn B. Wilcox, Food and Nutrition; D. K. Salunkhe, Plant Science; Carroll I. Draper, Poultry Husbandry; and F. S. Nury, USDA Collaborator.

Through an interdepartmental committee, the several colleges of the University are cooperating to provide an integrated program of teaching and research that will meet diversified needs of many indus-
trial and academic fields in which a training of Food Science and Technology is essential.

Food Science and Technology encompasses the application of science and technology to handling, transportation, manufacturing, storage, distribution, marketing, and utilization of foods. Several food industries require trained personnel to select raw material, to control manufacturing operation, to solve technical problems of palatability, nutritive value, keeping quality of foods and to investigate new methods of handling, storage, transportation and processing. Likewise, many opportunities in federal and state agencies, research laboratories, private research institutes, large hospitals, cafeterias and foreign assignments are available.

The undergraduate curriculum is designed to prepare students for service and leadership with adequate foundation in basic sciences of physics, mathematics, chemistry, and biology. Some latitude is also provided through restricted electives for students to acquire additional training in science and technology of fruit, vegetable, grain, meat, and dairy products or in business and marketing. The electives chosen will depend upon the professional goal of the student and must be selected in consultation with the adviser, and the chairman of the curriculum.

Several lines of specializations are available:

1. Dairy Manufacturing
2. Animal Products (including poultry)
3. Handling and Processing of Agronomic and Horticultural Products.
4. Chemical, Nutritional, Marketing and Microbiological Aspects of Foods
5. Food Marketing.

The above discussion will give students broad background in basic sciences as well as a more specialized concept in a study of foods.

Students studying toward a BS degree in Food Science and Technology must complete the University, the College and the Departmental requirements in addition and/or in concurrence with the following Food Science and Technology Curriculum requirements: Bacteriology (70 or 10, 71, 120, 121); Chemistry (3, 4, 5 or 10, 11, 101, 115, 121, 122, 123, 190, and a course in food toxicology); Botany 26, 120, 130); Zoology (16, 112); Biology 15; Economics and/or Agricultural Economics (Ag Econ 163, Economics 170); Mathematics (96, 97, 98, 99 especially for those who plan on doing graduate work); Physics (17, 18, 19); Industrial Education (15); Agricultural Entomology (108); Physiology (4); Plant Science (131, 139, 140); Dairy Science (at least two courses from 101, 130, 104); Business Administration (63); Animal Science (185); Food and Nutrition (5, 107, 108, 109, 140, 146); Applied Statistics (51). Agricultural Engineering (a new course will be created to cover design, construction and operation of food plants and processing technology).

Plant Science (a new course will be created to cover farm crop products such as potato and corn products, sugars, breakfast foods, milling, brewing, etc.).

Restricted electives will be arranged from the above courses, if needed, with the approval of the adviser and the chairman of the committee. D. K. Salunkhe is chairman for 1965-67.
COLLEGE OF BUSINESS AND SOCIAL SCIENCES
College of Business and Social Sciences

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  Personnel and Industrial Relations, 71
  Production Management, 72
  BA Major with computer science minor, 72
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Degrees Offered:
  Bachelor of Arts
  Bachelor of Science
  Master of Arts
  Master of Science
  Master of Business Administration
  Doctor of Philosophy
  Also ROTC Commission
The American economy today provides an unusual opportunity for enterprising managers and businessmen. In a free enterprise economy such as ours, the decisions of the business world are made by individual managers and owners of business. The very course of our national progress and prosperity is determined by the decisions and actions of businessmen. As never before, we need leadership in this area. We are currently challenged by an alternative approach—totalitarian state planning. If our system is to survive and grow, dynamic, imaginative leadership is needed in the business world, and great rewards await those who can provide this leadership.

Throughout all history man has been faced with certain crucial social problems which have never been solved: crime, poverty, tyranny, prejudice, war, injustice—the list is legion. The Social Sciences take as their special province the study of individual and group relationships and behavior, and thus attempt to explain, understand, and provide solutions to these great problems. Political Science explores the methods of government, or group law and order, vitally necessary for the preservation of our democracy and personal liberties. Economics analyzes the production and utilization of goods and services and the allocation of our scarce resources which set a ceaseless limitation on our abilities to fulfill man’s aspirations. History studies the full sweep of man’s experience with the hope that we can learn from our forefathers’ experience and rise upward to new heights of human existence. Sociology deals with the group relationships within the family, subcultures, work environment, and other groups. Anthropology studies diverse cultures such as the American Indian. Special attention is given to social work, crime, population problems, women’s role in society, and other great sociologic problems which beset us. Many of mankind’s greatest problems lie in the field of the Social Sciences. The challenge, as well as the opportunity, for significant breakthroughs has never been greater.

The purpose of the College of Business and Social Sciences is to provide an education that is practical and realistic, preparing men and women to take an active part in the main stream of our society so that our progress and prosperity will grow in the years ahead. At least a minimal introduction to social science is required of all students in the University. In addition, the seven departments in the College offer the following majors:

The newly formed Department of Accounting offers accounting. The Department of Business Administration offers Finance, Marketing, Personnel and Industrial Relations, and Production Management. The Department of Business Education and Office Administration offers Business Education, Distributive Education, Office Administration, and a combination
major in Office Administration and Family Life. The Department of Economics offers a major in Economics. The Department of History offers a major in History. The Department of Political Science offers majors in Political Science and Pre-Law, as well as excellent training for the Foreign Service. The Sociology Department offers majors in Sociology and Social Work. Opportunities for rewarding careers are excellent in all these fields. Successful business executives earn the largest financial rewards that our system has to offer, while the demand for social scientists is ever increasing as our society grows in complexity and size.

Many significant scholarships are available to students majoring in Banking and Finance, Economics, Social Relationships, Accounting and other areas in the College. The top ten per cent of the graduating class are awarded membership in the honorary scholastic fraternity of Phi Kappa Phi. Internships are also available in accounting and political science.

Courses in the College of Business and Social Sciences provide the foundation upon which to build significant careers in such occupations as the following: business executive, accountant or CPA, social worker, secretary, lawyer, salesman or marketing expert, personnel manager, historian, high school teacher, banker, economist, politician, or government worker, foreign service, juvenile court worker, criminologist, anthropologist, geographer, econometrician, office manager, investment broker, operations analyst, welfare worker, production manager, investment counselor, college professor, public administrator.

Graduate work is available in all departments of the College of Business and Social Sciences.

Department of

Accounting

Head: Professor Norman S. Cannon
Office in Main 131

Professors Emeritus William M. Bell, V. D. Gardner; Assistant Professors Judith Bills, W. Glenn Cannon, Joseph S. Merrill, William V. Tezak.

The basic objective of the first two years' program in the Department of Accounting is to provide a broad and sound educational foundation upon which to build a professional education in Accounting. This can be accomplished as follows:

<table>
<thead>
<tr>
<th>FRESHMAN</th>
<th>Course</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Basic Communications</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Natural Science (Math, Physiology, Biology, Physics, Chemistry, etc. Math 35 and 66 are required)</td>
<td>18</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SOPHOMORE</th>
<th>Course</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Political Science</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>History, Sociology</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>70 or Psychology</td>
<td>3-6</td>
</tr>
<tr>
<td></td>
<td>FE, MS, or AS</td>
<td>0-5</td>
</tr>
<tr>
<td></td>
<td>Aproved Electives</td>
<td>45-53</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Accounting 1, 2, 3 Introductory Accounting</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA 4, 5, 6 Business Law</td>
<td>6</td>
</tr>
<tr>
<td>Economics 51, 52</td>
<td>10</td>
</tr>
<tr>
<td>Computer Science 11</td>
<td>3</td>
</tr>
<tr>
<td>Math 60-66</td>
<td>8</td>
</tr>
<tr>
<td>Humanities</td>
<td>10-16</td>
</tr>
<tr>
<td>Approved Electives</td>
<td>5-11</td>
</tr>
</tbody>
</table>

48-52
The proposed program for the first two years stresses general education in the Social Sciences, the Natural Sciences, and the Humanities. It fills the lower division group requirements as well as the state and institutional requirement for an understanding of the American system. The few courses in business and economics offered in the Sophomore year form the foundation for entry into the upper division professional program.

During the last two years all accounting majors must take the following core and supporting courses:

**Business Administration**
- BA 131, 132 Business Statistics, Junior year
- BA 133 Management Concepts, Junior year
- BA 151 Marketing, Junior year
- BA 181 Corporation Finance

**Economics**
- Econ 107 Intermediate Economic Theory
- Econ 165, or 108, or 171

**Accounting**
- Acct 101, 102, 103 Intermediate Accounting, Junior year
- Acct 111 Cost Accounting, Junior year
- Acct 121, 122 Auditing, Senior year
- Acct 127 Income Tax Accounting, Senior year

**Professional Electives**

In addition the student must take at least 20 credit hours of electives selected from the following:

**Business Administration**
- BA 104, 105, 106 Business Law
- BA 134 Production Management
- BA 149 Business Policy
- BA 171 Personnel Administration

**Accounting**
- Acct 201, 202 Advanced Accounting
- Acct 128 2nd Quarter of Income Tax Accounting
- Acct 140 Accounting Theory
- Acct 129 Governmental Accounting
- Acct 150 Managerial Accounting
- Acct 211 Advanced Cost Accounting
- Acct 207 CPA Review
- Acct 298 Accounting Seminar

**Computer Science**
- CS 135 Computer Programming
- CS 157 Programming Business Problems

It is interesting to note that the student does not have time to take all of the courses of a professional interest to him in his four year degree program. Several Professional Accounting organizations have gone on record as favoring a fifth year in which to cover this additional area. Students with good scholastic records would be well advised to seek the Master of Science degree in this fifth year.

**SOME NOTES ON SELECTION OF A MINOR:**

A student majoring in Accounting may select a minor in any area as long as his program meets the University requirements and is approved by the minor department and his major adviser. In the past the most usual minor for Accounting majors has been Economics. If a student wishes to minor in Business Administration he will be required to take BA 134, 149, and 171 in addition to the core courses in business.

**Accounting Courses**

1. **1, 2, 3. Introductory Accounting.** Accounting concepts and techniques essential to an understanding of the operation of the business enterprise. Open to all students of Sophomore standing or above. Business majors should take this course in their Sophomore year. (3F, 3W, 3Sp, 3Su) Staff


3. **101, 102, 103. Intermediate Accounting Principles.** Fundamental techniques of accounting. Gives a working knowledge of accounting as it serves the business executive. Valuable to students who aspire to a career in accounting, and also to teachers, lawyers, engineers, and farmers. Graduate credit may be allowed upon completion of special work. Prerequisites: Acct 1, 2, 3, 101 (4F, 4W); 102 (4W, 4Sp); 103 (4Sp, 4F).

4. **111. Industrial Cost Accounting.** Job costing, process accounting, and special considerations. (5W) N. Cannon
117. Introduction to Stored Programming. Basic Computer logic, flow charting, routines, coding, library programs, and data processing application to business. (3W) Staff

118. Procedure Development. Principles of job planning and procedure development as applied to the electric accounting machine method of keeping records and processing statistical data. (3Sp) Staff

119. Accounting Systems and Automation. The application of new methods of processing data to the various types of accounting records and accounting systems. (3F) Staff


127, 128. Income Tax Accounting. A study of problems resulting from the imposition of taxes on income by the Federal Government, with emphasis on the accounting phases of these problems. (4F, 4W) N. Cannon


140. Accounting Theory. History and Development of Accounting and Financial Statements. Their meaning and interpretation with special emphasis on current problems in Accounting Theory. Prerequisite: a year of Intermediate Accounting. (4F) G. Cannon

199. Internship in Accounting. Practical experience with public accounting firms and approved business in the Intermountain and Pacific Coast Region for selected seniors. Credit arranged, not to exceed 7 hours. (W) N. Cannon


211. Advanced Cost Accounting. Special cases in estimating costing, standard costing, direct costing, and advanced theory in cost accounting. (3Sp) N. Cannon


290. Thesis. For students preparing a Master's degree thesis. Credit arranged. (F, W, Sp, Su) Staff

298. Accounting Seminar. (Credit 2) (W) N. Cannon

Department of

Business Administration

(Finance, Marketing, Personnel and Industrial Relations, Production Management)

Acting Head: Dean Robert P. Collier
Office in Main 131

Professor L. Mark Neuberger; Professors Emeritus William M. Bell, V. D. Gardner, D. E. Robinson; Associate Professor Marshall V. Jamison; Assistant Professors Howard Calder, Howard Carlisle, John Cragun, Scott Durdan, Eugene F. Grape, Raymond James, Eugene C. Kartchner, Glenn F. Marston, William V. Tezak, Robert Viets; Lecturers Serge Benson, Alan Matheson, Charles P. Olson.

The basic objective of the first two years' program in the Department of Business Administration is to provide a broad and sound educational foundation upon which to

build the student’s specialized education for business. The objective of the last two years of the Business Administration program is to provide sufficient specialized business training to prepare the student to successfully enter the business world in his chosen functional field. At the same time, the program attempts to provide the type of general business education that develops the attitudes and analytical ability required for future professional advancement.

The following program is required for Business majors during the first two years:

**FRESHMAN**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Communications</td>
<td>9</td>
</tr>
<tr>
<td>Natural Science (Math, Physiology, Biology, Physics, Chemistry, etc.)</td>
<td>21</td>
</tr>
<tr>
<td>Political Science 1 or 10</td>
<td>5</td>
</tr>
<tr>
<td>History, Sociology 70, or Psychology 53</td>
<td>10</td>
</tr>
<tr>
<td>Approved Electives</td>
<td>0-3</td>
</tr>
<tr>
<td>PE, MS, or AS</td>
<td>3-6</td>
</tr>
</tbody>
</table>

Total: 48 to 54

**SOPHOMORE**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acct 1, 2, 3, Introductory Accounting</td>
<td>9</td>
</tr>
<tr>
<td>BA 4, 5, 6, Business Law</td>
<td>6</td>
</tr>
<tr>
<td>Economics 51, 52</td>
<td>10</td>
</tr>
<tr>
<td>Computer Science 11</td>
<td>3</td>
</tr>
<tr>
<td>Humanities</td>
<td>15</td>
</tr>
<tr>
<td>Approved Electives</td>
<td>5-9</td>
</tr>
</tbody>
</table>

Total: 48 to 52

This program for the first two years includes few business courses and definitely stresses general education in the Social Sciences, the Natural Sciences, and the Humanities. It fills the lower division group requirements, as well as the institutional requirement for an understanding of the American System.

During the last two years all Business Administration majors must take the following core courses:

**REQUIRED CORE COURSES**

1. BA 131, 132, Business Statistics
2. BA 133, Management Concepts
3. BA 134, Production
4. BA 149, Business Policy
5. BA 150, Managerial Accounting
6. BA 151, Marketing Principles
7. BA 171, Personnel Administration
8. BA 181, Corporation Finance

In addition to the preceding core courses, all Business Administration students must complete the course requirements in one of the following functional fields of business.

**Finance**

Finance concentrates analytically upon the supply of, demand for, and management of money in business and investment institutions. Students majoring in this field must take the following courses in addition to the basic core. Junior year: Economics 107, 165, 171, and English 112. Senior year: BA 182, Economics 139 and 155. Additional work in Math and Computer Science is highly useful to Finance majors.

**Marketing**

Marketing is concerned with the distribution or “cash-register” phase of business. Marketing is the final and indispensable link in the business chain of finance—production—distribution activities. Students electing to major in marketing must take the following courses in addition to the basic core. Junior year: BA 143, 152, 153 and Economics 107. Senior year: BA 156 or 160 or 161 and Economics 165 and 171.

**Personnel and Industrial Relations**

All business operations depend upon manpower; its effective co-
ordination is essential to the success of the enterprise. If students are particularly interested in the recruiting, testing, training, and human relations aspects of management, they should take the following courses in addition to the basic core: Junior year: BA 143, Economics 125, 126, 127, Psychology 155. Senior year: BA 172, 173, Economics 107 and 108 (or Economics 171 and 174), Sociology 158.

Production Management
The production activity gives shape to a firm’s physical products; production management involves the planning, directing, and controlling of activities related to production. Typical starting jobs for graduates are in procurement and materials control, production planning and control, quality control, cost control, and first line supervision. In addition to the basic core, required courses are: Junior year: BA 143 or Eng 112, Mfg E 56, 148, CS 157. Senior year: BA 136, 138, Mfg E 137, Economics 107, 125, 171, Speech 21. Computer science, mathematics, and technology courses are recommended electives.

Graduation Requirement
To be recommended by the Department for graduation, all Business Administration majors must have obtained a grade point average of at least 2.1 in both their BA courses and the courses in their minor field.

BA Major with Computer Science Minor
With the rapid acceptance of electronic data processing by the business world, a strong minor in Computer Science is a valuable adjunct to the training of most Business Administration majors. The following courses constitute a minor in Computer Science:

<table>
<thead>
<tr>
<th>Course</th>
<th>Hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Philosophy 161 (Symbolic Logic)</td>
<td>5</td>
</tr>
<tr>
<td>CS 11 (Data Processing)</td>
<td>3</td>
</tr>
<tr>
<td>CS 135 (Computer Programming, 1401)</td>
<td>5</td>
</tr>
<tr>
<td>CS 157 (Programming Business Problems)</td>
<td>3</td>
</tr>
<tr>
<td>CS 198 (Special Problems)</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>19</strong></td>
</tr>
</tbody>
</table>

Dr. Rex Hurst in the Computer Center can recommend additional courses for students desiring further work in Computer Science.

Minor in Business Administration
A solid minor in Business can be extremely valuable when linked to a major in Agriculture, Landscape Architecture, Forestry, Science, Home Economics, etc. Any student who expects to operate his own technical business or professional office should strongly consider a Business minor. The following courses are required for a minor in Business Administration:

<table>
<thead>
<tr>
<th>Course</th>
<th>Hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acct 100. Survey of Accounting Principles.</td>
<td>4 credits</td>
</tr>
<tr>
<td>Acct I, 2, 3.</td>
<td></td>
</tr>
<tr>
<td>Since the basic data with regard to the performance of the business firm is compiled and arranged by accountants, some knowledge of the vocabulary and principles of accounting is needed in virtually every private enterprise job.</td>
<td></td>
</tr>
<tr>
<td>BA 133. Management Concepts.</td>
<td>3 credits</td>
</tr>
<tr>
<td>An introductory course dealing with fundamental managerial concepts and problems.</td>
<td></td>
</tr>
<tr>
<td>BA 151. Marketing Principles.</td>
<td>5 credits</td>
</tr>
<tr>
<td>Helpful in developing an understanding of the distributive aspects of business, or how the goods are moved from the producer to the ultimate consumer.</td>
<td></td>
</tr>
<tr>
<td>BA 171. Personnel Administration.</td>
<td>5 credits</td>
</tr>
<tr>
<td>Develops a better understanding of the techniques for working with and directing people. This course is very helpful for students contemplating careers in small and large organizations alike.</td>
<td></td>
</tr>
<tr>
<td>BA 181. Corporation Finance.</td>
<td>5 credits</td>
</tr>
<tr>
<td>Especially helpful to a student who may be establishing his own firm and facing the problem of raising capital as well as the problem of meeting payrolls.</td>
<td></td>
</tr>
</tbody>
</table>
In special cases, a student's adviser, working in conjunction with the Business Administration Department Head, can modify this basic list to fit specific backgrounds and needs.

Graduate Study

The Department of Business Administration offers a graduate program leading to the MBA degree. This program provides small classes with intimate contact with the major professors, significant individual flexibility, and an emphasis upon research and individual development.

Financial assistance is available in the form of Graduate Assistantships for outstanding candidates. Graduate Assistants may lead introductory sections of basic courses or otherwise assist individual faculty members. USU also offers a limited number of Research Fellowships which are open to all majors, including Business Administration.

Master of Business Administration. The MBA degree program is open to qualified graduate students regardless of their undergraduate major. The time necessary for completion consequently depends on the individual's background and preparation. One year should suffice for well-trained Business and Economics majors, while two years may be required if the student has little or no previous business training. The program provides a broad training which focuses on general management and provides a basis for long-range advancement. It attempts to develop those attitudes, skills, and character needed in top level management throughout the years ahead. The program culminates in the completion of either a thesis or a series of research papers. Considerable flexibility exists in terms of the specialized study the student pursues in his independent research. However, the heart of this graduate program is a year-long seminar built upon group discussion of individual reports and case studies, as well as discussion of the broad social responsibilities of business leadership.

The Management Institute

In response to the educational needs of business and industry, the Management Institute of the College of Business and Social Sciences offers a variety of seminars, workshops, and conferences throughout the year. These are all non-credit offerings and cover such materials as the management of small business, executive development, decision making, sales promotion, professional secretarial training, etc.

For further information about the services provided through the Management Institute, please contact Director Calvin D. Lowe.

Business Administration Courses

4, 5, 6. Business Law. BA 4 is a general survey. It is also introductory for students who take additional Commercial Law courses. BA 5 and 6 are devoted to a comprehensive study of the law of contracts and agency. Open to all students of sophomore standing or above. (2F, 2W, 2Sp, 2Su)

Benson, Matheson, Olson


Staff


Bell

63. Salesmanship. The history, development, and opportunity of sales work. Focuses on the principles of the selling process—interviews, presentation, holding attention, arousing desire, meeting objections, and creating acceptance. Special selling projects are conducted. Lecture and cases. (2F, Sp)

Grape, James

104, 105, 106, 107, 108. Business Law. 104 studies the law of negotiable instruments:
105 and 106 include study of the law of bailments, sales and personal property, partnerships, corporations, and bankruptcy. Courses 107 and 108 include the law of real property, including estates, deeds, conveyancing, abstracts of title, mortgages, wills. BA 105 and 106 alternate with 107 and 108. Prerequisites: BA 4, 5, 6 or the consent of the instructor. (3F, 3W, 3Sp) Olson

113. Business Simulation. Principles of Model Building and a simulation of actual business problems as practice in decision making. (2Sp) Staff

117. Introduction to Stored Programming. Basic Computer logic, flow charting, routines, coding, library programs, and data processing application to business. (3W) Kartchner

118. Procedure Development. Principles of job planning and procedure development as applied to the electric accounting machine method of keeping records and processing statistical data. (3Sp) Kartchner

119. Accounting Systems and Automation. The application of new methods of processing data to the various types of accounting records and accounting systems. (3F) Kartchner


133. Management Concepts. The investigation and application of fundamental concepts of management and organization theory. Prerequisite: Junior standing or above. Business majors should take this course fall or winter term of the Junior year. (3F, W, Su) Carlisle

134. Production. A study of the production function and its problems, considering inter-relationships with other business activities. Focuses on the managerial aspects of: production planning, procurement, inventory control, production control, quality control, layout, methods improvement, performance standards, and basic industrial processes. Prerequisites: BA 133, Math 35, 60, 66. (5W, Sp, Su) Staff

136. Procurement And Production Control. A study of the planning and direct control of materials and production activities. Broad topics covered include: industrial purchasing, the planning and control of inventories, and the planning and control of production. Prerequisites: BA 133, 134, Mfg E 56, 148, or equivalent. (6F) Staff


138. Quantitative Methods For Production Management. A study of the application of quantitative techniques for analysis to selected production problems. Topics covered include: the use of graphic and schematic models, PERT, statistical process control, sampling inspection, and an introduction to the use of linear programming. Prerequisites: BA 132, Mfg E 148, or equivalent. (4Sp) Staff

140. 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; life insurance as an investment; and the organization, management, and government supervision of insurance companies. (3F, W, Sp) Calder

141. Real Estate. Introduction to real estate contracts, forms, principles, and recent Federal housing legislation. (3W, Sp) Calder, James

143. Business Communications. Fundamental principles of effective business writing, such as letters, memos, reports, etc. Not open to freshmen. (3F, W, Sp, Su) Staff

147. Managing Small Business. Application of management principles and techniques to the independent, owner-manager type of firm. Prerequisite: Junior standing or above. (4F, Sp) Calder

149. Business Policy. A coordinating course to develop perspective, judgment, and facility in solving problems in production, distribution, personnel, finance, control, and social aspects of business. Prerequisites: BA 132, 133, 150, 151, 171, 181. (5W, Sp, Su) Gardner, Carlisle

150. Managerial Accounting. Emphasizes the use of accounting as a tool of control for management. Major aspects include budget and managerial control, break-even analysis, selection of alternatives. Prerequisites: BA 1. 2, 3, 132, 133, or equivalent. (5F, W, Sp) Gardner, Tezak

151. Marketing Principles. Describes, analyzes, and evaluates our present marketing system. Provides basic tools and background for understanding marketing principles. Prerequisite: Junior standing or above. (5F, W, Sp, Su) Grape, James

152. Marketing Problems and Cases. Devoted to the analysis of marketing case problems. Prerequisite: Marketing 151 or permission of the instructor. (5W) Grape, James
153. Marketing Readings and Research. Provides perspective by studying the changing market environment and outlook as conditioners of our material welfare. Prerequisites: Marketing 151. (5Sp) Grape, James


156. Principles of Advertising. Intended for those who as business executives may direct advertising programs. Includes study of the structure of advertisements for different products, choice of media, consumer research, and the work of advertising departments and agencies. Prerequisites: BA 151. (5F) Grape, James

157. Sales Management. A broad view of important phases of sales administration, planning, and execution applied to manufacturing and wholesale concerns. Deals specifically with the structure and functioning of sales organization and correlation of its activities with those of production and other departments of the business enterprise. Prerequisite: BA 151. (3W, Sp) Grape, James

158. Principles and Problems in Retailing. The marketing process from the viewpoint of the retail distributor: types of retail institutions, accounting and statistics, location, store layout, merchandise classification, service policies, pricing, brand policies, buying, merchandise control, advertising and sales promotion, general organization and administration policies. Prerequisite: BA 151. (5Sp) Grape, James

159. Personnel Administration. Critical analysis of problems of human relations that confront the manager of a business enterprise and of policies and methods of dealing effectively with these problems. Lectures, problems, and selected cases. Prerequisite: Junior standing or above. (5F, W, Sp, Su) Marston, Cragun

160. Personnel Practices. Application of personnel techniques in the industrial setting. The study and application of job evaluation, wage administration, testing and selection, training programs, employee benefit programs, etc. Prerequisite: BA 171. (5F, W) Marston

161. Credit Administration. Nature and functions of credit: forms of credit instruments, sources of credit information, organization and management of credit operating functions, technical and legal aspects of collections, credit and collection control. (5F) Staff

162. Business Research Methods. Methods and techniques of collecting, analyzing, and interpreting business data. (3F, Su) Staff


164. Managerial Economics. The integration of economic theory with business practice and policies for the purpose of facilitating decision-making and forward planning. (3F) Durtuchi

165. Credit Administration. Nature and functions of credit: forms of credit instruments, sources of credit information, organization and management of credit operating functions, technical and legal aspects of collections, credit and collection control. (5F) Staff

166. Business Research Methods. Methods and techniques of collecting, analyzing, and interpreting business data. (3F, Su) Staff


168. Managerial Economics. The integration of economic theory with business practice and policies for the purpose of facilitating decision-making and forward planning. (3F) Durtuchi

169. Thesis. For students preparing a Master's degree thesis. Credit arranged. (F, W, Sp, Su) Staff

170. Independent Research and Reading. Credit arranged. (F, W, Sp, Su) Staff
Business Education and Office Administration

Head: Assistant Professor Ted Ivarie
Office in Main 344

Associate Professor Floris S. Olsen; Assistant Professors Garth A. Hanson, Calvin Lowe, Helen Lundstrom, Jerry L. Wood.

The dual Department of Business Education and Office Administration offers three curriculums which provide students with an opportunity to pursue a degree that either prepares them to teach or to work in top-level office positions. The Business Education and Distributive Education curriculums give a broad background in the major field of business as well as allowing students to pursue a minor field of their choice. In addition they will be taking all necessary courses leading to a teaching certificate as established by the Utah State Board of Education. In Office Administration, students will have an opportunity to take all the courses needed to prepare them in the Secretarial field as well as pursuing a minor field of their own choice. This program can lead to a highly respected, top-level office position.

Business Education

The College of Business and Social Sciences and the College of Education cooperate in the preparation of students for a professional career in Business Education. Both undergraduate and graduate programs in Business Education are available for students preparing to teach, as well as for experienced teachers of business subjects.

The following is a list of requirements for students preparing to enter the Business Education profession. The program of studies for transfer students will be adjusted to meet the minimum professional certification requirements and allow for acceptance of transfer credit.

<table>
<thead>
<tr>
<th>Composite Major BE, OA, BA</th>
<th>Minimum 60 hours</th>
<th>Major 30-50 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minor (if desired)</td>
<td>minimum 25 hours</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>OA 42</td>
<td>Intermediate Typewriting</td>
<td>2</td>
</tr>
<tr>
<td>OA 43</td>
<td>Advanced Typewriting</td>
<td>2</td>
</tr>
<tr>
<td>OA 65</td>
<td>Records Administration</td>
<td>3</td>
</tr>
<tr>
<td>OA 92</td>
<td>Business Machines</td>
<td>2</td>
</tr>
<tr>
<td>OA 167</td>
<td>Office Practice</td>
<td>2</td>
</tr>
<tr>
<td>OA 175</td>
<td>Office Management</td>
<td>3</td>
</tr>
<tr>
<td>OA 186</td>
<td>Secretarial Procedures</td>
<td>3</td>
</tr>
<tr>
<td>BA 4</td>
<td>Business Law</td>
<td>2</td>
</tr>
<tr>
<td>BA 5</td>
<td>Business Law</td>
<td>2</td>
</tr>
<tr>
<td>BA 6</td>
<td>Business Law</td>
<td>2</td>
</tr>
<tr>
<td>Acct 1</td>
<td>Introductory Accounting</td>
<td>3</td>
</tr>
<tr>
<td>Acct 2</td>
<td>Introductory Accounting</td>
<td>3</td>
</tr>
<tr>
<td>BA 143</td>
<td>Business Communications</td>
<td>3</td>
</tr>
<tr>
<td>BA 151</td>
<td>Marketing Principles</td>
<td>5</td>
</tr>
<tr>
<td>BA 171</td>
<td>Personnel Administration</td>
<td>5</td>
</tr>
<tr>
<td>Econ 51</td>
<td>General Economics</td>
<td>5</td>
</tr>
<tr>
<td>Econ 52</td>
<td>Economic Problems</td>
<td>5</td>
</tr>
<tr>
<td>BE 178</td>
<td>Methods of Teaching Business</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>non-skilled</td>
<td></td>
</tr>
<tr>
<td>BE 179</td>
<td>Methods of Teaching Typewrit-</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>ting and Office Practice</td>
<td></td>
</tr>
<tr>
<td>BE 185</td>
<td>Managing Personal Finances</td>
<td>5</td>
</tr>
<tr>
<td>BE 189</td>
<td>Principles of Business Educa-</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>tion</td>
<td></td>
</tr>
</tbody>
</table>

It is recognized that some students may not want to enroll in shorthand and related stenographic classes. Therefore, a non-stenographic program can be developed with Business Education advisors.
in which a related field of specialization can be pursued.

Business Education majors planning to prepare for teaching shorthand and related subjects are required to complete the following courses in addition to those listed above:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>OA 75</td>
<td>Shorthand I or equivalent proficiency</td>
<td>3</td>
</tr>
<tr>
<td>OA 76</td>
<td>Shorthand II or equivalent proficiency</td>
<td>3</td>
</tr>
<tr>
<td>OA 77</td>
<td>Shorthand III or equivalent proficiency</td>
<td>3</td>
</tr>
<tr>
<td>OA 141</td>
<td>Dictation and Transcription I</td>
<td>5</td>
</tr>
<tr>
<td>OA 142</td>
<td>Dictation and Transcription II</td>
<td>5</td>
</tr>
<tr>
<td>BE 180</td>
<td>Methods of Teaching Shorthand and Transcription</td>
<td>3</td>
</tr>
</tbody>
</table>

The following courses are strongly recommended, although not required, for Business Education majors:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acct 3</td>
<td>Introductory Accounting</td>
<td>3</td>
</tr>
<tr>
<td>BA 140</td>
<td>Insurance or</td>
<td></td>
</tr>
<tr>
<td>Econ 127</td>
<td>Social Security or</td>
<td></td>
</tr>
<tr>
<td>BA 141</td>
<td>Real Estate</td>
<td>3</td>
</tr>
<tr>
<td>OA 85</td>
<td>Office Data Systems</td>
<td>3</td>
</tr>
<tr>
<td>Acct 127</td>
<td>Income Tax Accounting</td>
<td>4</td>
</tr>
<tr>
<td>Speech 21</td>
<td>Intermediate Public Speaking</td>
<td>3</td>
</tr>
</tbody>
</table>

In addition, the following courses must be completed to qualify for secondary school certification in the State of Utah:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psy 53</td>
<td>Elementary General Psychology</td>
<td>5</td>
</tr>
<tr>
<td>Psy 100</td>
<td>Human Growth and Development</td>
<td>3</td>
</tr>
<tr>
<td>Psy 106</td>
<td>Elementary Psychology for Student Teaching</td>
<td>3</td>
</tr>
<tr>
<td>PH 155</td>
<td>Public Health</td>
<td>3</td>
</tr>
<tr>
<td>Ed 126</td>
<td>Principles of Secondary Education</td>
<td>3</td>
</tr>
<tr>
<td>Ed 127</td>
<td>Secondary School Methods</td>
<td>3</td>
</tr>
<tr>
<td>Ed 129</td>
<td>Student Teaching</td>
<td>6</td>
</tr>
<tr>
<td>Ed 130</td>
<td>Student Teaching</td>
<td>4</td>
</tr>
<tr>
<td>Ed 150</td>
<td>Organization and Administration</td>
<td>3</td>
</tr>
</tbody>
</table>

Students who have taken business skill courses such as typewriting and shorthand in high school may not receive credit for beginning shorthand (OA 75) or beginning typewriting (OA 41) in college. Shorthand students will be placed in the appropriate level course by means of an evaluation of their proficiency. Students who have had typewriting in high school should register for OA 42, Intermediate Typewriting, where they may progress according to their individual ability. Any courses that are bypassed may be replaced by elective courses.

Business Education methods courses should be taken in the junior year if student teaching is to be taken in the fall or winter quarter of the senior year. BE 189, Principles of Business Education, should be taken in the sophomore year as a prerequisite to the methods courses.

Students may count BE 179 and either BE 178 or BE 180 toward the 33-credit professional certification requirement if needed.

Graduate Study

The Department of Business Education offers courses leading to the Master of Science degree and provides a minor for the Doctor of Education degree. The program established lends itself to a desirable working relationship with major professors and allows sufficient flexibility in the program to provide the necessary emphasis needed for individual research and development. Financial assistance is available to outstanding students in the form of graduate assistantships. See catalog, School of Graduate Studies, for further information.

Business Education Courses

150. Philosophy of Distributive Education. Philosophy of vocational business education with special emphasis on the importance of distributive education in a free enterprise system. (3F) 

Lowe

155. Methods of Teaching DE and Cooperative BE. Instructional methods and coordination techniques involved in teaching cooperative business and distributive education. Includes
178. Methods of Teaching Business—non-skilled. A study of the methods of teaching as applied to basic courses: General Business, Business Law, Business Principles, Business Arithmetic, Economic Geography, etc. Also, a study of methods applicable to record-keeping and bookkeeping. This course is designed for the inexperienced business teacher education student. (3F, Sp) Hanson, Ivarie

179. Methods of Teaching Typewriting and Office Practice. Instructional methods and new developments in teaching of typewriting, Methods for building accuracy, speed, and increasing production; work standards; classroom equipment and materials. Also, includes instructional methods and materials in teaching of office practice and business machines, class organization plans, equipment needs, cooperative training, standards and evaluation. For the inexperienced business teacher education student. (3W, Sp) Hanson, Ivarie

180. Methods of Teaching Shorthand and Transcription. Instructional methods and materials in the teaching of shorthand, transcription, business English, filing and secretarial procedure. Includes factors affecting speed building and standards and grading in shorthand, and transcription. For the inexperienced business teacher education student. (3F, W) Ivarie, Lundstrom

185. Managing Personal Finances. Designed to aid in meeting the growing complexity of personal finances; how to avoid financial entanglements, installment buying, borrowing money, owning or renting a home, investing and speculation in securities, everyday legal problems dealing with illness, death, personal taxes. (5W, Su) Lowe, Hanson

189. Principles of Business Education. The study of current problems in Business Education and a survey of the recent literature in the field. (3F, Sp) Ivarie, Hanson

210. Improvement of Instruction in Typewriting. A study of the basic factors of typewriting skill and improvement of methods and techniques in typewriting for the experienced business teacher. (3Su and as needed) Ivarie, Lundstrom

220. Improvement of Instruction in Shorthand and Transcription. Designed for in-service teachers of shorthand and transcription. A study of improved methods and techniques applicable to the teaching of shorthand and related courses in the high school and junior college level. (3Su and as needed) Lundstrom, Olsen

230. Improvement of Instruction in Bookkeeping and Accounting. Designed for the in-service teacher of bookkeeping and accounting. A study of improved methods and techniques for in-service business teachers at the secondary and at the college level. (3Su and as needed) Ivarie, Hanson

240. Improvement of Instruction in Basic Business. An analysis of methods and techniques employed in the teaching of basic business courses. Also, study of the function and purpose of the basic business courses. (3Su and as needed) Ivarie, Wood

245. Cooperative Programs in Business Education. Workshop and research activities for the high school teacher supervising a work-experience program. (3Su) Ivarie, Lowe

250. Issues and Trends in Business Education. An analysis of the pertinent issues and trends in education that pertain to a business as well as those issues and trends that are inherent in business education itself. (3Su and as needed) Ivarie

255. Office Technology. Adjustment to technological changes that are occurring in office occupations. A look at data systems, peripheral office equipment, and methods pertinent to curriculum improvement. (3Su and as needed) Ivarie, Lundstrom

260. The Business Curriculum. An analysis of the principles, concepts, methods, and procedures of studying, changing and construction of business offering in the secondary schools and colleges so as to better meet the needs of students. (3Su and as needed) Ivarie, Lundstrom

270. Workshop in Business Education. Special workshops on selected issues, trends, and principles in Business Education. (1-6Su) Staff

271. Workshop in Business Education. Intensive one- to five-day workshop on pressing issues and trends in business education. (1Su) Staff

272. Workshop in Business Education. Intensive one- or two-week workshop on principles, issues and trends in business education. (2Su) Staff

273. Workshop in Business Education. A two-week workshop on current trends and issues applying to specialized or general fields in business education. (3Su) Staff

280. Seminar in Business Education. An analysis of research methods applicable to business education. (2Su and as needed) Ivarie

290. Research in Business Education. Selection and researching the problem or problems required under Plan A or Plan B of the graduate study requirement. Credit arranged. (F, W, Sp, Su) Lundstrom, Ivarie
Distributive Education

Another curriculum leading to a teaching certificate is that of Distributive Education. This program is often referred to as marketing education in that it trains high school students and adults to become better salesmen and retailers through cooperative work experience programs in local businesses. Consult Dr. Calvin Lowe for full details.

The following are required for those interested in this field. Close cooperation is maintained between the Business Education Department, the College of Education, and the Vocational Division of the State Department of Education in providing the necessary course requisites in training a prospective teacher for this specialized profession.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Econ 127</td>
<td>Social Security</td>
<td>3</td>
</tr>
<tr>
<td>BA 171</td>
<td>Personnel Administration</td>
<td>5</td>
</tr>
<tr>
<td>OA 42</td>
<td>Intermediate Typewriting</td>
<td>2</td>
</tr>
<tr>
<td>Sp 21</td>
<td>Intermediate Public Speaking</td>
<td>3</td>
</tr>
<tr>
<td>Psy 53</td>
<td>Elementary General Psychology</td>
<td>5</td>
</tr>
<tr>
<td>Psy 100</td>
<td>Human Growth and Development.</td>
<td>3</td>
</tr>
<tr>
<td>Psy 106</td>
<td>Elementary Psychology for Student Teaching</td>
<td>8</td>
</tr>
<tr>
<td>PH 155</td>
<td>Public Health</td>
<td>3</td>
</tr>
<tr>
<td>ED 126</td>
<td>Principles of Secondary Education</td>
<td>3</td>
</tr>
<tr>
<td>ED 127</td>
<td>Secondary School Methods</td>
<td>3</td>
</tr>
<tr>
<td>ED 129</td>
<td>Student Teaching</td>
<td>5</td>
</tr>
<tr>
<td>ED 130</td>
<td>Student Teaching</td>
<td>4</td>
</tr>
<tr>
<td>ED 150</td>
<td>Organization and Administration</td>
<td>3</td>
</tr>
<tr>
<td>ED 161</td>
<td>Audio-Visual Education</td>
<td>3</td>
</tr>
<tr>
<td>BE 155</td>
<td>Methods of Teaching DE and Cooperative BE</td>
<td>3</td>
</tr>
<tr>
<td>BE 185</td>
<td>Managing Personal Finances</td>
<td>5</td>
</tr>
<tr>
<td>Econ 51</td>
<td>General Economics</td>
<td>5</td>
</tr>
<tr>
<td>OA 92</td>
<td>Business Machines</td>
<td>2</td>
</tr>
<tr>
<td>OA 41</td>
<td>Elementary Typewriting or equivalent proficiency</td>
<td>2</td>
</tr>
<tr>
<td>OA 42</td>
<td>Intermediate Typewriting</td>
<td>2</td>
</tr>
<tr>
<td>OA 43</td>
<td>Advanced Typewriting</td>
<td>2</td>
</tr>
<tr>
<td>OA 65</td>
<td>Records Administration</td>
<td>3</td>
</tr>
<tr>
<td>OA 76</td>
<td>Shorthand I or equivalent proficiency</td>
<td>3</td>
</tr>
<tr>
<td>OA 77</td>
<td>Shorthand II or equivalent proficiency</td>
<td>3</td>
</tr>
<tr>
<td>OA 92</td>
<td>Business Machines</td>
<td>2</td>
</tr>
<tr>
<td>OA 141</td>
<td>Dictation and Transcription I</td>
<td>5</td>
</tr>
<tr>
<td>OA 142</td>
<td>Dictation and Transcription II</td>
<td>5</td>
</tr>
<tr>
<td>OA 167</td>
<td>Office Practice</td>
<td>2</td>
</tr>
</tbody>
</table>

The following courses are strongly recommended, although not required, for Distributive Education majors:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acct 1</td>
<td>Introductory Accounting</td>
<td>3</td>
</tr>
<tr>
<td>Acct 2</td>
<td>Introductory Accounting</td>
<td>3</td>
</tr>
<tr>
<td>BA 4</td>
<td>Business Law</td>
<td>2</td>
</tr>
<tr>
<td>BA 5</td>
<td>Business Law</td>
<td>2</td>
</tr>
<tr>
<td>BA 65</td>
<td>Salesmanship</td>
<td>2</td>
</tr>
<tr>
<td>BA 143</td>
<td>Business Communications</td>
<td>3</td>
</tr>
<tr>
<td>BA 147</td>
<td>Managing Small Business</td>
<td>4</td>
</tr>
<tr>
<td>BA 151</td>
<td>Marketing Principles</td>
<td>5</td>
</tr>
<tr>
<td>BA 156</td>
<td>Principles of Advertising</td>
<td>5</td>
</tr>
<tr>
<td>BA 161</td>
<td>Principles and Problems in Retailing</td>
<td>5</td>
</tr>
<tr>
<td>BE 150</td>
<td>Philosophy of Distributive Education</td>
<td>3</td>
</tr>
<tr>
<td>BE 155</td>
<td>Methods of Teaching DE and Cooperative BE</td>
<td>3</td>
</tr>
<tr>
<td>BE 185</td>
<td>Managing Personal Finances</td>
<td>5</td>
</tr>
<tr>
<td>Econ 51</td>
<td>General Economics</td>
<td>5</td>
</tr>
<tr>
<td>OA 92</td>
<td>Business Machines</td>
<td>2</td>
</tr>
</tbody>
</table>

The program of Office Administration is arranged on a four-year degree pattern. Students who initially enroll for only two years may change to a four-year degree program by completing all of the following courses in addition to University lower division group requirements.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>OA 41</td>
<td>Elementary Typewriting or equivalent proficiency</td>
<td>2</td>
</tr>
<tr>
<td>OA 42</td>
<td>Intermediate Typewriting</td>
<td>2</td>
</tr>
<tr>
<td>OA 43</td>
<td>Advanced Typewriting</td>
<td>2</td>
</tr>
<tr>
<td>OA 65</td>
<td>Records Administration</td>
<td>3</td>
</tr>
<tr>
<td>OA 75</td>
<td>Shorthand I or equivalent proficiency</td>
<td>3</td>
</tr>
<tr>
<td>OA 76</td>
<td>Shorthand II or equivalent proficiency</td>
<td>3</td>
</tr>
<tr>
<td>OA 77</td>
<td>Shorthand III or equivalent proficiency</td>
<td>3</td>
</tr>
<tr>
<td>OA 92</td>
<td>Business Machines</td>
<td>2</td>
</tr>
<tr>
<td>OA 141</td>
<td>Dictation and Transcription I</td>
<td>5</td>
</tr>
<tr>
<td>OA 142</td>
<td>Dictation and Transcription II</td>
<td>5</td>
</tr>
<tr>
<td>OA 167</td>
<td>Office Practice</td>
<td>2</td>
</tr>
</tbody>
</table>

3Prerequisite to Pay 100 and Pay 106.
The following courses are strongly recommended, although not required, for Office Administration majors:

Acct 3 Introductory Accounting ... 3
BA 140 Insurance ... 3
BA 161 Principles and Problems of Retailing ... 5
Econ 127 Social Security or other upper division BA elective ... 3
Speech 21 Intermediate Public Speaking ... 3

To enroll in any skill course the student must have a grade of "C" or better in the preceding course in the same skill.

Transfer students are permitted to make reasonable substitutions with departmental approval.

Office Administration Courses

40. Remedial Typewriting. Remedial typewriting, with emphasis on improvement of accuracy and speed. Enrollment limited to students typing less than 60 wpm. (1F, W, Sp) Staff

41. Elementary Typewriting. For students with no previous training in typewriting. Designed to develop a thorough knowledge of the keyboard and machine parts. Personal use typing problems, centering, letter styles. (2F, Sp) Staff

42. Intermediate Typewriting. Assumes previous training in typewriting. Emphasis on skill building, typing of letters, envelopes, manuscripts, business forms and tabulation exercises. Prerequisite: OA 41 or equivalent. (2F, W, Sp, Su) Hanson, Wood

43. Advanced Typewriting. The development of number proficiency, statistical tabulation and typing on business forms, rough drafts, stencils for duplication. Prerequisite: OA 42. (2W, Sp) Wood


75. Fundamentals of Shorthand I. Assumes no previous training in shorthand. Study of fundamentals of Gregg shorthand. (3F, W) Olsen

76. Fundamentals of Shorthand II. Continuation of course 75. Introduction of new-matter dictation. Prerequisite: OA 75 or equivalent. (3W, Sp) Olsen

77. Fundamentals of Shorthand III. Continuation of course 76. Intensive practice in new-matter dictation. Prerequisite: OA 76 or equivalent. (3F, Sp) Olsen

78. Refresher Shorthand. A shorthand review course for those who need speed building and theory review to prepare for employment or for continuation in advanced shorthand and transcription. Taught only as extension or a 5-week summer course. (2Su and as needed) Staff

81. IBM Keypunch Speedbuilding. Three one-hour lab periods per week. Prerequisite: One year of typing. (2F) Staff

85. Office Data Systems. A survey of the development and contribution of better ways and means of keeping records as factors in providing information for management in its decision making. Intensive study of basic principles involved in data storage, processing, and retrieval by modern office equipment. (3F, Sp) Hanson


141, 142, 143. Dictation and Transcription I, II, III. A continuation of the study of shorthand fundamentals and a development of transcription skill. Admission to 141 should require a minimum dictation speed of 80 words a minute and a minimum grade of "C" in the course immediately preceding the course in which a student wishes to enroll. Prerequisites: OA 77 or equivalent, and OA 42. (5F, 5W, 5Sp) Olsen

167. Office Practice. Training in use of dictating and transcribing machines, photocopy equipment, wordprocessor, and spirit, stencil and offset duplicators. Prerequisite: OA 45. (2F, W, Sp, Su) Wood, Hanson, Lundstrom

175. Office Management. Emphasis on principles of office management, duties and re-
cooperation, methods of control, office responsibilities of the office manager, types of office management and equipment, job analysis, selection, employment and training of employees.

Prerequisites: Economics 51, 52. (3F)

Hanson

186, 187. Secretarial Procedures. Office routines are studied, with special emphasis on use of reference books, transportation and travel, use of telephone, telegraph, and computerized services, financial records, writing for publication, minutes and meetings. (3W, 3Sp)

Olsen

Combination Major in Office Administration and Family Life

This curriculum is designed for women who desire sufficient secretarial training to provide professional opportunities outside the home as well as a basic training for family living.

The secretarial type program may be combined with the Family Life program. Completion of these requirements, in addition to University and group requirements, leads to a Bachelor of Science degree.

Family Life Courses

42 hours with not less than 9 in any department.

<table>
<thead>
<tr>
<th>Clothing and Textiles</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT 10 Pattern Designing and Clothing Construction</td>
</tr>
<tr>
<td>CT 24 Introduction to Textiles</td>
</tr>
<tr>
<td>CT 75 Home Furnishings</td>
</tr>
<tr>
<td>CT 105 Clothing Selection and Consumption</td>
</tr>
<tr>
<td>CT 106 Behavioral Science Aspects of Clothing</td>
</tr>
<tr>
<td>CT 120 Comparative Construction Techniques</td>
</tr>
<tr>
<td>CT 135 History of Textiles and Costume</td>
</tr>
<tr>
<td>CT 140 Draping</td>
</tr>
<tr>
<td>CT 170 Flat Pattern Designing</td>
</tr>
<tr>
<td>CT 180 Tailoring</td>
</tr>
</tbody>
</table>

Family and Child Development

| FCD 20 Preparation for Marriage and Family Relations | 3 |
| FCD 67 Early Childhood | 3 |
| FCD 68 Preschool Laboratory | 3 |
| FCD 77 Child from 6-12 | 3 |
| FCD 100 Human Growth and Development | 3 |
| FCD 108 Guidance of the Young Child | 3 |
| FCD 109 Play-School Education | 2 |
| FCD 115 Growth of the Infant | 3 |
| FCD 120 Marriage | 3 |
| FCD 140 The Family in its Social Setting | 3 |
| FCD 160 Seminar | 2 |
| FCD 185 Family in Middle and Later Years | 8 |

Food and Nutrition

| FN 22 Principles of Nutrition | 3 |
| FN 23 Laboratory of Nutrition and Food Preparation | 3 |
| FN 25 Meal Preparation for the Family | 3 |
| FN 107 Science in Relation to Food Preparation | 3 |
| FN 108 Science in Relation to Food Preparation | 3 |
| FN 109 Experimental Foods | 3 |
| FN 135 Weight Control | 3 |
| FN 140 Nutrition | 4 |
| FN 146 Food Technology | 2 |
| FN 150 Seminar | 1 |

Household Economics and Management

| HEM 65 Housing | 3 |
| HEM 100 Household Equipment | 3 |
| HEM 149 Home Management | 3 |
| HEM 150 Home Management House | 4 |

or

| HEM 151 Home Management Problems | 4 |
| HEM 165 Family Finances | 3 |
| HEM 175 Consumer Educ | 3 |

Office Administration Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>OA 42</td>
<td>Intermediate Type</td>
<td>2</td>
</tr>
<tr>
<td>OA 43</td>
<td>Advanced Type</td>
<td>2</td>
</tr>
<tr>
<td>OA 65</td>
<td>Records Administration</td>
<td>3</td>
</tr>
<tr>
<td>OA 85</td>
<td>Office Data Systems</td>
<td>3</td>
</tr>
<tr>
<td>OA 92</td>
<td>Business Machines</td>
<td>2</td>
</tr>
<tr>
<td>OA 141</td>
<td>Dictation and Transcription I</td>
<td>5</td>
</tr>
<tr>
<td>OA 142</td>
<td>Dictation and Transcription II</td>
<td>5</td>
</tr>
<tr>
<td>OA 167</td>
<td>Office Practice</td>
<td>2</td>
</tr>
<tr>
<td>OA 175</td>
<td>Office Management</td>
<td>3</td>
</tr>
<tr>
<td>OA 186</td>
<td>Secretarial Procedures</td>
<td>3</td>
</tr>
<tr>
<td>Acct 1</td>
<td>Introduction to Accounting</td>
<td>3</td>
</tr>
<tr>
<td>BA 4</td>
<td>Business Law</td>
<td>2</td>
</tr>
<tr>
<td>BA 5</td>
<td>Business Law</td>
<td>2</td>
</tr>
<tr>
<td>BA 20</td>
<td>Introduction to Business</td>
<td>3</td>
</tr>
<tr>
<td>BA 145</td>
<td>Business Communications</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>43</strong></td>
</tr>
</tbody>
</table>

1It is recommended that Acct 2 also be completed—3 hours.
College of Business and Social Sciences

Department of Economics

Head: Professor Evan B. Murray
Office in Main 322

Professors Leonard J. Arrington, Robert P. Collier, Dean, College of Business and Social Sciences; Professor Emeritus Vernon L. Israelsen; Associate Professors Reed R. Durtschi, C. A. Hofman; Assistant Professors Bartell C. Jensen, Glenn F. Marston.

The Department of Economics offers the Bachelor of Science, Bachelor of Arts, Master of Science and Master of Arts degrees. To complete a major one should register with the Head of the Department after achieving Junior standing. A prospective major should take classes in Business Statistics and in Accounting. Any student who plans to do graduate work in Economics should have good training in Mathematics and in Languages. The following upper division courses in Economics are required of all Economics majors: 106, 107, 108, 165, 171; additional courses will be added from the specialized and applied areas as determined by specific interests of the prospective major.

Economics Courses

51. General Economics. For any university student regardless of major. Principles and institutions underlying operations of the economic system. (5F, W, Sp, Su) Staff

52. Economic Problems. Continuation of Economics 51. The emphasis in this second course is on the economics of a competitive market; commodity markets and factor markets are analyzed. (5F, W, Sp, Su) Staff

106. History of Economic Thought. Study of the origin and development of economic theories of leading thinkers in Western civilization from 1750 to now. (3F) Arrington


125. Trade-Unionism and Collective Bargaining. Development, structure, function, government, and philosophy of trade unions in United States; making and administering collective agreements; impact upon the economic and political system. (3F) Murray

126. Trade-Unionism and the Law. The legal frame-work of the trade union activity; restrictive, permissive, and promotional legislation; the judiciary and labor. (3W) Murray

127. Social Security. Survey of the main divisions of social security legislation; workers' compensation, legal minimum wage, regulation of hours, unemployment compensation, old age insurance, family wage systems and health insurance. (3Sp, Su) Murray

135. Transportation Economics. The emphasis is upon railroad transportation in the United States. Economic principles that underlie rate structures and work of regulatory agencies. (3W) Israelsen

139. Economics of Security Markets. Analysis of organization and operation of stock and bond markets, security speculation, brokerage houses, exchange relations with other institutions, security price behavior, exchange regulation. (3F) Staff

140. International Economic Relations. Basic economic relationship between industrial nations, trade restrictions, international debt and finance and means of promoting progress based on sound economics. (3Sp) Hofman

147. Public Utilities. A study of the characteristics of public utilities, regulatory commissions, rate structures, rate discrimination, finance, and rates of returns. (3Sp) Israelsen

150. Communist Economics. History and economic theories of Marxism, the organization of Communist economies, and the economic policies and problems of Russia, China, and other Communist countries. (3Sp) Arrington

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Instructor(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>Readings and Conferences. Credit arranged.</td>
<td>Staff</td>
</tr>
<tr>
<td>202</td>
<td>Independent Research. Credit arranged.</td>
<td>Staff</td>
</tr>
<tr>
<td>203</td>
<td>Seminar in Economic Research. An intensive study of the methods, tools, and objectives of economic research: statistics, economic analysis, and economic history. Permission of instructor required.</td>
<td>Arrington</td>
</tr>
<tr>
<td>204</td>
<td>Modern Economic Thought. An intensive study of the main currents in recent economic thought.</td>
<td>Arrington</td>
</tr>
<tr>
<td>207</td>
<td>Advanced Price Theory. A critical review of a few major topics in price and distribution theory. Open to graduate students and seniors with adequate preparation.</td>
<td>Durtschi</td>
</tr>
<tr>
<td>208</td>
<td>Advanced Income Theory. A critical review of the major topics in aggregate economic theory.</td>
<td>Durtschi</td>
</tr>
<tr>
<td>211</td>
<td>Literature of Economics. An intensive study of the bibliographical materials and literature of economics. Permission of instructor required.</td>
<td>Israelson</td>
</tr>
<tr>
<td>225</td>
<td>Labor Economics Seminar. Applications of principles and practices of American trade-unionism brought to light through individual and group research projects; analysis and evaluation of current issues in labor activities.</td>
<td>Pratt</td>
</tr>
<tr>
<td>226</td>
<td>Seminar in International Trade. A critical review of the major topics in international trade theory and practice.</td>
<td>Hofman</td>
</tr>
<tr>
<td>227</td>
<td>Seminar in Public Finance. A critical review of the current literature in the field of public finance.</td>
<td>Hofman</td>
</tr>
<tr>
<td>226</td>
<td>Advanced Money and Banking. A critical review of the current literature in the field of money and banking.</td>
<td>Israelson</td>
</tr>
<tr>
<td>270</td>
<td>Economic History Seminar. The methods and literature of economic history.</td>
<td>Arrington</td>
</tr>
<tr>
<td>290</td>
<td>Introduction to Econometrics. An introduction to the problems of econometric model construction and estimation. Emphasis is placed on the economic content of the methods. No previous knowledge of mathematics beyond elementary calculus and statistics is required.</td>
<td>Jensen</td>
</tr>
<tr>
<td>291</td>
<td>Principles of Econometrics. Continuation of Economics 290.</td>
<td>Jensen</td>
</tr>
</tbody>
</table>
The Department offers programs leading to the Bachelor of Science, Bachelor of Arts, Master of Science, and the Master of Arts degrees in History.

Major in History. For a major in History the student must complete forty-five hours in History. The minor (a minimum of eighteen hours) should be in a closely related field. The student should complete as soon as possible survey courses in the History of World Civilization, History 4 and 5, and American History, History 20. History 190, Sources and Literature of History, is recommended for the Junior year and History 201, Historical Method, for the Senior year. Those who plan to obtain a teaching certificate should consult early, at least in the Junior year, with the College of Education to assure eligibility for teacher training and the right course program for certification. Those who plan to do graduate work in History are encouraged to complete at least two years of French and German or Spanish as an undergraduate.

History constitutes the major study in the subject matter of the Social Studies curriculum of the secondary schools. Those who plan to teach in the secondary schools should either (1) pursue work leading to the major in History and to the secondary certificate, or (2) pursue work leading to the teaching major in History and the secondary certificate. The former plan is regarded as preferable. The History faculty advises History majors; teaching majors may be advised by either the History faculty or the Education faculty.

A grade of “C” or better is required in any course in History which is used to meet the requirements for a major in History.

Teaching Major in History. For a teaching major in History, the student must complete a minimum of 36 hours in History, and a minimum of 24 hours in a minor. History 4, 5, and 20 are preferred courses for this program. History 190 should be taken before practice teaching. 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. All 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 minor in History consists of 18 or more hours. History 20, History 190, and either History 1, 2, and 3, or History 4 and 5, are recommended. A
member of the History faculty will be pleased to advise concerning the minor.

College Teaching. There is an increasing demand for college and university history teachers. Students of capacity and dedication are encouraged to give serious consideration to this profession. Appointment to a major college department usually requires the PhD degree. Interested students should consult History faculty members, and check on fellowships and assistantships.

Institute of Utah Studies

By virtue of its Library holdings, its faculty, and research programs, Utah State University is a leading center for the study of all phases of Utah's historic and contemporary development. The Institute of Utah studies has been established to collect and preserve the written and oral record of Utah's distant and recent past, of training persons in the use of the sources and literature of Utah history, and encouraging and assisting all persons, especially teachers and research writers in the social sciences and humanities, in the detailed study of any and all phases of Utah's development, and of offering courses and seminars in regular history. The Institute appeals especially to teachers desiring to specialize in the teaching of Utah history and to writers of historical and analytical studies of a regional nature. Students with this interest should give special attention to History 135, 137, 226, and 237. Director of the Institute of Utah Studies is S. George Ellsworth.

Graduate Study

Master of Science or Master of Arts in History. Programs for either of the Master's degrees are described in the Catalog of the School of Graduate Studies. Those who are interested in these programs should obtain a copy of the Graduate Catalog and consult with a member of the History faculty.

American Studies. The Department of English and Journalism and the Departments of History and Political Science cooperate in administering the graduate program leading to the Master of Science and the Master of Arts degrees in American Studies. See the catalog section on English for a statement of that program.

History Courses

Basic Lower Division

1. Man and Civilization I. A survey of the major civilizations of the world, with emphasis on the European tradition, primarily concerned with the cultural development of man and the arts of civilization. Political, economic, and social institutions of major significance are studied, as well as the development of the arts and sciences. From the earliest times to about 1500. Not open to those who have had History 4. (3F) Staff

2. Man and Civilization II. Continuation of History 1. From about 1500 to 1850. Not open to those who have had History 5. (3W) Staff

3. Man and Civilization III. Continuation of History 2. From about 1850 to the present day. Not open to those who have had History 5. (3Sp) Staff

4. Ancient World Civilizations I. The cultural history of the world from earliest times to about 1500. A more detailed course than History 1. Not open to those who have had History 1. (5F, W) Alder

5. Modern World Civilizations II. Continuation of History 4. From about 1500 to the present day. Not open to those who have had History 2 or 3. (5F, W, Sp) Alder

20. American Civilization. A basic one-quarter course in the fundamentals of American history. Successful completion of this course meets the requirements established by SB 39. (5F, W, Sp) Staff

History of Europe and Asia

105. Greek History. Greek civilization to the Roman conquest, 146 B.C. Emphasizes political, social, intellectual, and artistic developments and contributions. (5F) Ellsworth
86 College of Business and Social Sciences

106. Roman History. From the earliest times to the decline of the Roman Empire in the West in the fifth century A.D. (5W) Ellsworth

111. Medieval Europe. (600-1500 A.D.) Political, economic, social, and cultural developments during the Middle Ages. (3Sp) Brite

114. History of Science I. History of Science from antiquity through Copernicus. (3Su) Staff

115. History of Science II. History of Science since Galileo. (3Su) Staff

123. Germany Since Napoleon. (3F) Alder

124. Renaissance and Reformation. (1250-1600) (5F) Brite

125. Absolute Monarchies. (1589-1789) (3W) Brite

126. French Revolution and Napoleon. (1789-1815) (3Sp) Brite

127. Nineteenth Century Europe. Political and economic developments between 1815 and 1914. (3Sp) Brite

128. Twentieth Century World. Political and economic developments in Europe, America, Asia, and Africa since the end of World War I. (3Sp) Brite, Alder

138. History of Russia to 1917. From the earliest times to the Revolution. (3F) Staff

139. History of the Soviet Union. From the Revolutions of 1917 to the present day. (3W) Staff

141. England to 1603. From the earliest times to the death of Elizabeth. (3F) Staff

142. England Since 1603. From King James I to the present day. (3W) Staff

143. The British Empire. Rise and decline of the British Empire in the modern world. (3Sp) Staff

145. Development of Modern America. (1877-1900) Political, economic and cultural developments; reform movements; and foreign affairs from the Reconstruction period to the establishment of the United States as a world power in 1900. (3F) Ahlstrom

146. The Progressive Era. Emphasis on political, economic, and social reform from the turn of the century to the 1920's. (1900-1920's) (3W) Ahlstrom

147. Recent America. Domestic and foreign affairs of the United States since the 1920's, emphasizing the great depression, world war II and America's contemporary problems. (3Sp) Ahlstrom

155. 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. (5W) Cazier

171. Constitutional History of the United States. (5F, Sp) Staff

173. Immigration to the United States. Survey of causes of emigration, the voyages, and
initial reception as well as eventual acculturation within the United States, emphasizing the immigration from Europe. (3Sp) Pratt

181. Latin America to 1830. Geography, pre-Columbian peoples, exploration and conquest and colonization by European powers, political and social and economic developments, international rivalries and ineffective mercantilism, prominent revolutionists and the independence wars. (3F) Pratt

182. Latin America since 1830. The new nations emerging from the independence wars; the social, economic and political development of the twenty Latin American nations in the nineteenth and twentieth century. (3W) Pratt

184. History of Mexico. The social, economic, and political history from colonial times to the present, with major emphasis on the national era. (3W) Pratt

185. History of United States-Latin American Relations. The diplomatic, economic and cultural relations between the United States and the twenty Latin American nations. (3Sp) Pratt

186. Economic History of Latin America. The economy as it developed in colonial days, the economic problems of the new nations in the 19th century, the push to industrialize as well as maintain raw material production in this 20th century, the need for capital investment and government and international efforts to provide this. (3W) Pratt

187. History of Atlantic South America. Political, economic and social development from pre-Columbian peoples to complex national cultures of Brazil, Paraguay, Uruguay and Argentina. (3F) Pratt

190. Sources & Literature of History. European, Asian, and American studies. For all persons preparing to teach or write history. Recommended to history majors in their Junior years. (3F, W, Su) Ellsworth, Alder

See also Economics 170—Economic History of the United States. (5W) Arrington

Graduate Courses and Seminars

201. Historical Method. Seminar in the basic techniques of historical research. History 190 recommended but not required as a prerequisite. Open to seniors. Recommended to graduate students in other fields making use of the historical method in their research. (3F, Sp) Staff

203. Historiography. The history of historical writing. (3W) Staff

205. Philosophy of History. Interpretations, causation, and interrelations in history. (3F) Cazier

222. Seminar in European History. (3W) Alder


226. Seminar in Western American History. (3W) Staff

228. Seminar in Latin American History. (3Sp) Pratt

237. Teaching Utah History. Seminar in the sources and literature of Utah History, exercises in the preparation and presentation of materials. (3Su) Ellsworth

239. Readings & Conference in Special Areas. Credit Arranged. (F, W, Sp) Staff

298. Thesis. Credit arranged. (F, W, Sp) Staff

Geography Minor

The Department offers a Geography minor which can be obtained by passing the following courses: Geography 5, 6, 7, 105, 106, 107, 185; Geology 1 or 3.

Geography Courses

1. General Social Science. A basic general education course giving synthesis of the social science disciplines. (5F, W, Sp) Peterson

5, 6, 7. Cultural Geography. Europe, Afro-Asia, and the Americas. A survey of geography with emphasis on the social viewpoint. The influence of geography on domestic and international problems: cultural, ethnic and linguistic backgrounds, boundaries, population trends, national economic and governmental systems as they may reflect foreign policy. Students may register for one, two or three quarters. (3F, W, Sp) Peterson

30. World Regional Geography. A survey of the regions of the earth with emphasis upon the study of the relations of human activities to natural environmental conditions of countries and continents. (5F, W) Stallings

100. Teaching of Geography. A course designed to assist the classroom teacher in the presentation of geographic information. Techniques, methods and sources of data will be stressed. (3W) Stallings

105, 106, 107. Geopolitics: Europe, Afro-Asia and the Americas. A more detailed study of the areas under consideration with special attention directed towards the political and cultural backgrounds of the people. Emphasis will be placed upon the historic development of
the regions in light of their position in the modern world picture. (3F, W, Sp) Peterson

130. Geography of Underdeveloped Lands. A geographic analysis of underdeveloped and emergent countries in terms of internal and external problems and interrelationships. (Sp) Stallings

135. Physical Geography of the World. An approach to geography from the physical viewpoint with an emphasis on those aspects of the physical environment that are most important to man. Areas covered are weather, climate, landforms, seas, water resources, natural vegetation and associated animal life, soils, mineral fuels, and minerals of economic importance. An analysis is made of the advantages and disadvantages presented by these factors to man's use and potential use of them. (Sp) Stallings

138. Geography of World War II. An analysis will be made of the world-wide character of World War II. Attention will be directed to the territorial losses of the Japanese, British, and French colonial holdings and to the emergence of the United States, the Soviet Union, and Red China as world powers. Emphasis will be placed on the new position of the United States as a Pacific power and the war time and post-war commitments of the United States in the picture. (2W) Peterson

145, 146, 147. Economic Geography. Europe, Afro-Asia, and the Americas. A regional study of economic relationships between geographic areas. Examination will be made of basic patterns of trade relations, population distribution, capital equipment, governmental agencies which affect production and trade and international relations. (2F, W, Sp) Benson

Department of

Political Science

(Political Science, Pre-Law)

Head: Professor M. Judd Harmon
Office in Main 250

Professors Wendell B. Anderson, Claude J. Burtenshaw, M. R. Merrill, University Vice President; Associate Professors Milton C. Abrams, JeDon A. Emenhiser; Assistant Professor Philip S. Spoerry; Lecturer H. Preston Thomas; Instructor Lucille Pratt.

The Department offers the Bachelor of Science, the Bachelor of Arts, Master of Science, and Master of Arts degrees in Political Science.

Students who major in Political Science should have at least 35 hours in the field. Exceptions are made in certain cases and particularly for those who plan to enter law school. All major students should complete successfully Political Science 10, American National Government. Students must have grades of "C" or above in all courses counted toward the major, and a 2.5 grade average in the major field is required for graduation. Before being certified for graduation by the Department the student must pass a comprehensive examination in the field. Students will be notified of the time and place of examinations.

All students who wish to graduate in Political Science should have a member of the Department as an adviser.

Career Opportunities in Political Science

One of the most important reasons for studying Political Science is to improve the quality of one's
citizenship. An informed citizenry is essential in a democracy. However, in these days there are a number of career opportunities for those who major in the field. These include teaching in the secondary schools, journalism, and business. There is also a demand for college teachers. The latter requires graduate work usually to the PhD level.

In addition the Department of Political Science offers career-oriented programs in International Relations, Public Administration, and Pre-Law.

International Relations

Unusual career opportunities are available for those possessing the requisite aptitudes and training. The United States Department of State, the Foreign Service, and many other government agencies offer a wide range of opportunities. Private American businesses are expanding foreign operations and international trade. These companies constantly seek qualified personnel. It is recommended that students contemplating an International Relations specialty become proficient in at least one foreign language. Students having a special interest in this area are invited to join the International Relations Club.

Public Administration

The career opportunities for persons trained in Public Administration include management positions in city, county, state, national, and international agencies. Administrative positions in finance and personnel are both rewarding and challenging.

Pre-Law

Utah State University has been very successful in preparing students to enter professional law schools. The success of these students both in the professional training period, and thereafter, indicates the high quality of the preparation.

Some law schools admit only college graduates. Others admit students with lesser training. College graduation is recommended even though it may not be required for admission.

Those who plan to enter law school should take the Law School Aptitude test several months prior to the time entrance is desired. Many law schools now require that test scores be included in the applications. Applications for the test should be made to the School of Graduate Studies, in Library 239.

Following is a recommended curriculum for Pre-Law students. This has been carefully prepared to conform to the recommendations of the law schools themselves. Some modification is possible. Pre-Law students should register with a member of the Political Science staff.

Recommendations for Pre-Law Majors

American Institutions: PS 10 is required.
Optional selections from the following: PS 15, 125, 140, 151, 180, 181, 182, 220, 230, 240, 250, 260. Total minimum hours—12.

Comparative Government: Optional selections from the following: PS 70, 170, 171, 172, 173, 174, 175, 176. Total minimum hours—3.

International Relations: Optional selections from the following: PS 101, 102, 111. Total minimum hours—3.

Political Thought: Optional selections from the following: PS 117, 118, 119, 145, 146, 147. Total minimum hours—7.

Public Law: Optional selections from the following: PS 127, 137, 128, 131, 137. Total minimum hours—5.

Areas of Emphasis in Other Departments. The lawyer must be familiar with as many areas of human endeavor as possible. It is recommended that the Pre-Law stu-
dent emphasize the following areas: English, American and European History, Literature, Psychology, Sociology, and Economics. Prospective lawyers should be reasonably skilled in typing and familiar with accounting procedures. 

Students contemplating law as a potential career are invited to affiliate with the Pre-Law Club. Professor W. B. Anderson is adviser.

Graduate Study

**Master of Science and Master of Arts in Political Science.** The program of studies for the Master of Science and Master of Arts degree in Political Science is described in the Catalog of the School of Graduate Studies. Students interested in the program should obtain a copy of the Graduate Catalog and must also consult with a member of the Political Science faculty.

**Political Science Courses**

1. **Government and the Individual.** Introduces the student to the political world of American democracy. Totalitarian governments and the philosophies of fascism and communism that form the theoretical bases of these regimes are also studied. Democracy as practiced in the United States and Great Britain is contrasted with these systems. (5F, W, Sp) Emenhiser, Merrill

10. **American National Government.** The basic course of the department. It is highly desirable that this be taken before upper division courses in Political Science. (5F, W, Sp) Staff

15. **American State and Local Government.** The emphasis is on Utah state, municipal and county government. It follows American government. (3F, W, Sp) Emenhiser

70. **Comparative Political Systems.** Introduction to the field of comparative government and politics, with emphasis on constitutional and totalitarian regimes, presidential and parliamentary structures, and one-, two-, and multiparty systems. Prerequisite: PS 10 or departmental permission. (3F) Sperry

91, 92, 93. **Public Affairs Series.** Those assemblies, forum and other campus events relating to public and international affairs are included in the series. Students will be expected to attend and report and evaluate six scheduled events. Passing rather than letter grades will be given. Series conducted in cooperation with Associated Students. (1/2F, 1/2W, 1/2Sp) Anderson

101. **American Foreign Policy.** The place of the United States in the world of nations as affected by our traditions, interests, and interpretations of international affairs. (3F) Merrill

102. **International Political Relations.** Psychological, economic, racial, and other obstacles to international cooperation, as exemplified in recent events. Attention is given to various proposals that attempt to solve the dilemmas of our time. (3W) Merrill

110. **Basic Problems in International Relations.** Examines current international developments with emphasis on their relation to the United States. (3Sp) Merrill

111. **International Government.** The purposes, organization and operation of the United Nations and the Atlantic Community are studied. (3Sp) Anderson

114. **Intergovernmental Relations.** Studies the relations between and among the various units of government in the United States including nation, state, county, city, and district. (3Sp) Emenhiser

115. **Problems of Utah Government.** Examines contemporary problems of Utah at the state, county, and city level, as well as federal-state and interstate relations. Special emphasis is given to natural resources problems. (3W) Emenhiser

117, 118, 119. **American Political Thought.** A survey of American Political ideas and the men who developed them. The historical approach is used, beginning in colonial times and carrying the development of American political thought through to the present. Emphasis is on ideas that have been significant in shaping the form and actions of American government today. Student may register for one, two, or three quarters. (2F, 2W, 2Sp) Harmon

123. **Political Surveys.** Introduces the student to the tools of political field research and stresses the analysis of voting behavior by utilizing census data, election returns, and questionnaires. (3W) Emenhiser

124. **Public Opinion and Policy Formulation.** Discusses the nature of public opinion and propaganda and their role in the political process. Assigns research topics on particular current policy developments and assists the student in attempting to determine the effects of public opinion upon governmental policy decisions. (5Sp) Emenhiser

125. **Political Parties and Practical Politics.** Organization and practices of political parties. (5W) Emenhiser
126. Polimetrics. Presents basic social statistical tests and other mathematical devices applicable to explaining quantitative political data. (3Sp) Emenhiser

127. Constitutional Law. The first part of a two-part foundation course in American constitutional law. The case method is used extensively. Political Science 10 is a prerequisite. (3F, 3Sp) Staff

128. International Law. A basic course in the law of nations. Students should have had at least one course in international relations or foreign policy. (5W) Anderson

131. Administrative Law. Constitutional limitations, legislative supervision, and judicial control of administrative agencies, and the forms of administrative action appropriate for American economic and political institutions. (3Sp) Staff

137. Constitutional Law. The second part of a two-part foundation course in American constitutional law. The case method is used extensively. Political Science 127 is a prerequisite. (3W, 3Sp) Staff

140. American Legislative Process. Includes a study of the organization and procedure of legislative bodies and the influences at work in and the character of the output of national and state legislatures. (5W) Emenhiser

145, 146, 147. History of Political Thought. Course 145 covers political thought from its beginnings in the Greek period to the Reforma­tion. Course 146 carries on the study to Hegel. Course 147 is devoted to the modern period and emphasizes a comparative study of socialist, communist, nazi-fascist, and democratic thought. (3F, 3W, 3Sp) Har­mon

151. Introduction to Public Administration. Defines the subject matter of public administration, concentrates upon analyzing the problems of governmental administrative organization and management, and explores the methods of securing responsible performance from the bureaucracy. (3F) Staff

152. Public Personnel Administration. Reviews the trends and techniques of recruiting and developing the public service and calls attention to the machinery established for these purposes. Prerequisite: Political Science 151. (3W) Staff

153. Public Finance Administration. Describes national, state, and local governmental budgetary and accountability processes in relation to policy formulation. Prerequisite: Political Science 151. (3Sp) Staff

154. Public Administration Internship. Offers the student the opportunity to observe and, within limits, practice what he has learned from his classroom experience. The student will be placed in a nearby governmental office where he will be expected to spend the equivalent of one day per week performing administrative tasks or conducting an administrative survey. Prerequisites: Political Science 151, 152, and 153. (2F, 2W, 2Sp) Staff

157. Civil Rights Law. The law as it relates to civil liberties. State and federal action in this area. The emphasis is on Supreme Court decisions and their implementation. (3Sp) Staff

159. Ethics of Society and Law. This course deals with the problems of knowing, free will, sources of morality, and the morality of law. (3F) Burtenshaw

160. Theory and Practice of Government. Designed to satisfy the demand for an offering in general government on the upper division level for non-political science majors, particularly those in education, forestry and the exact sciences. The course will deal with the important theories underlying the various governmental forms and with the practical operation of government. The emphasis will be on the national government of the United States. (3F, W, Sp) Staff


171. Major Governments of Asia. Principal attention will be given to the governments of Japan and China. (5W) Spoerry

172. Major Governments of Latin America. A comparative study of the governments of Argentina, Brazil, Mexico and other selected Latin American countries. (3Sp) Pratt

173. Soviet Government and Politics. Designed to present the structure and functioning of the Soviet government and Communist Party. Attention is given to the theoretical background of Communist government and party practices in modern times. (3F, Sp) Spoerry

174. Politics of the Communist Bloc. Relations between Communist and Soviet bloc governments, including the USSR, Communist China, and Eastern Europe. (3Sp) Spoerry

175. Political Systems in South and Southeast Asia. Politics and government in India, Indonesia, Burma, Philippines, and other countries in the area. (3W) Spoerry

176. Politics of Underdeveloped Areas. Characteristics and problems of the political systems of the non-Western world, including Asia, Africa, and the Middle East. (3W) Spoerry

177. Today's Critical Latin American Problems. Topics will vary as crises develop, dealing with background and development of each
College of Business and Social Sciences

Crisis from national, political, economic, or social views. (2F) Pratt

180, 181, 182. Current Political Problems. Any quarter may be taken without the preceding quarter or quarters. Lower division students must receive consent of the instructor. (2F, 2W, 2Sp) Merrill

190. Problems in American National Government. The student enrolling in this course should have some basic knowledge of the structure of the American national government. Political Science 190 will consider the government in operation and some of the problems which grow out of that operation. Particular emphasis is on the relations between the three branches of government. (3Su) Staff

195. Library Resources of Political Science. Devoted to familiarizing students with the basic library materials available. The various types of resources are carefully studied and used by each student. (1F)

Graduate Courses

201. Research in Political Science. Credit arranged. (F, W, Sp) Staff

203. Readings and Conferences. Credit arranged. (F, W, Sp) Staff

205. Methods in Political Science. Methods the political scientist must use that are common to all sciences, the particular problems with which the social scientist is confronted, and their application to special problems of political science. (3) Staff

211. Thesis. For graduate students preparing a master's degree thesis. Credit arranged. (F, W, Sp) Staff

220. Seminar in Comparative Politics. A seminar designed to give graduate students and qualified seniors a more detailed and deeper knowledge of comparative political systems. (3W) Spoerry

230. Seminars in Public Law. A seminar designed to give graduate students and qualified seniors a more detailed and deeper knowledge of public law, especially constitutional law. (3F) Staff

240. Seminar in American Politics. A seminar designed to give graduate students and qualified seniors a more detailed and deeper knowledge of American politics. (3W) Emenhiser

250. Seminar in Political Theory. A seminar designed to give graduate students and qualified seniors a more detailed and deeper knowledge of political theory, both American and European. (3F) Harmon

260. Seminar in Public Administration. A seminar designed to give graduate students and qualified seniors a more detailed and deeper knowledge of public administration. (3Sp) Staff

270. Seminar in Foreign Affairs. A seminar designed to give graduate students and qualified seniors a more detailed and deeper knowledge of foreign affairs, including American foreign policy, international relations, and international organizations. (3Sp) Staff

Department of Sociology, Social Work, and Anthropology

Head: Professor Therel R. Black
Office in Main 234


Instructional and Occupational Opportunities

Instruction in Sociology, Social Work, and Anthropology contributes to students in two important ways:

First, it provides a broad or general perspective about man. This perspective is developed through
examination of the general features of the cultural and social life of man in complex civilization, and of man in pre-historic, primitive, and less technologically developed societies. This approach leads to better understanding of the processes and principles of social life that are alike and that are different from one part of mankind to another. This helps the student see himself, his groups, and his society in a meaningful relationship to others.

Secondly, instruction in these fields prepares the student for varied occupations in fields of teaching, research, administration, and social welfare. Teaching positions are largely at the junior high and high school levels, and with more advanced training on the college level. Teaching positions in the public schools are usually integrated with history; thus a strong minor in history is encouraged for those who seek these teaching positions.

Research is another occupational outlet. Opportunities to do research exist in industry, government, private and public agencies, and in educational organizations. These positions usually require some graduate training. Because of the need for qualified research people in Sociology and Anthropology, graduate schools compete heavily with scholarships, assistantships, and fellowships to attract students with training in these fields.

Administration, particularly when associated with fields where management of people is crucial, has many and varied openings for persons with training in Sociology, Social Work and Anthropology.

The human and organizational aspect of administration is extremely vital, and training in subjects that provide knowledge and understanding in these areas is in demand.

Social Welfare positions, both public and private, are widely available. These positions are variously referred to as social worker, case worker, probation and parole officer, child welfare worker, psychiatric social worker, employment officer, etc. Those whose training has focused in social work have significant opportunities here. In the social work field there is a great demand for students who seek graduate training. Financial aid to such students is generally available.

Sociology

A major in Sociology must, in addition to meeting the group requirements for graduation, complete a minimum of 47 credits in Sociology. A maximum of 60 credits in Sociology will be allowed. A number of courses in Anthropology are included in the Sociology group. Specific required courses are listed in a requirement sheet which can be obtained from advisers.

Either Sociology 10 or 70 is a suggested prerequisite for all upper division courses in Sociology.

Students are required to complete at least three hours of Seminar 190 or its equivalent for graduation.

Graduate Study

The Department offers courses leading to the Master of Science and Doctor of Philosophy degrees in Sociology. Instruction is comprehensive since it covers the general areas of sociological theory, methodology, social organization, social psychology, and cultural anthropology. Instruction is specialized in the areas of social change and development, community organization, social organization aspects of natural resources, rural sociology, and other areas closely associated with staff and graduate research programs. Research is promoted through departmental relationship
with the Agricultural Experiment Station, with the Division of University Research, and with state and federal agencies.

**Doctor of Philosophy Degree.**

This degree is offered in the Department of Sociology and Social Work through collaboration with closely related departments in the Social Sciences.

Institutional requirements for the PhD degree are explained in the Graduate School section. Also see Catalog, School of Graduate Studies. Further details are available in a department bulletin for graduate students.

Graduate assistantships are available. Applications can be obtained in the Graduate School or in the Department.

**Sociology Courses**

5. *American Culture.* Basic beliefs, values, customs, and institutions of America. Problems of cultural lag. New knowledge, based upon a changing culture, that should redirect institutional life to meet the changing needs of people. (3F) **Roskelley**

10. *Rural Sociology.* The influence of geography upon rural culture. Patterns of settlement and their influence upon rural life. Population growth and migratory patterns of rural people. Conflict, co-operation and other interaction processes. Rural institutions and adjustments to meet rural problems. Credit not given if Sociology 70 has been taken. (5F, W, Sp) **Staff**

70. *Introductory Sociology.* How does biological man become human? The way men of different cultures control their societies and evaluate their behavior. How and why men organize as they do to express their love, hate, and fears or acquire money, education, or security. Credit not given if Sociology 10 has been taken. (5F, W, Sp) **Staff**

75. *Effective Community Living.* Understanding the community we live in. Practical experience in learning fundamental tools for social action by individuals, organizations and groups. (3Sp) **Staff**

100. *Educational Sociology.* The group and human relations factors within the school system, and between the school system, the home, and the community. (3W) **Black**


140. *Social Psychology.* The cultural and social determinants of personality growth. The application of such knowledge to the understanding of group process, mass behavior and the human relations problems that characterize our society. (3F) **DeHart**

141. *Rural Community Organization and Leadership.* Forces and procedures which are effective in organizing or disorganizing communities. Techniques of training leaders to help make the community more effective. (3Sp) **Roskelley**

144. *Woman Today.* The new and challenging roles of women in adjusting to a modern society. (3Sp) **Staff**

154. *Population Problems.* How communities, states, and nations are affected by increasing or decreasing populations. The significance of these trends on today's living and planning for the future. (3W) **Pennock**

156. *Social Institutions.* Similarities and differences in institutions as they emerge, grow and decline. Problems of keeping institutional objectives attuned to the fulfillment of the needs of an evolving social order. (3F) **DeHart**

158. *Human Relations in Industry.* Human relations, philosophy and skills applicable to present-day management practices. The contribution of social science in building a human relations program in industry. (3F) **DeHart**

159. *Industrial Sociology.* Stresses contributions of sociology to the understanding of industry as a social system. Includes work behavior of individuals and consideration of the impact of technological change on the community and larger society. (3Sp) **DeHart**

161. *Modern Social Problems.* Major American social problems. Adjustments and instruments of change as means of minimizing disorganization. (3) **Lewis**

170. *Intermediate Sociology.* Basic principles of sociology are considered in their theoretical and methodological settings, as a body of facts, a method of investigations, and an explanation of associate living. (5) **Black**

171. *Juvenile Delinquency.* Heredity, environmental, cultural and social conditions which are causative factors in delinquency. (3) **Pennock**


180. Group Dynamics. Group processes from the point of view of improving individual groups. Social action as a group process. (3W) DeHart

184. Social Change. A systematic analysis of selected theories of social change with emphasis on the social psychological approach leading to an understanding of the change process and alternative strategies for effecting change. (3Sp) Bylund

190. Seminar in Sociology. Selected sociological concepts or problems. (1F, W, Sp) Staff

191. Legal Obligations in Husband-Wife Relations. The legal approach to the validity of marriage, the obligations imposed by the law upon husband and wife and the legal remedies in problems of marital discord are examined. Legal history and precedents and the responses and the lack of responses of the courts to current social trends are noted. (2F, W) Compton

192. Legal Obligations in Parent-Child Relations. The determination of illegitimacy, custody and adoption, and the legal rights and duties flowing therefrom are studied. Other rights and legal obligations of parent and child are examined. Prerequisite: Sociology 191. (2Sp) Compton

195. Urban Sociology. The changing nature of American life as it has moved from predominantly rural to urban patterns. Significant events that have led to urbanization. Guidelines that are useful for thinking about the urban world of tomorrow. (3) Pennock

196. Race Relations. Historical perspective of minority group relations as they have existed in the United States and other parts of the world. Critical examination of the implications which these relations have for the institutionalized and social life in the United States. Analysis of current aspects of integration vs. segregation as they affect individuals and groups in our present day society. (3) Pennock

199. Social Disorganization. A study of social problems from the standpoint of the social processes that bring them about: the genesis of anti-social attitudes in the individual, the family and the community; and of the conflict between these attitudes and those held by the larger defined group. (3) Penock

201. Research in Sociology. A project for original study is organized and field work is carried on under supervision. Prerequisite: Sociology 287. Credit arranged. See Thesis adviser. (F, W, Sp) Staff

202. Advanced Sociological Theory. Critical analysis of current sociological theory about human society. Prerequisite: Sociology 170 or permission of instructor. (5) Black

203. Independent Readings in Sociology. Reading and conferences on topics selected by the student and the adviser. Credit arranged. Instructor's permission required. (F, W, Sp) Staff

207. Graduate Seminar. Short subjects within the field of Sociology and pertinent to but not available in regular courses. Instructor's permission required. (2) Staff

210. Advanced Rural Sociology. Analysis of major developments in rural social thought, research and application of both toward solution of social problems throughout the world. (3) Roskelley

225. Sociology of Deviant Behavior. Deviant behavior may be antisocial and not criminal or criminal and not antisocial. Research in depth to give the student greater insight and perspective into the social implications implicit within this concept. (3) Pennock

287. Methods of Social Research. Historical development of Social Research. Methods and techniques of interpreting data in social analyzing, and interpreting data in social research. (3F) Bylund, Roskelley

288. Practicum in Sociological Research. Supervised application of sociological research in field studies. Credit arranged. (F, W, Sp) Staff

Social Work

The demand for qualified Social Workers exceeds the supply. The opportunity in Social Work is steadily growing, not only because the mounting complexities of modern life bring about an increasing number of personal difficulties, but because methods of constructively dealing with these difficulties are becoming more fully known. As the professional content of positions in Social Work has become clearer, added emphasis has been given to adequate education and training.

With the establishment of the Council on Social Work Education in 1952, the graduate schools and undergraduate departments of Social Work joined forces with other
segments of the profession to provide more effective recruitment and training of a larger number of persons for the expanding positions in Social Work. Undergraduate education in Social Work is not regarded as a substitute for graduate training, but as the best preparation for employment in those positions for which graduate training is not required, as well as the best preparation for graduate study in Social Work. More than 100 under graduate departments of Social Work have been approved for constituent membership in the Council on Social Work Education, of which this Department is a charter member.

Course requirements for a major leading to a BS degree in social work include: 47 credit hours selected from courses in social work, sociology, psychology, economics, and political science. Major professors will aid in their selection. SW 173 is a suggested prerequisite to other social work courses.

In addition to the minimum 47 hours listed above, students are required, during each quarter in residence, to participate in a number of projects sponsored by the staff. These projects are designed to provide laboratory experiences in which the students may obtain practical experience diagnosing social situations and developing programs to resolve problems.

Social Work Courses

50. Social Welfare Agencies. Agencies and institutions which provide social services such as child welfare, family casework, school social work, and public assistance. (3W) Lewis

162. Mental Health. The prevention and treatment of mental illness and the maintenance of mental health in modern society. (3W) Lewis

170. Child Welfare. Evolution and current developments in programs for meeting needs of children: substitute parental care and adoptions, child labor laws, juvenile courts, provisions for unmarried parents, the handicapped child and the exceptional child. (3Sp) Lewis

173. The Field of Social Work. Social casework, social group work, and community organization. Objectives, processes, and personnel work. (Majors should take SW 173 and 175 concurrently.) (3F) Lewis

174. Introduction to Case Work. Theories and practices of social casework, with emphasis on problems and techniques of interviewing. (3W) Lewis

175 a, b, c. Introduction to Field Work. Various agencies dealing with social work and related areas. Includes field trips. (Taken concurrently and immediately following 173.) (2 cr. each) Lewis


178. Adolescence. Social adjustment of the adolescent, as influenced by the nature of the culture in which he lives. Methods of working with adolescents. (2) Staff

180. Group Dynamics. See Sociology 180. DeHart

195. Social Work Seminar I. Social work publications and other source material applicable to the field. (1) Lewis

198. Corrections. Historical perspective of crime and punishment as contrasted with modern concepts of penology which looks at the penitentiary as an institution of rehabilitation and resocialization of the juvenile and adult offender. (3) Pennock

199. Public Welfare. Examination and evaluation of public and private welfare programs including the program of the Department of Health, Education and Welfare as it applies to unemployment, old age assistance, aid to needy children, and physically or mentally handicapped. (3) Pennock

203. Independent Readings in Social Work. Credit arranged. Instructor's permission required. (F, W, Sp) Staff

Anthropology

Anthropology offers the widest possible framework for the understanding of man and society through courses dealing with the present diversity of cultural and human types as well as prehistoric evolutionary perspectives. The study of Anthropology provides a useful background for students in
the social sciences, humanities, biological sciences, and education. It leads, when pursued through graduate levels, to careers in research, teaching, and some branches of government service.

Anthropology Courses

90. Introduction to Cultural Anthropology. Nature and evolution of man and his social and cultural behavior. Using empirical data from prehistoric, primitive and contemporary cultures, current ideas and generalizations about human behavior are explored. (5) Keller

92. Peoples and Cultures of the World. Intensive comparison of the economic, political, kinship and religious structures of representative societies from the major culture areas of the world. (3) Keller

95. Human Pre-History. Evidence discovered through research of man's existence upon the earth before the period of written history. (3) Keller

105. Comparative Value Systems and Education. Theoretical and illustrative contributions of anthropology to a broad perspective on the variability of the educational processes and objectives in various primitive and complex societies over the world. (3) Keller

160. Comparative Family Systems. Basic anthropological concepts and theories relating social structure based on kinship, its analysis, evolution, functions, change, and variability over the world. (3)


165. Culture and Personality. The processes of personality development in terms of culture and social class. The nature and interpretation of personal experiences in different cultures. (3Sp) Roskelley

166. American Indian Ethnology. Economic, political, and religious structures of representative aboriginal cultures of the main culture areas of North American Indian. Emphasis will be given to prehistoric peoples of the local Great Basin area. (3) Keller

167. North American Prehistory. Analysis of man and cultural evolution in the major cultural areas of prehistoric America. Includes archeological laboratory and field methods with investigations of local sites. (3) Keller

268. Independent Studies in Anthropology. Advanced readings or projects relating to theory, field or laboratory studies arranged by student and staff. Instructor's permission required. (Credit arranged)

Division of

Military Science and Aerospace Studies

Dr. Edwin L. Peterson, University ROTC Coordinator
Colonel Bert Perrin, Professor of Military Science
Lt. Col. Roland H. Taylor, Professor of Aerospace Studies

Each male citizen of this country has an obligation to serve in the military forces when required for the defense of his nation. The Reserve Officers' Training Corps program is one of several ways by which this obligation can be fulfilled. Through the ROTC program, America offers outstanding college men a pathway from campus leadership to important command responsibilities as officers with the Active or Reserve Military forces.

Two separate ROTC units are located at Utah State University: Army and Air Force. Men may initially choose which program they wish to enter; however, subsequent transfer between units is not generally approved because of the difference in curriculum.

Army and Air Force ROTC consist of a two and a four year program. Army and Air Force ROTC four-year programs consist of two two-year courses. The Basic Course
is normally taken during the Freshman and Sophomore years. It consists of six quarters of work, including drill periods. The Advanced Course of the ROTC program is normally taken during the Junior and Senior years and consists of six quarters of work plus a summer camp (between the Junior and Senior years).

The Army and the Air Force ROTC two year programs are designed for students who come to Utah State University from other institutions, to include junior colleges, where ROTC was not offered as part of the curriculum or for those students of Utah State University who were unable to take the basic course because of scheduling difficulties.

Students who elect the two year program will be required to attend a six weeks summer camp before enrolling into the Army or Air Force Advanced Course.

The Advanced Course is both elective and selective. Once entered upon, completion of the Advanced Course becomes a requirement for graduation unless a proper release is obtained. Physically and mentally qualified students are selected for enrollment in the Advanced Course by boards composed of military and civilian faculty members. Selection by the boards is based on leadership ability, academic standing, officer potential, and interest in the military. Satisfactory completion of the Basic Course or basic summer camp is a prerequisite for entrance into the Advanced Course unless constructive credit is granted for previous active military service.

Satisfactory completion of either basic camp or a basic summer camp of at least six weeks duration or the Basic Course and Advanced Courses, including the summer camp, leads to a commission as a Second Lieutenant in the Army or Air Force Reserve. Outstanding students in both programs are designated Distinguished Military Students and are afforded the opportunity of applying for commissions in the regular service.

Deferment from the draft is offered to selected students who maintain satisfactory grades in ROTC. Upon completing the program and being commissioned, students normally enter on active duty with the Armed Forces as a second lieutenant in the service in which they are commissioned. The period of active service required of ROTC graduates depends on the requirements of the service concerned.

Enrollment Regulations. ROTC leadership, drill and command periods are an integral part of the ROTC program. Registration for one of these periods is required of all ROTC students.

A combination uniform and laboratory fee of $5 is required of all ROTC students and is paid at the time of initial enrollment each year.

General Requirements

(A) Basic Course:
(1) Be a citizen of the United States.
(2) Not less than 14 years of age.

(B) Six-week Officer Basic Military Summer Training:
(1) Have two academic years remaining.
(2) Be a citizen of the United States.

(C) Advanced Courses:
(1) Satisfactorily complete the basic course or have equivalent credit.
(2) Accept and sign a draft deferment agreement and agree to stipulations of the Advanced Course contract, outlining the obligations of both the student and the service.
(3) Have high moral character.
(4) Obtain a satisfactory score on the Army or Air Force Qualification Test.
(5) Be selected for enrollment into the Advanced Course by a selection board composed of officers and civilian faculty members. Selection is based on academic standing, previous military or air science grades, scores in the tests, moral character, leadership, and officer potential.
(6) Have at least two years of college remaining before becoming eligible for a Bachelor's degree. It is desirable, but not required, that a student complete the ROTC program and the requirements for a degree simultaneously.
(7) Enlist in a reserve component for a period required by the Secretary of the service concerned. (The student will not be required to become a member of a local unit nor attend weekly drills.)

**Pershing Rifles.** The National Society of Pershing Rifles was formed "to foster a spirit of friendship and cooperation among men in the Military Departments." Company "G" 9th Regiment, is located at USU. Membership in Pershing Rifles is open to any Army or Air Force basic or advanced cadet. Included within the Pershing Rifles is a Rifle Team to promote marksmanship among Army and Air Force cadets. The Company competes in several regional and national invitational tournaments. The Pershing Rifle Drill Team enjoys a national reputation as a drill unit, and is open to all members of the Pershing Rifles.

**Scabbard and Blade.** The National Society of Scabbard and Blade is an honorary society of Advanced Army and Air Force Cadets. Company "A," 4th Regiment, was organized at USU in 1922. Members are dedicated to unite in closer relationship the Military Departments of the University, and to perform such services to the University and to the community which will result in the spreading of intelligent information concerning the military requirements of our country. Members are invited to join after being selected from among the outstanding advanced cadets on campus by the society's current membership.

**Pershing Rifles Courses**
37, 38, 39. Pershing Rifle Drill, Freshman.
40, 41, 42. Pershing Rifle Drill, Sophomores.
137, 138, 139. Pershing Rifle Drill, Juniors.
147, 148, 149. Pershing Rifle Drill, Seniors.

**Department of Aerospace Studies**

**Head:** Professor Lt. Col. Roland H. Taylor

**Office in Military Science 107**

**Assistant Professors** Major John E. Jarrell, Captains Gaylord A. McCallison, J. G. Poulsone.

The purpose of Air Force ROTC is to provide education that will develop skills and attitudes vital to the career professional Air Force Officer; to find and interest capable young college men to apply for Air
Force Officer training; to screen and select them in desired numbers and categories to meet Air Force needs; and to perform these functions in a way to motivate these men to enter the military profession on a career commitment. It is not the purpose of the course to train in a specific field, but rather to give an understanding of the mission and the global responsibilities of the United States Air Force. The academic phase develops a background in national and international affairs to help interpret and evaluate world events.

The AFROTC teaching methodology is based on the seminar and independent study methods of the graduate school. Professional officer preparation is achieved by active participation of the cadet in a learning situation which parallels, in many respects, the activities of an Air Force officer, through discussion, conference, and coordination actions leading to decision making. The curriculum has been designed to meet the following criteria: college level in content, scope, intensity and presentation; appeal to students in all academic fields; and preparation of students to undertake flying training upon graduation.

The Four-Year Program

Study is divided into the General Military Course (GMC), covering the first two years, and the Professional Officer Course (POC), covering the Junior and Senior years plus a four weeks summer training. The course consists of instruction totaling 420 hours, allocated as follows: Freshman and Sophomore - 90 each; Junior and Senior years - 120 hours each and summer training, four weeks.

The Two-year Program

Screening of candidates for the two year program will conform to the same requirements for selecting advanced students in the four-year program. Prior to formal enrollment each student must be eligible and successfully complete six weeks of field training. The course of instruction is the same required of the four-year program with the basic program covered in the six weeks of field training.

OE 100, the Freshman course explores the causes of present world conflict as they affect the security of the United States. The Sophomore course, OE 200 is a comparative study of world military forces. These two courses constitute the General Military Course.

In the Junior year, OE 300 deals with the development of air power, astronautics and space operations, and future developments in Aerospace power. The Senior course, OE 400 provides a study of professionalism, leadership and management. The focus of the Advanced Course is on the mission environment and personal identification of the cadet with his career.

In addition the curriculum includes: experiences designed to stimulate and develop a growing interest in Air Force flight training program (e.g., orientation flights and visits to Air Force Bases); opportunities to apply the principles of leadership, management and staff work in practical situations, and other related experiences.

Physical Requirements

All cadets must meet the physical standards for general military service. A cadet's physical examination for entry into the University will generally determine whether or not he meets these requirements.

Veterans

A veteran is accepted into the AFROTC program if he can complete the program prior to reaching
age 30, provided he has completed at least two years active duty and can meet the physical requirements. Parts of the General Military Course may be waived in lieu of prior military service. If accepted he can participate in the flight indoctrination program in the Senior year, provided he will be commissioned before age 26½ years.

Special University and AFROTC Requirements

Once a student enters the General Military Course or the Professional Officer Course, successful completion of the course becomes a requirement for graduation, unless relieved of the requirement by the Professor of Aerospace Studies or the President of the University. In addition, when entering the Professional Officer Course, 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, Aerospace classes should be scheduled to be completed simultaneously with requirements for a degree. If the student is an engineer under a five-year program, he should plan his Aerospace program in advance with his adviser and the AFROTC Director of Training in order to meet the above requirements.

To qualify as a pilot or navigator, cadets must be able to finish the Aerospace program and graduate from the University before age 26½ years. Other cadets must complete the military program and graduate from the University prior to reaching the age of 28, unless they are veterans.

Regular Commissions in the United States Air Force. Outstanding AFROTC Cadets who have demonstrated a high degree of leadership, initiative, and an interest in a career as a regular officer and are designated a Distinguished Military Graduate may be offered an opportunity to apply for a regular Air Force Commission.

Payments to Advanced Cadets.
The advanced cadet is paid a retainer fee of $40 per month, maximum amount paid for Junior and Senior years is $800. Cadets will be paid approximately $120 for the six weeks Field Training Course and $120 for the four weeks Field Training Course plus travel pay for the round trips to and from camp.

Summer Training

(a) Field Training Course (6 weeks) is a prerequisite for cadets entering the AFROTC at the Junior level without the basic courses. Training will be given at an Air Force base and will last for six weeks.

(b) Field Training Course (4 weeks). All advanced cadets will attend one summer training camp of four weeks in duration. Normally, attendance at this camp is between the Junior and Senior years at a selected Air Force Base. Six quarter hours of college credit are granted for this training.

Flight Training. AFROTC is concerned with two types of flight training; the first type is taken while a student is a cadet at the University and the other after he has received a commission and has graduated.

Cadets designated potential pilots are required to register for the AFROTC Flight Instruction Program (FIP) during their Senior year. Successful completion of 36½ hours of flight instruction and a FAA examination enable him to gain three hours of university credit. The entire cost of this training is paid for by the Air Force.

Cadets designated to become pilots and navigators are required to
take flight training after reporting for active duty. During the year of flight training in the U. S. Air Force as a Second Lieutenant, a cadet will receive full pay and allowances, plus flight pay, a total of approximately $6,500.

**Non-Flying 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 within the Air Force. These skills cover the exact sciences and social sciences but are not limited to these study areas. In many of these fields cadets may be granted a year's delay to acquire an advanced degree prior to call to active duty. After their call to active duty they will serve four years in major fields of study. Interested cadets may contact the AFROTC Education and Training Officer 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 Master or Doctor's degree. The length of the delay depends upon current AFROTC regulations and directives. Students who are slated for flight training, however, must enter such training before reaching 26 1/2 years of age.

**Texts and Uniforms.** All texts and uniforms are furnished at no expense to the student.

**Air Force Library.** A library of Air Force periodicals and publications is maintained for the Air Force ROTC Cadet. Material relative to the AFROTC curriculum is available.

**Air Force ROTC Counseling Service.** AFROTC Detachment maintains counseling services for each cadet. Service is offered primarily in areas concerned with the AFROTC curriculum (Education, study and leadership).

**Air Force Angel Flight.** The Angel Flight is an AFROTC-sponsored organization of approximately 30 University women chosen by a composite board of judges. Former members of Angel Flights recognized by National Headquarters may transfer upon application. Applications for membership may be made by University women, except second and third quarter seniors. The purpose of the Angel Flight is to provide the University with an AFROTC Women's social auxiliary and to further the cause of the U. S. Air Force by promoting the interest of college students in the AFROTC Program.

**Angel Flight Courses**

- 61, 62, 63. Aerospace Studies Angel Flight, Freshmen. A course in leadership management and organization including drill and classroom activities for University women selected for membership (IF, 1W, 1Sp) **Staff**
- 64, 65, 66. Aerospace Studies Angel Flight Sophomores. (IF, 1W, 1Sp) **Staff**
- 161, 162, 163. Aerospace Studies Angel Flight, Juniors. (IF, 1W, 1Sp) **Staff**
- 164, 165, 166. Aerospace Studies Angel Flight, Seniors. (IF, 1W, 1Sp) **Staff**

**Aerospace Studies**

One hour of Leadership Laboratory is required each week during the Fall, Winter and Spring quarters for each year of Aerospace Studies.

**Aerospace Studies Courses**

**AEROSPACE STUDIES OE 100**

**FIRST YEAR**

**GENERAL MILITARY COURSE**

10. An introductory course exploring the causes of present world conflict as they affect the security of the United States. The factors of national power, the types of conflicts nations will practice to achieve their goals. Two class periods per week and one leadership drill per week (2F) **Poulson**
11. Democracy and Communism. A comparative survey of the theory and practice to develop an understanding of opposed ideologies and their relevance to the cold war. Two class periods per week and one leadership drill per week. (2W) Poulson

12. Aerospace Power Orientation. An introduction to contemporary aerospace equipment, weapon systems and their employment trends in the development and the impact of these trends on world affairs. Two class periods per week and one leadership drill per week. (2Sp) Poulson

AEROSPACE STUDIES OF 200 SECOND YEAR GENERAL MILITARY COURSE

21. 22 and 23. World Military Systems. A comparative study of world military forces including Free World Land and Naval Forces, Western Alliances, Communist Military Systems, and trends in the development and employment of military power. Two class hours and a leadership laboratory period of one hour per week each quarter.

21. Free World Land and Naval Forces. Compares the roles, missions, and objectives of each service. Shows that the roles assigned to each force are those which best fit the nature of each service and complement the roles of the other. The course will include a general knowledge of the weapon systems and their employment, an awareness of the trends in the development of land and naval equipment, and the changing concepts of the force employment. (2F) Jarrell

22. Commisit Articles Military Systems. A study of the mission, organization, functions, and characteristics of Communist Air, Naval and land forces and the characteristics and operations of Communist regional security organizations. (2W) Jarrell

23. Western Alliances and Trends and Implications of World Military Power. A study of the Western Alliances and the reasons for their existence. Shows the political, economic, and military strength of the alliances. Includes the exploration of the trends in the development and employment of military power and the impact of these trends on world affairs. (2Sp) Jarrell

AEROSPACE STUDIES OF 300 FIRST YEAR PROFESSIONAL OFFICER COURSE

Growth and Development of Aerospace Power. The course develops an understanding of the military characteristics of aerospace power and the development of doctrine governing its employment. Presents the role of space explorations and operations in maintaining general supremacy in aerospace. Includes the United States space programs, vehicles, systems and problems in space explorations. Three class hours and a leadership laboratory period each quarter.

131. Growth and Development of Aerospace Power. Study consists of the nature of war, history of airpower and impact of the nuclear weapon. (3F) McCallison

132. Growth and Development of Aerospace Power. Study consists of importance of a national space effort, development of the space program, the spatial environment, orbits and trajectories, space vehicle systems, propulsion, propellants and power sources, instrumentation, communications, guidance and control, ground support systems, manned space flight and operations in space, and a leadership laboratory period. (3W) McCallison

133. Growth and Development of Aerospace Power. Study consists of the mission and organization of the Department of Defense and the future developments of aerospace powers, and a leadership laboratory period. (3Sp) McCallison

AEROSPACE STUDIES OF 400 SECOND YEAR PROFESSIONAL OFFICER COURSE

This course is concerned with depicting the Air Force as a profession, to develop understanding of the practicing of professionalism in the Air Force, to reveal the responsibility and authority of the Junior Officer duties.

141. Military Professionalism. The general characteristics of the Air Force profession, an understanding of the background of the Air Force officer's professional code. Military laws governing members of the Armed Forces, understanding the functions of the military justice system, basic principles and procedures of courts and boards. Three class hours per week, one hour of leadership laboratory. (3F) Taylor

142. Leadership and Management. The professional concept of military duty, management principles, responsibilities of commanders and members of command, leadership related to command and staff roles, factors and variables of leadership, functions of military discipline characteristics of human relation problems, Air Force Personnel Policies and channels of communication. Three classroom hours per week, one hour of leadership laboratory. (3W) Taylor

143. The Junior Officer as Administrator. Principles of organization, duties and responsibilities of the Squadron Officer, Air Force regulations, Personnel Problems, financial control, use of reports, Air Force Management Concept, Machine Accounting system, mechanized records keeping and the Air Force Inspecc-
tion system. Three classroom hours per week, one hour of leadership laboratory. (3Sp)

Taylor

150. Aerospace Studies. Air Force ROTC Field Training consists of four weeks (144 contact hours) of practical training at an Air Force Base and is directed toward providing a variety of practical Air Force experiences. Among the experiences offered in tour and lecture form by Regular Air Force officers are electronic communications, navigation, supply, biological and chemical warfare, weather, traffic control, first aid and sanitation. Pressure and altitude chamber experience complete with orientation lectures, as given to regular Air Force jet pilots, permits cadets to ride in jet aircraft. A minimum of two flights is permitted to each cadet, one thirty minute jet ride, and one ride in another type aircraft as a crew member. Cadets participate in pre-flight and post flight briefings, and receive emergency equipment indoctrination. Demonstration and field trips are provided to airfield installations and fire power demonstrations. Practical leadership training is provided through group calisthenics, individual and group sports, familiarization firing of pistol and carbine and directing cadet operations. The cadet attends the Summer Training Unit between his Junior and Senior year. Exemption from attendance at this time is granted only by the Professor of Aerospace Studies based upon emergency situations of extreme hardship. If an exemption is granted, the cadet must attend summer training at the end of his Senior year and will be commissioned upon successfully completing the summer training if his university degree requirements have been met. (8Su)

Staff

145. Aerospace Studies. Flight Instruction Program. This course covers instructions in ground school, Civil Air Regulations, Weather and Navigation, Radio and Airways procedures, general service and operation of aircraft. Flight instruction includes 36½ hours on light aircraft and includes pre-flight checks, solos, cross country flights and FAA flight examinations. Subject open only to qualified Senior AFROTC Cadets. Instruction arranged to not interfere with regular academic schedule. Ground school taught on campus. (3F, W, Sp)

Staff

Head: Professor Colonel Bert Perrin, Infantry
Office in Military Science 101

Assistant Professors Captain Patrick D. Louney, Ordinance Corps; Captain Ernest E. Beach, Quartermaster Corps; Captain Scott J. Lehner, Armor; Captain Thomas W. Wilke, Armor.

ROT C's purpose is to develop reserve officers in sufficient quantity to provide a nucleus of well educated, all-around leaders for an army that would have to expand rapidly in the event of a national emergency. In this present period of "limited" emergency, the program produces new Second Lieutenants for the Active Army and the Army Reserve. A limited number of Distinguished Military graduates are offered commissions in the Regular Army.

To be eligible for a commission as a Reserve Second Lieutenant a student must not have reached his 28th birthday prior to appointment. If he is commissioned in the Army Reserve and unless he has completed flight training, he will be required to serve either six months or two years on active duty. If he participates in flight training, he must serve three years on active duty.

The Army ROTC offers a two and a four year program. The Army ROTC four-year program consists of two courses: Basic and Advanced. It is optional as to whether or not students enroll in the Basic Course.
To enroll in the Basic Course, students must be either a (a) Freshman, (b) Sophomore with credit for High School ROTC or other military training, (c) Sophomore pursuing a course requiring four more years to earn the Bachelor's Degree.

The two-year program is designed for students who transfer to the University from another institution where ROTC was not offered, to include Junior Colleges, or for those students of Utah State University who are unable to take the Army ROTC four-year program because of scheduling difficulties.

In the two-year program a 3rd quarter Sophomore student will take the entrance examinations, go before a board of officers to determine eligibility for commission and if selected for the Advanced Course will attend a six-week basic summer camp prior to enrollment in the Advanced Course.

After completion of the two-year Basic Course or summer camp and selection for further training, cadets may enroll in the Advanced Course, subject to any quota limitations. Under the provisions of the contract between the University and the Department of the Army, the University agrees to require that each student who enrolls will complete the course as a prerequisite to his graduation. Therefore, if he enrolls in the Advanced Course, he must complete that course unless relieved of this obligation by regulations prescribed by the Secretary of the Army. Signing of an ROTC draft agreement as a Basic Course student obligates him to elect enrollment in the Advanced Course if selected for it.

Any person who is selected and enrolled in the Advanced Course of Army ROTC will enlist in the Army Reserve but will not attend meetings other than ROTC classes. He will also sign a contract with the U. S. Army agreeing to serve as a Commissioned Officer for the period specified by law (6 months to 2 years).

Academic Course Substitutes. Recognizing the modern Army leader's need for certain training to prepare him for responsibilities of diplomat, scientist, or statesman while in the military service, the Army has authorized substitution of certain academic University courses in lieu of some ROTC classroom instruction. In the MS I year a student must earn a minimum of three credits in one of the approved academic areas. During the MS III and MS IV years he must earn a minimum of four quarter hours per year in courses from these same areas. These areas of interest are: Effective Communications; Science Comprehension; Political Development and Institutions; and General Psychology. Lists of courses in these fields currently taught at this University are available through advisers or from the staff of the Military Science Department. These are not additionally required courses but, in effect, ones granting "dual credit"—they fill requirements for a major and meet requisites for ROTC training leading to a commission.

Army ROTC Flight Training. This training is offered to selected Senior Army ROTC students who meet class I physical standards for flying. Instruction is so arranged that it will not interfere with ROTC or regular academic schedules. For acceptance in the course students must be enrolled in MS IV ROTC or have successfully completed MS III and summer camp. Academic credit may be arranged upon completion of the program. The flight program consists of 71½ hours of training; 35 hours of ground and 36½ hours of actual flight instruction. Completion of this training may qualify a student for a FAA pri-
College of Business and Social Sciences

A private pilot's license. All training is conducted by FAA-approved instructors. If interested in participating in flight training see the Military Science class adviser for further information.

**Summer Camp.** Advanced ROTC cadets must participate in a six weeks summer camp held at Fort Lewis, Washington. Attendance is required between Junior and Senior years unless a subsequent period is specifically approved by the Commanding General, Sixth army. Practical application of classroom theory and living in the field make it an interesting and stimulating experience. Pay is received for the six week period and for travel to and from camp.

**Payment at Basic Summer Camp.** Students who follow the two-year course and must attend the basic six-week summer camp will be paid $78 per month and travel pay to and from their home of residence and the camp at a rate of $.06 per mile.

**Veterans.** Veterans may be given credit for all or part of the Basic Course, depending upon length of service. Enrollment in the Advanced program is contingent upon selection as in the case of other cadets.

**High School ROTC.** Students who have completed the three-year high school ROTC program may be given credit for the first year Basic Course.

**Military Science Major.** A major in Military Science is offered by the Army ROTC department. This major is intended to serve two categories: service personnel stationed at near-by military installations who desire to complete a degree while in the service, and college students interested in the possibility of making a career of the service. The latter who elect this major are required to complete a dual major, the purpose of which is to assure adequate preparation for the future in the event they are not selected or cannot qualify for a reserve commission. Further, it is not possible for a student to qualify for a major in Military Science if he fails to be selected for Advanced ROTC. Although all major fields at this institution are acceptable in a dual major, the following are particularly recommended: Engineering, Physics, Chemistry, Mathematics, Political Science, or Psychology. A Freshman student electing Military Science as a major is advised to pursue one of the above fields. In addition to Basic ROTC he should concentrate on filling lower division group requirements and strive for a high grade point average.

**Payment to Advanced Cadets.** Upon enrollment in the Advanced Course students will enlist in the Army Reserve and will receive Retainer Allowance of $40 per month for a period of twenty months. They will further receive a travel allowance to and from Advanced Course Summer Camp and their home of residence at a rate of $.06 a mile. While at the Advanced Course summer camp the student will receive $120 per month plus room and board. Upon entrance into active duty the cadet will receive a $300 uniform allowance.

**Regular Commissions in the United States Army.** Each year outstanding Army ROTC cadets who have demonstrated a high degree of leadership, initiative and desire for a career as a Regular Army Officer are designated Distinguished Military Graduate and are offered an opportunity to apply for a Regular Army Commission.

**Delay of Entry on Active Duty.** When students have completed the Army ROTC program and are com-
missioned they may delay entry upon active duty to continue advanced studies. The U.S. Army will delay call to active duty one year at a time up to four years providing the applicant shows acceptance to an accredited Graduate School and maintains requirements for retention in the Graduate School. In special cases, where more than four years are required for a Doctor's degree, additional delay time will be granted by Department of the Army.

**Texts and Uniforms.** All texts and uniforms are furnished at no expense to the student.

**Sponsor Corps**

Sponsor Corps is a semi-military organization composed of 50 coeds chosen for the Corps by the Sponsor Staff, with final selection being made by a board of judges. Former members of Sponsor units recognized by the national organization may transfer upon application. Try-outs are accepted only from new students who have not previously tried out for entrance. The purpose of the Sponsor Corps is to provide official hostess and ushering service for the University, to perform as drill units in a variety of exhibitions and to assist the ROTC Department in furthering their aims of military interest on campus.

**Sponsor Corps Courses**

51, 52, 53. Sponsors Drill, Freshmen. A course in leadership organization and drill for women elected to Corps of Sponsors. (1F, 1W, 1Sp) **Staff**

54, 55, 56. Sponsors Drill Sophomores. (1F, 1W, 1Sp) **Staff**

151, 152, 153. Sponsors Drill, Juniors. (1F, 1W, 1Sp) **Staff**

154, 155, 156. Sponsors Drill, Seniors. (1F, 1W, 1Sp) **Staff**

**Military Science Courses**

**BASIC COURSES**

**MS I—First Year Basic**

**Director:** Capt. Patrick D. Louney

11. Military Science I. Organization of the Army and ROTC; U.S. Army and National Security; Leadership, Drill and Command. One class period and one leadership laboratory period per week. (2F) **Louney**

12. Military Science I. Continuation of Military Science 11. Individual Weapons and Marksmanship; Leadership, Drill and Command. One class period and one leadership laboratory period per week. (2W) **Robertson**

13. Military Science I. Continuation of Military Science 12. U.S. Army and National Security; Leadership, Drill and Command. One class period and one leadership laboratory per week. (2Sp) **Louney**

**MS II—Second Year Basic**

**Director:** Col. Bert Perrin

21. Military Science II. American Military History, Leadership, Drill and Command. Pre-requisites: Military Science 11, 12 and 13 or 24. Two class periods and one leadership laboratory period per week. (3F) **Perrin**


23. Military Science II. Continuation of Military Science 22. American Military Science; Operations and Tactics; Leadership, Drill and Command. Two class periods and one leadership laboratory period per week. (3Sp) **Perrin**

24. Military Science II. Special Studies. Tutored study for students who have not been able to take Basic courses at their regularly offered times. (3F, 3W, 3Sp) **Staff**

**ADVANCED COURSES**

**MS III—First Year Advanced**

**Director:** Capt. Ernest E. Beach

131. Military Science III. Leadership; Military Teaching Methods; Leadership, Drill and Command. Two class periods per week and one leadership drill period per week. (2F) **Beach**

132. Military Science III. Continuation of Military Science 131. Organization, Function, and Mission of Arms and Services; Small Unit Tactics; Leadership, Drill and Command. Two
class periods and one leadership laboratory period per week. (3W)  

133. Military Science III. Continuation of Military Science 132. Small Unit Tactics and Communications; Leadership, Drill and Command. Two class periods and one leadership laboratory period per week. (3Sp)  

150. Military Science Summer Camp. Attendance at summer camp is required of all Advanced Military Science students. Practical training for six weeks at a regular Army post subsequent to completion of Military Science III. (6Su)  

MS IV—Second Year Advanced  

Director: Col. Bert Perrin  

141. Military Science IV. Operations; Logistics; Leadership, Drill and Command. Two class periods and one leadership laboratory period per week. (3F)  

142. Military Science IV. Continuation of Military Science 141. Military Administration and Personnel Management; Role of US in World Affairs. Two class periods and one leadership laboratory period per week. (3W)  

143. Military Science IV. Continuation of Military Science 142. Military Law; Service Orientation; Leadership, Drill and Command. Two class periods and one leadership laboratory period per week. (3Sp)  

145. Military Science IV Flight. An FAA-approved standardized flight program of instruction consisting of 36 hours of ground instruction and 36½ hours of flight instruction. Three additional hours are granted to meet unforeseen contingencies. Prerequisite MS IV or completion of ROTC program; meet Army flight physical requirements. (3F, W, Sp)  

Seminars  

174. Advanced Military Science Seminar Problems. Prerequisite: Enrollment in or completion of Advanced Military Science. Credits arranged. (F, W, Sp)  

201. Advanced Military Science Seminar Problems. Prerequisite: Graduate standing. Credits arranged. (F, W, Sp)
College of Education

Department of Educational Administration, 113
Department of Elementary Education, 116
Department of Health, Physical Education and Recreation, 120
Library Science, 128
Department of Psychology, 129
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Degrees Offered:
- Bachelor of Arts
- Bachelor of Science
- Master of Education
- Master of Arts
- Master of Science
- Specialist in Education
- Specialist in Educational Administration
- Doctor of Education
The College of Education has several principal functions. It prepares teachers, administrators, supervisors and other professional personnel for the public schools. Through graduate programs leading to advanced degrees it prepares college teachers. The departments of Psychology, Health, Physical Education and Recreation and Library Science, in particular, have curriculum programs for the preparation of professional specialists in fields other than in Education.

Included within the College are the following departments: Elementary Education; Secondary Education; Educational Administration; Special Education; Health, Physical Education, and Recreation; Psychology; and Library Science.

In addition to offering majors and minors, each department offers courses contributing to general education as well as courses designed to supplement the major work of other departments in the University.

The College of Education is a member of the American Association of Colleges for teacher education and is accredited through the Doctoral degree by the National Council for Accreditation of Teacher Education.

Admission Requirements. Enrollment in the lower division of the College of Education is dependent upon meeting the general admission requirements of the University. Each application is reviewed by the Dean of the College. However, admission to the professional education curricula requires formal action by a faculty committee on admission to teacher education. The latter procedure applies to all curricula leading to graduation, wherein recommendations for professional certification in education are concerned.

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

Teacher Education. The University offers complete programs of Teacher Education in all phases of public school work. Cooperative programs with other departments of the institution provide for Teaching majors and minors required of all prospective secondary school teachers. Similarly, general areas of concentration in subject matter are required of all elementary teachers.

Careful attention is given to both staff and facilities in Teacher Education. Especially selected personnel at all training levels give students individual guidance.

Facilities in addition to the regular College of Education classrooms include the Nursery School, operated on the campus by the Department of Family and Child Development in the College of Family Life. Here Teacher Education focuses on the pre-school child.

The Edith Bowen Teacher Education Laboratory School is a func-
titioning elementary school on the University Campus. The teachers of the school are members of the University faculty. This school serves as a center for Teacher Education for those students preparing to teach kindergarten and grades one through six. Here child understanding and behavior are studied and desirable school practices are developed. Demonstration classes in Special Education are also housed in this building.

Students are not permitted to enroll in professional courses in education unless they have been admitted to the Teacher Education program, nor will a student be admitted to student teaching in either special, secondary or elementary education unless his total grade point is 2.0 or above, and the grade point average in the teaching major and minor and professional certification subjects, 2.5 or above. The student should be financially prepared to spend a quarter off campus student teaching.

The University Council on Teaching Education coordinates all activities dealing with the preparation of teachers and other professional school personnel. Members of the council are appointed by the President of the University from the College of Education and other departments offering courses included in teaching majors and minors. The Dean of the College of Education serves as Chairman of the council.

The council is concerned with (1) development of Teacher Education curricula; (2) approval of all Teacher Education curricula; (3) election, admission, and counseling procedures for students entering Teacher Education programs; (4) graduation requirements and the recommendation of students for professional certification, and (5) the continued improvement of graduate programs in professional education.

Teacher Certification. The College of Education is designated by the Utah State Department of Public Instruction as one of its official representatives in administering certification requirements for students.

The University provides training to prepare students for any of the professional certificates issued by the Utah State Department of Public Instruction.

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

As a valuable and integral part of Teacher Education for the elementary or secondary certificate, a closely supervised program of student teaching is conducted. In elementary education this student teaching is carried on in the Edith Bowen School, and in cooperating public schools. In secondary education, all student teaching is done in selected public schools. Contractual arrangements are made for these services with the schools concerned.

The Bachelor of Science degree with a major in Elementary or Secondary Education, is designed for the student preparing to teach in either of these fields. Those 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 both the elementary and the secondary certificates should consult with an adviser in the Education Department early in his program. Ordinarily, dual certification will require at least one additional quarter of work.

On the graduate level, programs are offered for students who desire to meet requirements for adminis-
trative supervisory, teaching or other advanced professional certificates. The MEd, MS, MA, and EdD degrees are offered; also the Specialist in Educational Administration degree requiring a two-year sequence in graduate work. The College of Education also cooperates with the College of Engineering in providing a program leading to a Doctor of Education Degree in Education in Industrial Education. More detailed information concerning graduate work is found in the Graduate School section of this catalog. A separate catalog is also issued by the School of Graduate Studies.

**Teacher Placement Bureau.** The University is interested in placing its graduates in professional positions. To accomplish this purpose in the College of Education, the Teacher Placement Bureau functions as an integral part of the University Placement Service. If students qualify for a teaching or other professional certificate, they must register with the Bureau as a help in compiling the proper credentials to be used in placement. Application for membership should be made prior to student teaching whenever possible. No fee is charged for membership in the Bureau.

**Department of Educational Administration**

**Head:** Associate Professor Homer M. Johnson  
**Office in Education** 206


**The Educational Administration Program**

Graduate work leading to the degrees of Master of Arts, Master of Science, Master of Education, Specialist in Educational Administration, and Doctor of Education is available to individuals desiring involvement in Educational Administration. The Master's degrees are primarily to meet the principal's certification requirement in certain states. The Specialist in Educational Administration is offered for those who wish to qualify as superintendents, staff administrative personnel or elementary and secondary school principals. In addition, the Doctor's degree is intended to train people for top administrative positions or higher education. The Specialist in Educational Administration (two years beyond the Bachelor's degree) will meet the certification requirements for superintendents and elementary or secondary principals in Utah. The Doctorate goes beyond present certificate requirements. Both degrees, however, meet the standards for membership in the American Association of School Administrators.

All programs through the Doctor's degree are approved by the National Council for Accreditation of Teacher Education which in turn means approval by AASA.
College of Education

Effective September 1, 1966, elementary principals, secondary principals, and superintendents must have a Bachelor's degree and have completed planned two-year graduate programs for the preparation of administrators, preferably including Master's degrees. Recommendations are required from the institutions where the programs are completed and are given careful consideration before certificates are issued by the Utah State Board of Education. The outline for planned two-year graduate programs is available from the office of the Department of Educational Administration.

For additional information and more specific details, see the Graduate Catalog or contact the Head of the Department of Educational Administration.

Educational Administration Courses

150. The American School System. Fundamental principles of operating public schools with emphasis on Utah conditions. An analysis of the public schools system as it has developed in the United States. (3F, W, Sp, Su) Ballam, Hansen, H. Johnson

153. Social Foundation of Education. The significance of society on current educational theories and practices. (3F) Hansen

154. History of Education. Major educational movements from early Greek to the present, with emphasis on purposes, organization, instructional procedures, curriculum, etc., and their bearing on today's education. (3Sp, Su) Hansen

207. Elementary School Administration. Operation and management of the elementary school. (3W, Su) Jackson

236. Secondary School Administration. Topics in secondary school administration, including problems of teacher-pupil personnel, the principal as supervisor, and managing the activity program. Designed for experienced school principals, and those preparing for the administrator's certificates in secondary education. (3W, Su) Hatch

254. Organization and Administration of Education. The work of the school administrator and the principles upon which the profession of school administration is practiced. Federal, state, and local relations to education. (3F, Sp, Su) Hatch, Hansen, H. Johnson

260. Historical and Philosophical Foundations of Education. Deals with major philosophies of education in their historical setting and their effect upon subsequent development of the American school system. (3F, Su) Hansen

262. Organization and Administration of Guidance. An analysis of concepts, plans, relationships, and problems involved in the effective development and operation of guidance services and activities at all levels of education. (3Sp, Su) Williams, Himes

264. Instructional Leadership in Education. See Sec Ed 264. (3W, Su)

266. Introduction to Research in Education. This course is to provide teachers and school administrators with research tools that they may apply directly to their practical problems. The specific objectives of the course are: 1. to give students an appreciation of scientific methods of problem solution 2. to acquaint students with a research literature in Education and teach them how to use it 3. to provide training and experience in action research 4. to teach students how to plan, carry out, and report a project for the Master of Education degree. Prerequisite or taken concurrently: Ed 164. (3F, Sp, Su) Carlisle, Borg

267. Research in Psychology and Education. Deals with identifying a problem for the thesis reviewing and evaluating research literature, and designing and carrying out the research project. A portion of the student's thesis or seminar report is prepared as the term paper. The instructor schedules individual conferences to assist the student in the initial planning of his thesis or seminar report. Prerequisite: Psy 112. (3F, Su) Hansen

269. Comparative Education. A study of the school system and educational problems of Europe, Latin America, the Middle East, Far East, and Russia. Students from foreign lands and resident faculty members personally acquainted with various educational programs are utilized as resource persons. (3W, Su) Hansen

270. Public Relations in Education. Objectives, guiding principles, techniques and media for an improved school public relations program. (3W, Su) Drake, Ballam

274. Legal Aspects of School Administration. Emphasizes responsibilities and functions of local and district school administrators. Interpretation of legal status, form and procedure, as established by statutes, legal opinion, and court decisions. (2Sp, Su) Hatch

276. Field Experience in School Administration. Provides introductory experiences in school administration. Students work a minimum of five hours weekly under the direction of an administrator in the public schools, either elementary or secondary. The University
supervisor will direct programs and meet in seminars periodically. (F, Sp, Su, arranged)  
Hatch, Jackson

283. Reading and Conference. Provides for individually directed study in subjects of special interest and preparation. Credit arranged. (F, W, Sp, Su)  
Staff

Staff

350. Seminar in Administrative Theory and Research. The seminar will concentrate on current theories about administration and the contribution of behavioral science research to the problems of organization and administrative behavior. An expected by-product is the student's growing awareness of significant problems in educational administration which can be researched. The appropriateness of various research methodologies to specific kinds of problems will be considered, although the seminar does not stress formal instruction in either research methodology or statistical analysis. Doctoral students only. (3F)  
Johnson, Hatch

351. Seminar in Communications Theory and Research. Internal communication of the organization constitutes an essential ingredient of the administrator's effectiveness. In addition, the change of behavior of individuals requires, fundamentally, a communications process. Of equal importance is the problem of communications between the organization and its supporting public. This seminar will help the student gain insight into the variables that affect this total communications process. Research will be reviewed to better understand attitude and opinion change. Doctoral students only. (3W)  
Johnson, Ballam

352. Seminar in Problems of Educational Administration. Basic to the understanding of the administrative process is the ability of the student to see clearly the relationship between theory and practice. By employing certain simulation techniques it is hoped that the student will be able to employ theory in the analysis and solution of problems. In addition, the doctoral student should begin to conceptualize issues in international relations, cultural anthropology, comparative education and economics. Opportunities will exist for the teachers involved to evaluate both students and program. Doctoral students only. (3Sp)  
Johnson, Ballam, B. Hansen, Carlisle

355. School Building Programs. School housing surveys, location and capacity of schools, instructional needs as a basis for planning, standards for equipment, checking plans and specifications, business and legal provisions governing financing and construction of new buildings, bids and contracts. (3F, Su)  
H. Johnson

Hansen

361. Readings in Foundations of Education. Considers problems of education in terms of their sociological, historical, and philosophical foundations. (3Sp, Su)  
Hansen

362. Group Processes in Educational Leadership. Analysis of the work of the school administrators and supervisors in dealing with various groups concerned with public education, school faculties, boards of education, parent-teacher groups, and the like. Research from studies in group dynamics will be drawn upon. (3W, Su)  
H. Johnson

Ballam

372. Higher Education. A study of the development and current status of education beyond the high school in America. (3W)  
Himes

374. Practicum in Public School Surveys. The students in the class will participate in making a field study or survey of a school district. Classroom discussions will be concerned with practical problems of the particular district. Education literature dealing with the area of school surveys will also be extensively considered. Open only to advanced students in school administration with the specific approval of the instructor. Time and credit arranged. (Sp)  
H. Johnson

381. School Finance. Historical background of school finance; principles and practices involved in collecting and distributing school revenues, with special reference to conditions in Utah. (3F, Su)  
Ballam

382. School Business Management. A study of the factors involved in the efficient business management of school systems and individual schools. For school administrators, school business managers, clerks and students preparing for these positions. (3Sp, Su)  
Staff

384. Internship in School Administration. Provides extensive experience for the advanced student working on the Doctor of Education Degree in School Administration. Class members work a minimum of one quarter full time under the direction of an administrator in the public schools. Credit arranged. (F, W, Sp)  
H. Johnson, Ballam

Staff
Department of Elementary Education

Head: Associate Professor Malcom Allred
Office in Education 204.

Associate Professors Bryce Adkins, Arthur D. Jackson, Director, Edith Bowen Laboratory School, Edith S. Shaw, Director, Elementary Student Teaching; Assistant Professors L. Gail Johnson, Ivan Pedersen, Dorothy Jean Pugmire, Thomas Taylor, Evelyn Wiggins, John R. Williams; Instructors Joan C. Bowden, Barbara B. Howell, Kathryn Salisbury, Helen Tanner, Eyre Turner.

The function of the Department of Elementary Education is the preparation for certification of teachers, supervisors, administrators and other professional personnel for positions in the elementary schools. The Department, in cooperation with the College of Education and with the support of the University, offers the Bachelor of Science Degree with a major in Elementary Education designed to prepare the student to teach in the elementary school.

On the graduate level, the Department of Elementary Education is an integral part of the College of Education and assists in the preparation of students seeking the MA, MEd, MS, Specialist, and EdD Degrees. Students who desire information relative to the graduate program should write to the Graduate School Dean or to the Head of the Department of Elementary Education for detailed information.

The Program in Elementary Education. To obtain the Bachelor of Science Degree in Elementary Education and qualify for the Utah Teacher's Certificate for elementary schools, students must meet the following minimum requirements (Because of recent changes in certification requirements made by the Utah State Board of Education, these requirements may be modified. Students should discuss their plans and course work with their advisors):

1. Courses designed to provide a liberal background:

<table>
<thead>
<tr>
<th>Subject</th>
<th>Credit</th>
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<tbody>
<tr>
<td>Biological Science</td>
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<tr>
<td>Exact Science</td>
<td>10</td>
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<td>Foreign Language or Literature and Speech</td>
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<td>Social Science</td>
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<td>Psychology</td>
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<td>Basic Communications</td>
<td>9</td>
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<td>Fine Arts</td>
<td>6</td>
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<tr>
<td>Physical Education</td>
<td>3</td>
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</tbody>
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(Students may select from: Bacteriology, Biology, Botany, Physiology, Zoology, and others with the approval of the adviser.)

(Students must select one of the following: History 20, or Economics 51, or Political Science 10. Additional credits may be selected with the approval of the adviser.)

(Students may select from Music, Art, and Theatre with the approval of the adviser.)
A student who meets these requirements for certification also meets the lower division requirements for graduation from the University at the same time.

(2) Areas of academic concentration. Thirty-six credit hours in one field of concentration or eighteen hours in each of two fields are required. Students are encouraged to go beyond the minimum requirements in areas of academic concentration and should include some upper division courses in these areas.

If one field of concentration is selected, this field must be a subject area that is taught in the elementary school (science, mathematics, social studies, etc.). If two minor fields are selected, the first must be a subject area that is taught in the elementary school. The second should also be a subject area. However, it may be a supporting area, if the student has prior approval of his adviser and the Department of Elementary Education. Supporting areas are those directly concerned with the school, the pupils, or the profession.

(3) Professional Education. A major of at least 48 credit hours in professional education courses is required as follows:

**Group I Understanding the Child**

- Psychology 100 or CD 100 .......... 3
- Public Health 155 .................. 3
- Additional credits selected from the following: Psychology 180, 181, 182, 183, 123, 145; Speech 67; Child Development 67 .......... 3

**Group II Understanding the School**

- Education 100 ..................... 4
- Education 150 ..................... 3

**Group III Curriculum and Methods**

- Education 104 ..................... 5

Education 105 ........................ 3
Education 106 ........................ 12
Education 107 ........................ 3
Psychology 106 ....................... 3

Elective Courses (minimum of 6 credits) selected from the following:

- Education 102 ..................... 3
- Education 108 ..................... 3
- Education 109 ..................... 3
- Education 112 ..................... 3
- Education 116 ..................... 3
- Education 161 ..................... 3
- Education 186 ..................... 3
- Psychology 127 ................... 3
- English 122 ....................... 3
- Music 150 ......................... 3
- Art 151 ............................ 3
- Physical Education 177 .......... 3
- Physical Education 182 .......... 3
- Instruction Education 180 .......... 3
- Speech 118 ......................... 3
- Speech 122 ......................... 3
- Forestry 110 ....................... 3

(Other courses may be selected with the approval of the adviser.)

**Suggested Sequence of Courses**

**First and Second Years**

Concentrate on filling lower division requirements and beginning work in the major or minor fields.

**Third Year**

- Psychology 100
- Public Health 155
- Education 100
- Education 150

Courses to complete the major field of concentration or two minors. Electives in Education and related areas.

**Fourth Year**

- Psychology 108
- Education 104
- Education 105
- Education 106

Courses to complete the major field of concentration or two minors. Elective courses in Education and related areas.
Kindergarten Certification. Having completed the requirements for the elementary school certificate, a student may obtain the Kindergarten Certificate by completing Education 116 and 106B. Application for 106B must be made at least two quarters in advance.

Dual Certification. A student desiring to obtain both the elementary and the secondary certificates should consult with an adviser in the Education Department early in his program. Ordinarily, dual certification will require at least one additional quarter of work. Curricula are also designed for dual certification in elementary and special education.

Out-of-State Certification. A student interested in meeting certification requirements of other states should check with his advisers for specific courses required.

A student is not permitted to enroll in professional courses in education unless he has been admitted to the Teacher Education Program, nor will a student be admitted to student teaching in elementary education unless his total grade point is 2.0 or above, and the grade point averages in the areas of academic concentration and professional certification subjects are 2.5 or above.

The student must be financially prepared to spend a quarter off campus student-teaching.

Education Courses

100. Principles of Elementary Education. An introduction to the elementary school; its background and development, philosophy, personnel, practices, achievements, and its place in the American system of education. (4F, W, Sp, Su) Williams


104. Elementary School Curriculum. Familiarizes prospective teachers with the nature and content of the elementary curriculum and factors that influence its development. Includes an introduction to the teaching guides for Utah elementary schools, and considers some of the objectives, methods of instruction, teaching aids and materials, and sources of information related to the curriculum. (5F, W, Sp, Su) Allred, Wiggins


106. Student Teaching in the Elementary School. For juniors and seniors who have had a substantial amount of professional course work including Principles of Elementary Education, Educational Psychology, and Elementary School Curriculum. The apprentice plan is followed which requires an initial period of observation with minor responsibilities but with gradual increase of work and responsibility as the student's ability is demonstrated. Application for student teaching must be arranged two quarters in advance of registration for student teaching. Students who have credit for other courses in student teaching, or who have successful teaching experience, may register, by special permission of the instructor, for less than twelve credits.

Students enrolled in this class may be assigned by the University to work in selected public schools throughout the State and must make plans to spend this quarter off campus. (3SP, W, Sp)

106 A. Student Teaching in the Elementary School. For experienced teachers or individuals who have completed requirements for the secondary certificate and are preparing also for elementary. At least one-half day is required for one full quarter. The student will be assigned to a sponsor teacher in the campus laboratory school or in the public schools. Ed 106 must be taken or audited concurrently. (5F, W, Sp)

106 B. Student Teaching in the Elementary School. For experienced teachers or individuals who have completed requirements for the secondary certificate and are preparing also for elementary. At least one-half day is required for a Summer Session or part of a quarter. The teacher will be assigned to a sponsor teacher in the campus laboratory school or in the public schools. Ed 106 must be taken or audited concurrently. (8Su)

107. Teaching of Reading. Considers the objectives of the reading program, stages of
reading development, skills and attitudes to be gained, the materials of instruction, and the experiences of children that contribute to the achievement of the objectives in reading. Opportunities for observation of reading situations in elementary school classrooms. (3F, W, Sp, Su) G. Johnson, Shaw, Wiggins

108. Social Studies in the Elementary School. Organizing the elementary curriculum to provide social studies experiences consistent with the nature of the child and the democratic society in which he lives. (3W, Su) Allred

109. Science in the Elementary Grades. Investigation of the aims of science programs. Acquaintance with the materials, techniques of instruction, and experiences that may help children gain the skills, understanding, and attitudes desirable in this subject area. (3W, Sp, Su) Addkins, T. Taylor


112. Arithmetic in the Elementary School. The place of arithmetic in the elementary school curriculum and methods of teaching it in the several grades. (3F, Sp, Su) Addkins, Jackson, T. Taylor

116. Curriculum and Methods for Kindergarten. The study of the kindergarten program with emphasis on the influence of recent research in child development and human relations. Special attention will be given to planning the curriculum, methods, materials and equipment used in the kindergarten. (3F, Su) Pugmire, Shaw


163. New Media in Education. See Secondary Education 163. (3F, W, Sp, Su) Staff


188. Diagnosis of Reading. For teachers, supervisors, and others interested in remedial reading instruction. Concerned with causes of reading disability, diagnostic tests, and procedure used in remedial reading. Prerequisite: Education 107 or two years teaching experience in the elementary school. Concurrent enrollment in Education 190. (3W, Su) G. Johnson

189. Remedial Reading Instruction. Designed to follow Education 188. Considers the nature of remedial reading instruction, selection of remedial students, group and individual instruction, methods and materials used in remedial reading programs. Concurrent enrollment in Education 190. (3Sp, Su) G. Johnson

190. Practicum in Remedial Reading. Provides opportunity for the student to work with children in need of remedial help in reading. Enrollment only with the consent of the instructor. (3W, Sp, Su) G. Johnson

204. Elementary School Curriculum, Advanced Course. Designed for experienced teachers. It deals with new concepts in elementary curriculum resulting from recent research in the field. Class members will have opportunity to develop curriculum materials in their areas of interest. (3F, Sp, Su) Addkins, Allred

205. Improvement of Kindergarten Education. An advanced course in kindergarten education for experienced teachers. It will include an evaluation of the kindergarten program based upon the latest research in the areas of psychology, child development, education, and sociology. (3F, W, Sp) Staff

207. Elementary School Administration. See Educational Administration 207. (3F, Su) Allred, Jackson

219. Seminar in Elementary Education. Formerly 245. Considers those areas of elementary education in which members of the class desire to gain modern authoritative viewpoints. Opportunity for both individual and group work. (3Sp, Su) Addkins, Allred, Jackson

220. Creative Education in the Elementary School. Exploration of research concerning creativity in education and ways and means of utilizing basic principles in this area in the improvement of classroom practices. (3W, Su) Shaw

225. Improvement of Reading in the Elementary School. In addition to a concern for an adequate developmental reading program, emphasis will be placed on helping the child who is having reading difficulties. Prerequisite: Ed 107 or teaching experience in elementary school. (3F, Su) Allred, G. Johnson

226. Improvement of Science in the Elementary School. For experienced teachers. Deals with newer concepts in curriculum and methods of instruction in science in the elementary schools. Prerequisite: Ed 109 or teaching experience in elementary school. (3W, Su) Adkins, Braswell


228. Improvement of Social Studies in the Elementary School. For experienced teachers. Deals with newer concepts of curriculum and methods of instruction in social studies in the elementary school. Prerequisite: Ed 108 or
teaching experience in elementary school. 
(3Sp, Su) Allred

229. Improvement of Language Arts in the Elementary School. For experienced teachers. Deals with newer concepts in curriculum and methods of instruction in language arts in the elementary school. (3Sp, Su) Wiggins

232. Aerospace Education. See Sec Ed 232. (3Su) Wiggins

259. Supervising Student Teaching. Considers ways and means of providing desirable experiences for student teachers in the public schools. The role of the classroom teacher and the college supervisor will be analyzed. Credit arranged. (F, Su) Budge, Shaw, Wiggins

264. Instructional Leadership In Education. See Sec Ed 264. (3W, Su) Allred

266. Introduction to Research in Education. See Educ Adm 266. (3F, Sp, Su) Carlisle, Berg

267. Research in Psychology and Education. See Educ Adm 267. (3F, Sp, Su) Berg

283. Reading and Conference. Provides for individually directed study in subjects of special interest and preparation. Credit arranged. (F, W, Sp, Su) Staff


365. Curriculum Development. See Secondary Education 365. (3Sp, Su) Staff

385. Field Studies and Thesis. Individual work on research problems in the EdD program. Credit arranged. (F, W, Sp, Su) Staff

Department of

Health, Physical Education and Recreation

Head: Professor H. B. Hunsaker
Office in Smart Gym

Professor Dale O. Nelson; Associate Professors Lois Downs, Lincoln H. McClellan; Emeritus Associate Professor H. Cecil Baker; Assistant Professors Pauline Fuller, Arthur H. Mendini, Janice Pearce, H. Dale Rasmussen; Instructors Nolan K. Burnett, Jacqueline W. Fullmer.

Activity Courses — Intramural Sports — Recreation Activity Courses. In the activity courses opportunity is given to develop skills in some physical activity that will help establish a permanent interest in healthful recreation, promote physical fitness, build morale, and maintain health.

All students under the age of 31 must meet the school requirements of three quarters of Physical Education. This requirement should be met by the end of the sixth quarter of residence work. Men may meet this requirement by taking Military Science or Aerospace Studies. (It is recommended that require-

ments (a) and (b) below be completed during the first year.)

The requirement must be met by taking: (a) Physical Education 1 (Basic Physical Education), (b) a swimming course—Note: Either or both of these courses may be met by passing waiver tests administered by the Physical Education Department after which students may select courses rather than register for required courses (a) - (b). Selected courses are from five activity groups. Only one course from a group may count toward the requirement. Courses, by groups, are as follows:

Aquatics—All swimming classes. 
Dance—All dance classes.

Dual Activities—Boxing (Men), Wrestling (Men), Fencing, Badminton, and Tennis.

Individual Activities — Skiing, Track (Men), Bowling, Weight Training (Men), Self Defense (Men), Trampoline (Men), Tumbling-Gymnastics (Men), Tumbling Stunts (Women), Adapted Body Conditioning (Women), Archery, Golf, and Cross Country (Men).

Team Activities — Football (Men), Baseball (Men), Softball, (Men), Basketball (Men), Soccer (Men), Volleyball (Men), Soccer-Speedball (Women), Volleyball (Women), Basketball (Women), Softball (Women), and Field Hockey (Women).

Intramural Activities are conducted by the Department. The intramural program is planned to give moral, social, physical and educational values derived from competitive sports. This program provides for both individual and team endeavor, and the Department attempts to make it possible for all students to participate.

The Women’s Intramural Association offers a varied program of activities. All women are eligible and encouraged to participate in any of the activities offered.

The Department offers an extensive intramural sports program for men. Competition in a variety of activities is conducted in separate leagues: fraternity, department, club, and all-campus. All men are encouraged to participate in one of these leagues.

Recreation. The Department attempts to meet recreational interests of the total student body. Through intramural sports, student clubs, recreation periods, and special events, a variety of recreational opportunities are offered. The purpose of these activities is to develop a love for wholesome recreation, and sufficient skill to allow individuals to participate with satisfaction and enjoyment in various activities.

Professional Preparation in Physical Education

A student may major in Physical Education with specialization in Elementary Physical Education, Secondary Physical Education, Professional Scouting or Pre-Physical Therapy. Selection of a program of study in these areas should be carefully planned under the guidance of advisers. The following courses, in addition to the three credits required for graduation are suggested for each of the above areas:

As a Non-certifying Physical Education major complete Physical Education 17A, 18, 20, 21, 22, 30, 31, 75, 83, 85, or 92, 106, 107, 108, 183; six credits in Sports Techniques and ten credits from approved electives.

If specializing in Elementary Physical Education, the student should complete Physical Education 24, 55, 75, 81, 83, 85 or 92, 106, 120, 177, 182, 183, 184; six credits in Sports Techniques and six credits from approved electives.

If specializing in Dance, a student should complete Physical Education 21, 24, 26, 77, 78, 79, 83, 102, 103, 104, 106, 107, 111, 120, 121, 140, 150, 151, 153, and 14 credits selected from the following courses in Theatre Arts: 50, 52, 55, 57, 59, 152 and 154. PE 165, 183, 192.

For a composite major in Dance and Physical Education a student should complete Physical Education 20, 24, 26, 74, 75, 77, 78, 79, 81 or 111, 83, 92, 102, 104, 106, 107, 108, 120, 121, 122, 140, 150, 151, 152, 161 or 162, 165, 183, 184, and 192.

If planning to enter a Physical Therapy School with a major in
Physical Education, a student should complete Physical Education 17A, 18, 55, 74, 75, 83, 106, 107, 108, 183; four credits in Sports Fundamentals, Sports Techniques, and 12 hours of approved electives. Physical Therapy students work closely with their advisers in selecting courses to fill groups and minor requirements.

Teaching Major in Physical Education

For Secondary Physical Education majors the following four year programs are suggested.

### MEN

#### FRESHMAN

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<tr>
<th>Course</th>
<th>Credit</th>
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<td>PE 75</td>
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<td>PE 17A</td>
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<td>Group Req</td>
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<td>Minor</td>
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<td>Electives</td>
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#### SOPHOMORE

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<td>PE 74</td>
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<td>PE 83</td>
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<td>Physiol 20</td>
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<td>PE 85</td>
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<td>Group Req</td>
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#### JUNIOR

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#### SENIOR

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<th>F</th>
<th>W</th>
<th>Sp</th>
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<tbody>
<tr>
<td>PE 130, 131</td>
<td>2 2</td>
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<td>PE 183, 192, 184</td>
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<tr>
<td>Education 127, 129, 130</td>
<td>Any Quarter</td>
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### WOMEN

#### FRESHMAN

<table>
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<tr>
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<tr>
<td>PE 75</td>
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<tr>
<td>PE 20, 21, 22</td>
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<td>PE 24, 26</td>
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<td>PE 98</td>
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<td>PE 17A</td>
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<td>Basic Communications</td>
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<td>Group Req</td>
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#### SOPHOMORE

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<tbody>
<tr>
<td>PE 83</td>
<td>3</td>
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<tr>
<td>PE 82, Physiol 20</td>
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<td>PE 77, 76, 79</td>
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<tr>
<td>PE 94, 95, 96, 98</td>
<td>1 1 2</td>
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<tr>
<td>PE 74</td>
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#### JUNIOR

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<tr>
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<tbody>
<tr>
<td>Education 126</td>
<td>Any Quarter</td>
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<tr>
<td>Education 150</td>
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<tr>
<td>Psychology 100 and 102</td>
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<td>Minor</td>
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<td>Elective</td>
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#### SENIOR

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>PE 160</td>
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<tr>
<td>PE 183, 182, 184</td>
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<td>Pub Health 154 (or 155—4 cr)</td>
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<td>Education 127</td>
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<td>Education 129</td>
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<tr>
<td>Education 130</td>
<td>Any Quarter</td>
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<tr>
<td>Minor</td>
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<tr>
<td>Electives</td>
<td>All Quarters</td>
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</table>

Professional Preparation in Health Education

The following foundation science courses are recommended for a teaching major or minor in Health Education: Biology 1, Phys-
Health, Physical Education and Recreation 123

Health, Physical Education and Recreation Activity Courses

Activity Courses for Men

1. Basic Physical Education (1F, W, Sp) Staff
2. Freshman Football (1F) Staff
3. Boxing (Beginning) (1F, 1W, 1Sp) Staff
4. Boxing (Advanced) (1F, 1W, 1Sp) Staff
5. Football (Non-Varsity) (1W) Knapp
6. Wrestling (Beginning) (1F, 1W, 1Sp) Staff
7. Wrestling (Advanced) (1F, 1W, 1Sp) Staff
8. Basketball (IF, 1W, 1Sp) Baker
9. Baseball (1Sp) Maughan
10. Track (1Sp) Maughan
11. Track and Field (1W) Railey
12. Swimming (Beginning) (1F, 1W, 1Sp) Staff
13. Swimming (Intermediate) (1F, 1W, 1Sp) Staff
14. Softball (1Sp) Maughan
15. Softball (1Sp) Staff
16. Cross Country (1F) Maughan
17. Cross Country (1F) Staff
18. Cross Country (1F) Maughan
19. Cross Country (1F) Maughan
20. Cross Country (1F) Maughan
21. Cross Country (1F) Maughan
22. Cross Country (1F) Maughan
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93. Cross Country (1F) Maughan
94. Cross Country (1F) Maughan
95. Cross Country (1F) Maughan
96. Cross Country (1F) Maughan
97. Cross Country (1F) Maughan
98. Cross Country (1F) Maughan
99. Cross Country (1F) Maughan
100. Cross Country (1F) Maughan

For a minor in Recreation Education, a student must complete: RE 83, RE 179, PE 183, RE 196

and seven additional credits selected from those prescribed for a major in Recreation.

Graduate Study

Master of Science Degree. The Department offers courses leading to the Master of Science degree in Health Education, Physical Education, or Recreation. Before admission to candidacy for the degree, a student must complete the equivalent of a Bachelor's Degree in Physical Education at USU and additional requirements as prescribed by the School of Graduate Studies. Required courses are: PE 206, 294, 271, 292, 295, 299. English 111 or 211.

Health, Physical Education and Recreation Activity Courses

Professional Preparation in Recreation Education

A student may earn a Bachelor of Science degree with a major in Recreation Education. The major course requirements for such a degree are as follows: PE 74, RE 83, PE 85, PE 106, PE 120, PE 153, RE 157, RE 179, PE 183, RE 196, Theatre Arts 158, Speech 118, Ind Arts 90, Landscape Arch 130, Pol Science 15; plus 4 credits from the following: PE 177 or 182, PE 175, PE Sports Fund Courses, PE Tech Technique Courses, Forestry 137, 138 or 139, Soc 141, CD 100 or PE 84, Bus Admin 100.

For a minor in Recreation Education, a student must complete: RE 83, RE 179, PE 183, RE 196

and seven additional credits selected from those prescribed for a major in Recreation.
### Activity Courses for Women

<table>
<thead>
<tr>
<th>Number</th>
<th>Course Description</th>
<th>Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Basic Physical Education (1F, W, Sp)</td>
<td>D. Nelson</td>
</tr>
<tr>
<td>14</td>
<td>Track and Field (1F, 1Sp)</td>
<td>Down</td>
</tr>
<tr>
<td>39</td>
<td>Soccer-Speedball (1F)</td>
<td>Staff</td>
</tr>
<tr>
<td>40</td>
<td>Volleyball (1F, 1W)</td>
<td>Staff</td>
</tr>
<tr>
<td>41</td>
<td>Basketball (1W)</td>
<td>Staff</td>
</tr>
<tr>
<td>42</td>
<td>Softball (1Sp)</td>
<td>Staff</td>
</tr>
<tr>
<td>43</td>
<td>Field Hockey (1Sp)</td>
<td>Staff</td>
</tr>
<tr>
<td>44</td>
<td>Tumbling and Stunts (1W, 1Sp)</td>
<td>Staff</td>
</tr>
<tr>
<td>52</td>
<td>Swimming (Beginning) (1F, 1W, 1Sp)</td>
<td>Staff</td>
</tr>
<tr>
<td>55</td>
<td>Synchronized Swimming (1F)</td>
<td>Staff</td>
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<tr>
<td>57</td>
<td>Gymnastics (Advanced) (1F, W, Sp)</td>
<td>Staff</td>
</tr>
<tr>
<td>60</td>
<td>Body Conditioning (1F, W, Sp)</td>
<td>Staff</td>
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<tr>
<td></td>
<td><strong>Activity Courses for Men</strong></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Skiing (Beginning) (1W)</td>
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<td>9</td>
<td>Fencing (1F, 1W, 1Sp)</td>
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<tr>
<td>13</td>
<td>Bowling (1F, 1W, 1Sp)</td>
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<tr>
<td>18</td>
<td>Swimming (Advanced) (1F, 1W, 1Sp)</td>
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<tr>
<td>19</td>
<td>Skiing (Intermediate) (1W)</td>
<td>Staff</td>
</tr>
<tr>
<td>28</td>
<td>Diving. Prerequisite: PE MW 18. (1Sp)</td>
<td>Staff</td>
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<tr>
<td>33</td>
<td>Skiing (Advanced) (1W)</td>
<td>Staff</td>
</tr>
<tr>
<td>45, 46, 47</td>
<td>Adapted Physical Education. Designed to meet the needs of individuals who are unable to participate in the required program of Physical Education. Students must obtain permission of the head of the department before registering. (1F, 1W, 1Sp)</td>
<td>D. Nelson</td>
</tr>
<tr>
<td>48</td>
<td>Modern Dance (Beginning) (1F, 1W)</td>
<td>Fuller</td>
</tr>
<tr>
<td>49</td>
<td>Modern Dance (Intermediate) (1W, 1Sp)</td>
<td>Fuller</td>
</tr>
<tr>
<td>51</td>
<td>Modern Dance (Advanced) (1W, 1Sp)</td>
<td>Fuller</td>
</tr>
<tr>
<td>53</td>
<td>Square Dancing (1F, 1W, 1Sp)</td>
<td>Burnett</td>
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<tr>
<td>61</td>
<td>Archery (Beginning) (1F, 1W, 1Sp)</td>
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<tr>
<td>62</td>
<td>Archery (Advanced) (1W, 1Sp)</td>
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<tr>
<td>66</td>
<td>Badminton (Beginning) (1F, 1W, 1Sp)</td>
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<tr>
<td>67</td>
<td>Tennis (Beginning) (1F, 1Sp)</td>
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<td>68</td>
<td>Folk Dance (Beginning) (1F, 1W)</td>
<td>Fuller</td>
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<tr>
<td>69</td>
<td>Badminton (Advanced) (1F, 1W, 1Sp)</td>
<td>Downs</td>
</tr>
<tr>
<td>70</td>
<td>Tap Dancing (Beginning) (1F, 1W, 1Sp)</td>
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### Activity Courses for Men and Women

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<th>Number</th>
<th>Course Description</th>
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<tr>
<td></td>
<td><strong>Professional Courses in Physical Education</strong></td>
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<tr>
<td>17A</td>
<td>Swimming. For freshmen and transfer students majoring in Physical Education. (1F, 1W)</td>
<td>Rasmussen</td>
</tr>
<tr>
<td>20</td>
<td>Fundamentals of Sports. Designed to develop the fundamental skills of tennis and archery. (1F)</td>
<td>Staff</td>
</tr>
<tr>
<td>21</td>
<td>Fundamentals of Sports. Designed to develop the fundamental skills of social and square dancing. (1W)</td>
<td>Staff</td>
</tr>
<tr>
<td>22</td>
<td>Fundamentals of Sports. Designed to develop the fundamental skills of badminton and golf. (1W, 1Sp)</td>
<td>Staff</td>
</tr>
<tr>
<td>24</td>
<td>Dance Laboratory. Folk dancing for freshman and sophomore women majoring or minoring in Physical Education. (1F)</td>
<td>Fuller</td>
</tr>
<tr>
<td>26</td>
<td>Dance Laboratory. Tap dancing for freshman and sophomore women majoring or minoring in Physical Education. (1Sp)</td>
<td>Fuller</td>
</tr>
<tr>
<td>30</td>
<td>Fundamentals of Sports. Designed to develop the fundamental skills of boxing, weight training and wrestling. (1F)</td>
<td>Staff</td>
</tr>
<tr>
<td>31</td>
<td>Fundamentals of Sports. Designed to develop fundamental skills of tumbling, gymnastics and trampoline. (1W)</td>
<td>Staff</td>
</tr>
<tr>
<td>32</td>
<td>Fundamentals of Sports. Designed to develop the fundamental skills of volleyball and speedball. (1Sp)</td>
<td>Staff</td>
</tr>
<tr>
<td>75</td>
<td>Introduction to Physical Education. An introduction to the history, philosophy, theory and practice of Physical Education. (2F)</td>
<td>McClellan</td>
</tr>
<tr>
<td>77</td>
<td>Dance Laboratory. Techniques of Elementary modern dance for freshman and sophomore women majoring or minoring in Physical Education. (1F)</td>
<td>Fuller</td>
</tr>
<tr>
<td>78</td>
<td>Dance Laboratory. Techniques of intermediate modern dance for freshman and sophomore women, majoring or minoring in Physical Education. (1W)</td>
<td>Fuller</td>
</tr>
<tr>
<td>79</td>
<td>Dance Laboratory. Techniques of advanced modern dance for freshman and...</td>
<td></td>
</tr>
</tbody>
</table>
81. Rhythms and Dramatic Games. Rhythms for young children; its use in creative movement. Methods of presenting and developing rhythms are studied. (2F) Fuller


83. Sports Officiating for Men. Knowledge of the rules and mechanics of officiating football, touch football, basketball, wrestling and boxing. Attention is also given to the proper instruction of other game officials such as timers, scorers and game administrators. (2F) Mendini

84. Sports Officiating for Women. Knowledge of the rules and mechanics of officiating volleyball, ski meets, water basketball, badminton and softball. The techniques of officiating basketball are reviewed. Attention is also given to the proper instruction of other game officials such as timers, scorers and game administrators. (2F) Mendini

92. Organization of Intramural Programs for Women. Organization of sports days, play days, tournaments, and administration of intramural activities for women. (3W) Downs


94. Physical Education Laboratory. For lower division women, designed to develop the fundamental skills of soccer-speedball and volleyball. (1F) Downs

95. Physical Education Laboratory. For lower division women, designed to develop the fundamental skills of basketball and basketball officiating. (1W) Pearce

96. Physical Education Laboratory. A professional course for lower division women designed to develop the fundamental skills of softball and field hockey. (1Sp) Downs

97. Physical Education Laboratory. Fundamentals of individual sports for lower division women majoring or minoring in Physical Education. (1Sp) Downs

102. Dance Composition. Composition based upon the elements of direction, level, and dimension. Experience in individual and group composing. (2F) Fuller

103. Composition in Modern Dance. Composition based upon the following musical forms: A,B, rondo, theme and variation, canon and round, dance suite. (2Sp) Fuller

104. Dance Production. Composition done independently. Participation in a performance required. Lighting, staging, costume and make-up applied to a dance concert. (2W) Fuller

106. Kinesiology. The science of movement. Includes a study of the structure of the human body in terms of its use in activity; a mechanical analysis of all types of activity based upon principles of good body mechanics; methods of developing and using the human body. Prerequisite: Physiol 20. (3F, 3W) D. Nelson

111. Creative Rhythms for Schools. Methods and materials used in guiding creative rhythmic experiences of students. Material applicable to elementary or secondary school. (3W) Fuller

113. Construction of Physical Education Equipment. Construction of and practice in the use of rhythmic instruments and play equipment. (3Sp) Staff

120. Methods in Physical Education. Student assists in teaching the service program under direction of a staff member. He begins his first practical training in teacher preparation. Classwork consists of methods and techniques of teaching physical education and relates directly to the assistant teaching program. (3F, 3W, 3Sp) Downs

121. Techniques in Physical Education. Designed to develop teaching techniques in Social and Square Dance. Open to men and women. (2W) Staff

122. Techniques in Physical Education. Designed to develop teaching techniques in tennis and badminton. Open to men and women. (2Sp) Staff

126. Physical Education for Teachers of the Mentally Retarded. The course is a general physical education teacher training program adapted to the mentally retarded student. The material is designed for those students pre-
paring to teach mentally retarded people. (3F, W, Sp) Nelson

130. Techniques in Physical Education. Designed to develop teaching techniques in volleyball, speedball and wrestling. (2F) Seniors only; (2Sp) Juniors only. Staff

131. Techniques in Physical Education. Designed to develop teaching techniques in gymnastics, tumbling and trampoline. (2Sp) Staff

132. Water Safety Instructor's Course. Prerequisites: American Red Cross Senior Life-saving certificate and permission of the instructor. Attention is given methods of teaching swimming, diving, life-saving and use of small water craft. American Red Cross certification is given students who pass the exam. (2W, 2Sp) Rasmussen

140. Dance History. A history of dance from the primitive through Greek, medieval and renaissance periods into the theatrical dance forms: ballet and modern. (3W) Fuller

150. Methods in Dance. The place of various types of dance in the physical education program. Emphasis given methods of teaching these activities and practice in teaching class members. (2Sp) Fuller

151. Techniques of Dance. Techniques of a variety of dance types, with emphasis on ballet and modern. (2Sp) Staff

153. Leadership in Dance. An advanced class in dance leadership to meet needs of students who expect to teach social or square dancing in schools or churches. Prerequisite: one quarter of social or square dancing. A syllabus is required. (2Sp) Staff

160. Techniques of Team Sports for Women. Designed to develop teaching techniques in soccer, speedball, basketball, softball, field hockey and volleyball. (3F, Sp) Pearce

165. Techniques in Physical Education for Women. Designed to develop teaching techniques in tumbling and gymnastics. (2Sp) Staff

177. Physical Education in the Elementary School. Designed to give a philosophy of Physical Education in the elementary school. Emphasis is on program planning, teaching techniques, the direction and participation in elementary Physical Education activities and the selection of activities that will help satisfy the needs of the elementary school child. (3F, 3W, 3Sp) Downs

182. Materials and Methods in Elementary Physical Education. Designed to gain an understanding of the elementary school Physical Education program. Curriculum, facilities, equipment, and the teaching of activities are emphasized. Emphasis is also placed on activities as specified in the Utah State Course of Study for the elementary school. (3W, 3Sp) Downs

183. Interpretation of Physical Education Objectives. Results and values of Physical Education activities in terms of development, adjustment and standards. (3F) Hunsaker

184. Administration of Physical Education. Administration procedures in Physical Education in the high school; curriculum and program planning. (3Sp) Hunsaker

188. Methods in Football. Fundamentals of football, theory and practice; details of each position on the team; training, and managing; complete technique of developing offensive and defensive tactics. (2W) Knap

189. Methods in Basketball. Coaching and training of basketball teams; emphasis on the psychology of the game; methods of defense and offense. (2F) Andersen

190. Methods in Track. Fundamentals in track and field training, and the conduct of athletic meets. (2Sp) Maughan


192. Tests and Measurements in Physical Education. Practical studies of tests and technique of test construction. (3W) Hunsaker

Professional Courses in Recreation Education

83. Techniques in Game Leadership. Lectures and practical work. Lectures on selection of suitable material and methods of handling various groups. (3F, 3Sp) Burnett

123. Cub Leaders Training Course. A course designed to prepare well qualified leaders in cub scouting, and to prepare professional scout leaders in this phase of scouting. (2Su) Mendini

124. Scoutmaster's Basic Training Experience. The standard training course approved by the National BSA Council and includes the following: Plans and methods in organization and leadership, program planning, meetings, hiking, and camping. (2Sp) Mendini

157. Field Work in Recreation. Practical experience in conducting social recreational activities, such as for church, school and civic groups. Prerequisite: PE 88. Credit arranged (Sp) Burnett

175. Winter Survival and Recreation. Lectures and field trips to teach students ways of living in the wilderness under adverse weather conditions and how to participate and enjoy outdoor winter sports. Students must provide adequate clothing for field trips. (3W) Burnett

178. Problems and Trends in Outdoor Recreation. Problems associated with providing adequate outdoor recreation opportunities. A study of (1) past and present trends in the
availability and use of outdoor recreation areas, (2) types of outdoor recreation areas and the present and future needs for each type, (3) the roles of different agencies in providing outdoor recreation, including federal, state, and local government agencies, as well as private and commercial agencies, (4) laws governing the recreational usage of outdoor areas. (3Sp) Burnett

179. Camping and Camp Craft. Training in camp techniques and camp leadership. Different types of camps and their organization, supervision, equipment and safety. Several short hikes and an overnight camp are conducted during the course. (2Sp) Burnett

196. Organization of Recreation. Problems of organization and administration of community recreation departments, including staff, facilities, program of activities, and office management. Problems of recreation surveys, legislation, property acquisition, finances, construction and maintenance, and securing community and school co-operation in a united recreational program. (3Sp) Burnett

Professional Courses in Health Education

55. Safety and First Aid Instruction. Standard and Advanced American National Red Cross courses in first aid, with emphasis on practical use of the knowledge in various occupations. Detailed demonstrations and practice. American Red Cross First Aid certificates may be obtained by students who pass a satisfactory examination. (3F, W) Mendini

199. Problems of Body Conditioning. Deals with problems of weight control, body mechanics, posture and general body conditioning. It is approached through lecture, special exercises and various recreational sports. (2F, 2Sp) D. Nelson

155. Safety Education. (a) The needs for safety education; (b) the role of the school in a program for safety; (c) methods and materials for teaching, discussions, and readings, stressing various aspects of safety in many areas. (3Sp) Fuller, Staff

136. Medical Self Help. Course designed to provide information and training that will help prepare students for survival in time of national disaster when services of a physician or other allied health personnel are not available. Radioactive fallout and shelter, healthful living in emergencies, care of sick and injured, as well as standard first aid procedures will be covered. (2F, W, Sp) Mendini

145. Alcoholism and Education. The alcohol problem is considered from the physiological, psychological, sociological, educational, historical, and legal aspects. The development of a correlated attack on the problem is emphasized. (3Sp) D. Nelson

154. First Aid Instructors Course. Prerequisite: American Red Cross Advanced First Aid Certificate. Attention is given to methods of teaching First Aid. Detailed demonstration and practice is given. American Red Cross First Aid Certificate is given to students who pass the examination. (2Sp) Mendini, Staff

158. Curriculum Development in Health Education. Topics: The scope and socio-scientific basis for health education; organization for health education development; emphasis on the scheduling and sequence of health instruction in primary grades, intermediate grades, junior high school, high school, and health education in college; and, evaluation of outcome. (3) Pearce

163. Methods and Materials in Health Education. The nature of Health Education in the school and community; the health needs of the school child; the health education curriculum; Methodology in the teaching of health; the resource materials of health education; and the measurement and evaluation of the total health program. (3) Pearce

191. Interpretation of the Health Examination. Examination procedures, the detection of physical defects, the general assessment of the health of the individual, and the follow-up program. (3Sp) Staff

Graduate Courses in Physical Education

206. Analysis of Sports Performance. A mechanical and physiological analysis of all types of sports performance based upon principles of movement and body mechanics. Advanced methods of developing and using the human body are emphasized. The course includes slow motion photography, physiological bases and actual performance for employing the analysis. (3) D. Nelson

207. Problems in Physiology of Exercise. (3Sp, Su) Nelson

250. Reading and Conference. Provides for individually directed study. Credit arranged. Hunsaker, Nelson, Downs

271. Research and Thesis Writing. Credit arranged. Staff

275. Philosophical Basis of PE. A study of the divergent origins, conditions, leaders, and forces giving rise to current basic beliefs about Health, Physical Education and Recreation. Development of individual professional philosophies. (3Sp) McClellan

282. Curriculum in Physical Education. A course dealing with the objectives and needs of the elementary, junior and senior high Physical Education students. The various sports and activities of Physical Education will
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be studied and evaluated to determine their potential in developing the needs of students at each age and area level. Current practices, problems and curriculum trends will be studied. (3W, Sp)  

294. Research & Evaluation in Physical Education. Methods, techniques, purposes and interpretation of various kinds of research. Practical application in the conduct of a research project is utilized during the class. (3F, 3Sp) D. Nelson

295. Problems in Physical Education. Various selected problems in Physical Education are studied through the use of literature and discussion as they apply to the individual and the group. Individual problems are emphasized. (3F, 3Sp) Hunsaker

299. Physical Education Seminar. The group is offered the opportunity of investigating selected bodies of knowledge in Physical Education and discussion materials grow from the depth of investigation. Credit arranged. (W) Hunsaker

Library Science

Head: Assistant Professor R. Kent Wood
Office in Library 322

Associate Professors Milton C. Abrams, Ida-Marie Logan; Assistant Professors D. LaMont Chappell, Anna Marie Smith, Gene Garfield, Mark Sorensen; Instructors Kaarlo Mustonen, LaDell Hoth.

The program in Library Science is designed to prepare persons for positions in school, public and university libraries not requiring advanced degrees, as well as providing the prerequisite courses for study at graduate library schools. Library Science may be used as a minor in connection with a major in any subject. A teaching minor of not fewer than 20 credits may be selected from the Library Science courses including Library Science 100, 120, 150, and 155.

Persons planning careers in school librarianship must meet teacher certification requirements in addition to completing required courses in librarianship. A person may choose to meet the dual certification requirements in Education and Library Science for certification at both elementary and secondary school levels.

Courses required for Elementary Library Certificates are English

122, Library Science 120, and 150; for Secondary Library Certificate, Library Science 120, 150 and 155. Pending changes for library certificates will become effective on September 1, 1966.

Recommended courses from other departments for students of Library Science are: Education 107, 147, 161, and 162; English 122, 123, 151 and 154; Speech 118; Office Administration 65; Political Science 151 and 152. See departmental listings for course descriptions.

Library Science Courses


100. Advanced Reference and Bibliography. This course is designed to build a knowledge of the scope, significant characteristics, principles and philosophy of information retrieval and bibliographic techniques. Each student is given the opportunity to explore the literature and important reference tools augmenting the major disciplines. (6Sp, Su) Wood, Logan

1These persons are regular library staff members holding professorial rank who teach in Library Science.
110. Public Documents. The study of bibliographies, catalogs, indexes, and other sources which are the keys in using public documents. Federal, state, and United Nation documents which constitute vast sources of knowledge will be introduced to potential librarians, teachers, and other interested persons. (3Sp) Mustonen

120. Technical Library Processes. Fundamentals, methods, techniques, functions and administrative organization of the Technical Services Departments (Order, Serials and Cataloging) with emphasis on a thorough study of the Dewey Decimal Classification Scheme. (5F, Su) Hoth, Wood

150. Library Organization and Administration. A study to develop understanding of the organization of the several types of libraries and techniques useful in the administration of libraries generally. Special emphasis is placed upon activities in the school and public libraries. (5W, Su) Wood, Chappell, Hoth

151. Library Practice. Observation and supervised practice in libraries under the direction of library personnel. Designed as the practice teaching experience for librarians. Prerequisites: Library Science 100, 120, and 150. Credit arranged. (F, W, Sp, Su) Smith, Wood


158. Workshop in Librarianship. Designed for teachers, librarians, and administrators to study the current needs of libraries in schools and communities in relation to the problems of education and the institutions served. Resources and organization of new media, development techniques for implementation of the instructional materials center concept, as well as a review of the new books, magazines, and related materials will be stressed. (2Su) Wood and Visiting Staff


170. Readings and Conference. Provides for individually directed study. Limited to Library Science Minors. Prerequisite: Instructor's Consent. Credit arranged. (F, W, Sp, Su) Staff

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Psychology 129

Department of Psychology

Head: Professor Helmut Hofmann
Office in Education 302

Professors Walter Borg, Arden N. Frandsen, Heber C. Sharp, David R. Stone; Associate Professors Philip Langer, Peter Wolff, E. Wayne Wright; Assistant Professors Glendon Casto, Keith Checketts, John Cragun, Marvin Daley, John Doidge, Ronald Peterson, Robert Publicover, Benne Williams; Instructor David Burnstein.

Psychology is a scientific approach to understanding the behavior of man and animals. Its research interests are the understanding, prediction and control of behavior. Because it has important applications to the improvement of human efficiency, health, and the development and utilization of human resources, the study of Psychology contributes to both professional training and personal development.

A major, and preferably a Master's or Doctorate degree, in Psychology should prepare students professionally (1) for research and/or college teaching; (2) for guidance and counseling positions; (3) for school psychology services in elementary, secondary and special education programs; (4) for clinical work; (5) for individual and personnel work in private and government agencies. Psychology is also a suitable major for students.
planning to study medicine, nursing, law, social work, or personnel work after graduating with a Bachelor's degree.

The Department of Psychology has arrangements with schools, social welfare agencies, juvenile courts, the Wyoming State Mental Hospital, the State Industrial School, by which graduate students and some seniors can have practical experience in counseling and clinical psychology.

Lower Division Preparation for Psychology. The best preparation for Psychology is basic training in physical and biological science, social science, mathematics and literature. In completing the group requirements, it is recommended that the following courses be included: Physiology 4, 121, 122; Zoology 112; Sociology 70; English Literature (novel and biography) courses; Physics 6, 17, 19, or 21; Mathematics 34, 35, and additional mathematics courses if interested in this subject.

The minimum of 45 hours in the "group requirements" might well be exceeded. Psychology for lower division students expecting to major in psychology are Psychology 53, 71, and, if desired before attaining upper division status, 100 and 112.

Requirements for a major in Psychology include 45 credits of approved courses from the following: Psychology 53, 71, 100, 112, 127, 140, 161, 171, 172, 174, 175, and 181; and approved courses from Psychology 106, 123, 155. Recommended upper division electives: Sociology 90, 153; Education 186; Speech 167; Zoology 112, 119; Physiology 104 or 121, 122; the Education courses for teacher certification; SW 165; and upper division courses in literature. Undergraduate students are urged to take courses for a strong minor rather than to over-emphasize psychology courses.

A minor in Psychology should include Psychology 53, 71, 100, 112, and six hours from the following: 127, 140, 161, 171, 172, 175, and 181.

Graduate Study

Master of Science Degree in Psychology. Providing for specialization at the Master's degree level, the Utah State University Department of Psychology (and Guidance) offers the Master of Science and Master of Arts degrees in nine areas: (1) General, (2) Developmental, (3) Educational, (4) School Psychologist, (5) Counseling, (6) Animal Behavior, (7) Physiological Psychology, (8) Experimental, (9) Social Psychology, and (10) Learning and Motivation.

In addition to these ten areas in Psychology, a course of study leading to the Master of Education degree in Guidance and the Master of Science degree in Counseling is outlined below.

Master of Science Degree in Counseling Psychology. For this particular program in counseling, 30 credits of prerequisite courses in Psychology are required. The student is eligible to begin study for this degree without a teaching certificate; however, students planning to receive certification as a school counselor should be aware that a valid teacher's credential is a state requirement for counseling certification. A one-quarter internship in a school system or other appropriate agency is required as part of the total practicum experience.

Master of Education Degree in Counseling and Guidance. A teaching certificate and a total of 30 credits in Education and in Psychol-
ogy (with not less than 17 credits of approved Psychology courses) makes one eligible to begin study for this degree. Included in the required courses are: Education 186, 128, 262, Spec Ed 288, and Psy 123, 140, 181, 200, 202 or 205, 212, 280, 282, 283, 284, 286, 287, 288, 289; for this particular degree only a seminar report in the field of counseling and guidance will be considered in lieu of a thesis.

All degrees in counseling (MS in Psy, MS in Counseling Psy and MEd in Guidance) will usually require a minimum of two years, since no candidate will be permitted to graduate without the counseling practicum and field practice. In general, each student in counseling will be expected to complete two quarters of counseling practicum and one quarter of full-time field practice. However, with the approval of the Director of Counselor Education and the student's graduate committee, prior work experiences in counseling or related activities may be considered toward meeting part of the practicum and/or field practice requirement.

Doctorate in Educational Psychology. The Department of Psychology in cooperation with the Department of Education, has planned a program of advanced graduate study in counseling, school psychology that leads to the EdD degree in Educational Psychology with specialization in Counseling, School Psychology, Development-Learning. The program requires two years of graduate study, including supervision of individual study, beyond the MS degree, and an internship in school, mental hygiene clinic, or social agency.

PhD Programs in Psychology. The department offers PhD programs with specialization in the following areas:

1) Animal Behavior
2) Child and Developmental Psychology
3) Learning and Motivation
4) Physiological Psychology
5) Social Psychology

For a description of the programs contact the Department Head or the Dean of Graduate School.

Committee approval for entrance into any one of these graduate programs is based upon appraisal of (1) the student's undergraduate transcript; (2) scores on the Departmental Comprehensive Test in Psychology, and (3) scores on the Graduate Record Examination.

Psychology Courses

20. Spelling Clinic. The application of programmed techniques to adult spelling improvement. Individual instruction based on diagnostic testing. (1F) Stone

53. Elementary General Psychology. Principles of behavior of organisms, including scientific methodology in psychology, the biological basis of behavior, conditioning and learning, perception and thought, child development, personality, abnormal psychology, and industrial psychology. For any lower division student. (5F, W, Sp, Su) Staff

60. Personal Study Efficiency. Designed to evaluate self-concept as a major factor in study, with discussions of concentration, motivation, and goal-setting in study, study techniques, and personality factors in study. (2F, W, Sp) Casto, Williams

71. Experimental Psychology. A laboratory course of the scientific methods used in the study of behavior. Prerequisite: Psychology 53. (5F, W, Sp, Su) Burnstein, Wolff

80. Reading and Study Skills. A practical course, highly individualized, designed to aid in improving the efficiency of reading and study skills. Individual appointments arranged. (2F, W, Sp) Stone

100. Human Growth and Development. A study of the developmental characteristics and processes of human physical and psychological development from birth to maturity. Prerequisite: Psy 53. (3F, W, Sp, Su) Staff

106. Educational Psychology. A study of the principles of learning in teaching and of the abilities and other relevant characteristics of children and adolescents on the basis of which elementary and secondary teachers can evalu-
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112. Application of Statistics to Education and Psychology. Elementary study of statistical procedures in handling test scores and other data, and of the concepts needed to read current educational and psychological literature. Prerequisite: Psychology 53. (3F, W, Sp, Su)

113. Application of Statistics to Education and Psychology. Elementary study of statistical procedures in handling test scores and other data, and of the concepts needed to read current educational and psychological literature. Prerequisite: Psychology 53. (3F, W, Sp, Su)

114. Application of Statistics to Education and Psychology. Elementary study of statistical procedures in handling test scores and other data, and of the concepts needed to read current educational and psychological literature. Prerequisite: Psychology 53. (3F, W, Sp, Su)

115. Application of Statistics to Education and Psychology. Elementary study of statistical procedures in handling test scores and other data, and of the concepts needed to read current educational and psychological literature. Prerequisite: Psychology 53. (3F, W, Sp, Su)

116. Application of Statistics to Education and Psychology. Elementary study of statistical procedures in handling test scores and other data, and of the concepts needed to read current educational and psychological literature. Prerequisite: Psychology 53. (3F, W, Sp, Su)

117. Experimental Analysis of Behavior. The course will emphasize methods and procedures which enable psychologists to manipulate behavior. Current research methods will be emphasized and demonstrated. Nonstatistical analysis of behavior will be emphasized. Prerequisites: Psychology 53 or equivalent. (3F, Su)


119. Sensory Basis of Behavior. An introductory course into the sensory basis of behavior to include study and experimentation on psychophysical methods, anatomy of receptors, physiology of receptors and central nervous system basis of sensation. Prerequisites: Human Physiology 4, Psychology 53 and 71. (3W)

120. Improving Personal Reading Efficiency. Designed to help adults improve their methods of reading. Stresses improvement in organization and comprehension skills, and the ability to flexibly adapt speed to the material and needs of the reader. (3Su) Stone

121. Psychology of Exceptional Children. The development and behavior characteristics of exceptional children. The education, home management, social control, and psychological treatment suited to their needs. Groups included are the mentally deficient, physically handicapped, the exceptionally gifted, and children having serious personality and conduct problems. (3F, W, Sp, Su) Staff

122. Psychology of Learning. A comprehensive study of descriptions and explanations of learning. Prerequisites: Psychology 53 and 112. (3F, W, Su)

123. Abnormal Psychology. A descriptive and explanatory study of the varieties of mental abnormality—psychoses, psychoneuroses, and minor maladjustments—their causes, the methods of treatment, and the mental hygiene approach in preventing psychological maladjustments. Prerequisite: Psychology 53. (3Sp)

124. Mental Hygiene. For teachers and other workers in social occupations. Designed to promote understanding of emotional and social adjustments, and as a basis for guiding children, adolescents and adults toward improved mental health. Prerequisite: Psychology 53. (3W)

125. Psychology of Business and Industry. The methods and principles of psychology are applied to several general problems in business and industry, including advertising and selling, selection and placement of employees, motivation and morale, training, conditions of work, and productivity. Prerequisite: Psychology 53. (3W)

126. Social Psychology. A study of behavior in the framework of social influences, including communication, social interaction, social norms, roles, leadership, influence of culture and social structure on personality, social attitudes, attitude change and propaganda. Prerequisite: Psychology 53. (3F, Sp, Su)

127. Perception. The development, structure, role in behavior, and factors affecting perceptual processes: a study of the theories and experiments. (3F) Hofmann

128. Psychometrics Applied to Guidance. The evaluation, interpretation, and uses of tests of intelligence, aptitudes, interests, personality, and adjustment. Prerequisites: Psychology 53 and 112. (5F, Su)

129. History and Systems of Psychology. History of psychology and a critical comparison of the several systematic points of view on major problems in psychology. (3Sp) Sharp

130. Principles of Learning in Teaching. A study of learning theory and of experiments in psychology and education for the purpose of developing a set of learning principles as a guide to creating conditions for effective learning in both elementary and secondary schools. Prerequisites: Psychology 53, 112, and 106. (3W, Sp, Su)

131. Experimental Analysis of Behavior. The course will emphasize methods and procedures which enable psychologists to manipulate behavior. Current research methods will be emphasized and demonstrated. Nonstatistical analysis of behavior will be emphasized. Prerequisites: Psychology 53 or equivalent. (3F, Su)


133. Sensory Basis of Behavior. An introductory course into the sensory basis of behavior to include study and experimentation on psychophysical methods, anatomy of receptors, physiology of receptors and central nervous system basis of sensation. Prerequisites: Human Physiology 4, Psychology 53 and 71. (3W)

134. Psychological mechanisms underlying behavior. Prerequisite: Psychology 174. (3Sp, Su)

135. Psychometrics Applied to Guidance. The evaluation, interpretation, and uses of tests of intelligence, aptitudes, interests, personality, and adjustment. Prerequisites: Psychology 53 and 112. (5F, Su)

136. History and Systems of Psychology. History of psychology and a critical comparison of the several systematic points of view on major problems in psychology. (3Sp) Sharp

137. Principles of Learning in Teaching. A study of learning theory and of experiments in psychology and education for the purpose of developing a set of learning principles as a guide to creating conditions for effective learning in both elementary and secondary schools. Prerequisites: Psychology 53, 112, and 106. (3W, Sp, Su)

138. Psychology of Adolescence. Growth, psychological and social characteristics, development, educational and guidance needs, and adjustment problems of adolescents as met in schools, homes, and communities. Prerequisite: Psychology 53. (3Sp, Su)

139. Child Psychology and Development. The roles of maturation, learning, and environmental conditions in the motor, mental, social, emotional and personality development in children from birth to adolescence. Prerequisite: Psychology 53. (3F, Su)

140. Advanced Applications of Statistics to Education and Psychology. This second course covers analysis of variance and covariance, varied correlation techniques, partial and multiple correlation, and non-parametric methods. Prerequisite: Psychology 112. (3W, Su)
214. Independent Readings in Psychology. For students who cannot participate in the discussion in Psychology 215, this course provides opportunity for independent readings and conferences on topics individually selected. Prerequisite: prior course in the area of the topic selected. (2F, W, Sp, Su) Staff

215. Seminar Discussion of Current and Special Topics in Psychology. Weekly discussions of topics in current magazines plus independent reading either of some especially significant book or periodical literature on a specialized topic, selected according to student's interest. May be taken 1, 2, or 3 quarters. (2F, 2W, 2Sp) Staff

217. Research for Master's Thesis in Psychology. Credit arranged. (F, W, Sp, Su) Staff

224. Characteristics of the Mentally Retarded. A study of the characteristics, identification, and treatment of the mentally retarded. Emphasis upon the psychological, social, and educational problems in the treatment and control of the mentally handicapped. (3Sp, Su) Halstrom, Hofmann


235. Observation and Case Analysis in Play Therapy. Exploration of theories and potentialities of specialized play therapy experience. Concepts and principles in the interpersonal process are examined and developed. (3F) Doidge


261. Advanced Social Psychology. Experimental and theoretical studies of selected current topics in social psychology—including group behavior, motivation, reactions to frustration and conflict, attitude measurement, personality development, and cultural aspects of behavior. Prerequisite: Psychology 112 and 161. (3W) Langer

262. Social Psychology of Teaching. Applications of the principles of social psychology in teaching, including study of social structures and dynamics of instructional groups; roles of teacher and students; formation and effects of group norms; and of factors affecting group learning and problem solving, discipline, and self and social development. (3Sp, Su) Cragun, Langer

264. Experimental Social Psychology. A review and critique of the experimental literature in certain selected areas of social psychology. Students will be required to prepare and carry out an experiment in one of these areas. Prerequisites: Psy 261, 212. (3W) Langer

265. Culture and Personality. A study of the relationship between various cultural systems and their effect on personality. Various theoretical orientations will be reviewed including psychoanalytic theory, general behaviorism and field theory. Prerequisite: Psy 261. (3Sp) Langer

266. Introduction to Research in Education. See Ed Adm 266. (3F, Sp, Su) Carlisle, Borg

267. Research in Psychology on Education. See Ed Adm 267. (3F, Sp, Su) Borg

271. Seminar in Conditioning Techniques. The course will emphasize current research in respondent and operant conditioning. The student will be responsible for an independent survey of the literature or an independent experimental demonstration. (3W) Daley

274. Sensory Basis of Behavior. An advanced course in sensation concentrating on the physiological basis of sensation. This course is designed for the graduate student in physiological psychology. It is a survey of current research in both the cellular and gross physiological basis of sensation. Prerequisite: Psy 174. (3W) Wolff

275. Advanced Physiological Psychology. Neuroanatomy and neurophysiological basis of behavior. A survey of brain and behavior from the cellular level on up. Current research in neuropsychology will be emphasized. Prerequisites: Psy 174, 175. (3Sp) Wolff

276. Comparative Psychology. A phylogenetic study of animal behavior. Comparing naturalistic and experimental findings. (3Sp) Daley

280. Personality. An advanced study of the organization, development, dynamics, and appraisal of personality. Theories and empirical investigations of personality are studied as a basis for arriving at integrated concepts of the nature and development of personality. (3Sp, Su) Sharp

282. Individual Diagnostic Intelligence Testing. Techniques of individual testing, including intensive practice in the administration and interpretation of (a) the Stanford-Binet and Wechsler's intelligence scale for children, in the examination of school-age children, and (b) Wechsler's adult intelligence scale for use with adolescents and adults. Prerequisite: Psychology 181. (3W, Su) Frandsen, Doidge

283. Principles and Techniques of Counseling. Principles and techniques of counseling students on problems of curriculum planning and vocational choice, on improving methods of study, and emotional and social adjust-
ment. Prerequisites: Psychology 53, 102 and Education 128. (3F, Su) Wright

284. Theories of Counseling. An advanced study of the theories of counseling, to develop greater understanding of and a more effective approach to counseling. Prerequisite: Psychology 283. (3W, Su) Wright

285. Introduction to Projective Methods of the Study of Personality. The dynamics of human adjustment and the common projective methods for revealing motives, attitudes, and adjustment mechanisms of children and adults. Prerequisite: Psychology 181. (3Sp, Su) Dodge, Frandsen

286. Group Procedures in Counseling and Guidance. The intent of this course is to acquaint the student with current theory and practice in the use of groups for various educational and psychological processes and to effect some initial skills in working particularly with guidance, counseling, and/or therapy groups. Prerequisite: Pay 181, 283. (3W, Su) Wright

287. Educational Occupational Information. Collection, classification, and uses of occupational information in counseling. (3W) Casto, Williams, Cragun

288. Practicum in Counseling. Supervised practice in counseling in elementary or secondary schools, in the University or in clinical or guidance agencies. Prerequisites: Psychology 181, 284. (2F, W, Sp, Su) Wright, Cragun

289. Practicum in Psychological Testing. Supervised practice in psychological testing in elementary or secondary schools, in the university, or in clinical or guidance agencies. Prerequisite: Pay 282. (2Sp) Frandsen, Dodge

290. Internship in Counseling and Guidance. A one-quarter internship for prospective counselors in approved school systems or other agencies of Utah and Idaho. In some settings the trainee may receive a stipend for full-time work. The intern will be placed in a field setting appropriate to his anticipated employment goals, and will be supervised by a qualified person in the field setting and by the counselor education staff of the University. Prerequisite: consent of the Director of Counselor Education. (6F, W, Sp) Wright

297. Workshop in Guidance. A faculty or part of a faculty in a school or school district studies, evaluates, and attempts to improve the use of the school's resources for more effective guidance in its several phases. (3F, W, Sp) Staff

298. Techniques of Programming. Analysis of program efficiency based on a study of curricular sequence. Review of research and laboratory work on styles of program construction. (3Su) Stone

300. Educational-Psychological Theories in Practice. From observance and wide reading of educational-psychological theories—on motivation, learning, individual differences, personality, interpersonal relations, evaluation, etc.—hypotheses are formulated for checking by observation in selected school situations, both at the elementary and secondary levels. (3W, Su) Frandsen

305. Advanced Child Psychology. A critical and creative approach to the study of the nature and factors affecting child development, including the consideration of theories, experiments, and proposed new studies in the field. (3W) Hofmann, Frandsen

310. Educational Diagnosis of Learning Difficulties. Principles from educational psychology applied to the diagnostic study of the difficulties students have in learning reading and other subjects. (3F, Su) Stone

314. Advanced Independent Study in Psychology. Credit arranged. (F, W, Sp) Staff

315. Doctoral Colloquium. A Colloquium on advanced theories and research in Psychology. Required of all PhD and EdD Candidates. (3Sp) Staff

317. Research for the Doctorate Thesis in Psychology. (F, W, Sp)

323. Advanced Exceptional Child. A critical and creative approach to the study of the characteristics, education, and guidance of exceptional children. (3F) Hofmann

381. Advanced Psychometrics. A critical and creative approach to an evaluation, interpretation, and uses of tests of intelligence, aptitude, interests, personality, and mental health. (3F) Frandsen

386. Problems in Counseling. Individual case studies of children and adolescents presenting problems of diagnosis, guidance, remedial teaching, and psychotherapy. (3F) Wright

387. Clinical Internship. A clinical internship for doctoral candidates in which advanced testing, diagnosis, and the writing of psychological protocols is practised in mental hospitals, mental health clinics and child guidance centers. Administration and interpretation of mental tests, projective tests and aptitude tests will be supervised by clinical psychologists in the center and by departmental staff. Financial support by the center for selected candidates will be available. Approved centers: Cache County Mental Health Clinic, Utah State Industrial School, Ogden, and Wyoming State Mental Hospital, Evanston, Wyoming. (3-6F, W, Sp, Su) Sharp, Hofmann, Dodge

388. Internship in School Psychology. Supervised practice in providing psychological services in a school setting. (3F, W, Sp) Staff
Department of Secondary Education

Head: Associate Professor Kenneth C. Farrer
Office in Education 206

Professors John C. Carlisle, Dean, College of Education, Eldon Drake; Associate Professor A. L. Braswell; Assistant Professors Leon Beutler, Pearl S. Budge, John Haas, Robert Hammond, Helen Lundstrom, H. Dale Rasmussen.

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.

Undergraduate Program

The Department, in cooperation with the College of Education and with other departments and colleges of the University, offers the Bachelor of Science and Bachelor of Arts Degrees with a major in Secondary Education; and cooperates with other departments of the University, which graduates students with secondary teaching majors, in providing the professional education courses necessary for certification. The secondary certificate qualifies the candidate to teach in junior and senior high schools (grades 7-12).

To obtain the Bachelor of Science degree in secondary education and qualify for the Utah Teacher's Certificate for secondary schools, the student must meet the following minimum requirements:

(1) Lower Division Group Requirements.

Natural Science:
- Biological Sciences .................. 10
- Exact Sciences ...................... 10
- Humanities .......................... 10
- Social Sciences ..................... 10
- Psychology 53 ....................... 5

Plus
- Basic Communications ............... 9
- Physical Education .................. 3

(2) Teaching Major and Minor.

An approved teaching major of not fewer than 36 credits, of which 15 must be upper division, and an approved teaching minor of not fewer than 24 credits, must be completed. A composite teaching major consisting of not fewer than 60 credits in two or more related subjects may be selected. Courses required or recommended for majors, minors, and composite majors are agreed upon by the various subject departments, the Department of Education, and the Council on Teacher Education. For a list of approved programs consult the handbook on Approved Teaching Majors and Minors in Secondary Education. Students completing a teaching major and minor may graduate in either the department offering that major or the Department of Education. Individuals completing a composite major usually graduate from the Department of Education.

(3) Admission to Teacher Education.

Regardless of the department in which the student majors, he must apply and be granted permission to enter the Teacher Education program by the Admissions Committee of the Department of Education prior to enrolling in any Education course. It is advisable...
for the student to make this application at the end of the Sophomore or the beginning of the Junior year.

A student must be admitted to student teaching in addition to admission to Teacher Education. Total grade point of 2.0 or above and the grade point average in the teaching major, minor and professional certification subjects of 2.5 or above are required for entrance to student teaching. The student should be financially prepared to stay off campus during the time he is student teaching.

(4) Professional Courses in Education. For a Utah Teacher's certificate for secondary schools students must complete 33 required hours, and if majoring in secondary education, an additional 3 hours. The professional courses are to be taken in the various divisions as follows:

**Required Courses:**

**Group I. Understanding the Pupil** (minimum 9 credits)
- Public Health 155 .................................. 3
- Psychology 100 .................................. 3
- Psychology 106 .................................. 3

**Group II. Understanding the School** (minimum of 6 credits)
- Education 126 .................................. 3
- Education 150 .................................. 3

**Group III. Student Teaching, Methods and Curriculum** (minimum 15 credits)
- Education 127 .................................. 3
- Education 129 .................................. 5
- Education 130 .................................. 4

**Group IV. Special Methods** (minimum 3 credits)

Students are required to take the special methods course in a teaching major if it is offered. The special methods course in the minor field is also recommended.

**Elective Courses**

Additional courses may be elected in each of the four groups listed above. These courses are included on the sheet listing certification requirements for teaching in secondary schools, which may be obtained from the Department of Secondary Education.

**Dual Certification.** Ordinarily, dual certification will require at least one additional quarter of work.

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 15 credits required for certification in secondary education, including Education 127, and a special methods course in either the teaching major or minor, and Education 130.

A student desiring to obtain both the elementary and the secondary certificates should consult with an adviser in the Secondary Education Department early in his program. Curricula are also designed for dual certification in Secondary and Special Education.

**Homemaking, Industrial Teacher Education, Business Education, Agriculture.** Students desiring to major in Homemaking Education, Industrial Education, Business Education or Agricultural Education should consult the professional education requirements listed under these departments.

**Graduate Program**

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 De-
Secondary Education Courses

Undergraduate

126. Principles of Secondary Education. The background and status of the American secondary school. Problems concerning desirable objectives and functions are analyzed. An introduction to various type curricula and methods. (3F, W, Sp, Su) Carlisle, Farrer, Staff

127. Secondary School Methods. Considers the problems arising during student teaching. Discusses planning, teaching procedures, adapting classroom practices to individual differences, testing, and evaluation. To be taken during the same quarter as Ed 129 and 130. (3F, W, Sp, Su) Staff

128. Principles of Guidance. Emphasis given to organization of guidance as a service, including individual and occupational differences, tests, measurements, and counseling. (3F, W, Sp) Staff

129. Student Teaching in the Secondary Schools. Members of the class are assigned to a sponsor teacher in secondary schools for student teaching in their major and minor subjects. A brief period of observation is followed by gradually increasing responsibilities until, upon completion of the assignment, the student has had guided experiences in all professional responsibilities of the typical faculty member in the secondary school. Prerequisites: Psy 100, 102 or 106 and Ed 126. (4F, W, Sp, Su) Staff

131. Student Teaching in Higher Education. Enrollment by permission only. Especially adapted to instructional assignments of graduate assistants, laboratory instructors, or other graduate students who might be specifically preparing for college teaching. (4W, Sp) Braswell


135. The Teaching of English. Considers the content of the English course, effective methods, and significant trends. (4F, W, Sp, Su) Budge

145. Teaching Science in Secondary Schools. Aims and objectives of science education in the secondary schools and the development of curriculum materials to achieve these aims. Class members develop teaching units in science taught in the secondary school. (3F, Sp, Su) Braswell

146. Laboratory Practicum for Secondary Science Teachers. Lecture and laboratory experience provides initiation into investigative laboratory techniques and procedures appropriate for the new high school science curricula. (3W, Su) Braswell

147. Improvement of Reading in Secondary Schools. A study of research and classroom practices is designed to assist secondary school pupils with low reading abilities. For English teachers and those wishing to qualify for remedial reading certificates. (3W, Su) Budge


161. Audio-Visual Education. Studies the building of a program in which the newest materials and techniques are utilized. Preparation of audio-visual material. (3F, W, Sp, Su) Drake, Beutler

162. Audio-Visual Techniques. An advanced course designed to prepare students in the operation, care and maintenance of Audio-Visual equipment. The construction and proper utilization of teaching aids in the classroom will also be emphasized. (3Su) Drake

163. New Media in Education. The development, organization, and use of such new media as television, teaching machines, programmed learning in the public schools. Ways and means of organizing for team teaching will be considered. (3F, W, Sp, Su) Staff
138 College of Education

164. Measurement and Evaluation in Education. Evaluates procedures in education including principles of measurements, tests, and text construction. The development of more valid and objective teacher-made tests will be studied. (3F, W, Sp, Su) Staff

165. Diagnosis and Treatment of Learning Difficulties. See Special Education 186. (3F, Sp, Su) Stone

Secondary Courses Offered In Other Departments

Applied Linguistics for Teachers (See Lang Fr 113, Gr 112).

Methods in Physical Education (See PE 120).

Teaching of Speech (see Speech 123).

Art Methods (See Art 152).

Music Methods (Music 151, 152, 153).

Teaching of Mathematics (See Math 175).

Business Education Methods (See BE 178, 179).

Graduate Courses

230. Secondary School Curriculum. A study of the secondary school curriculum, junior and senior high school, as it now exists in typical schools, together with proposals for improvement. (3F, Su) Farrer, Haas

232. Aerospace Education. See Industrial Education 232. (3Su) Summers

233. The Junior High School. Formerly 217. A study of the junior high school as it has developed as a distinct segment of the American Public School system, its functions, organization and curriculum, together with recommendations for improvement. (3Su) Staff

237. Seminar in Secondary Education. For graduate students in secondary education and those preparing for school administration or supervision in junior or senior high school. Reviews current research in areas of interest to class members. (3Sp, Su) Carlisle, Staff


242. The Improvement of Science in the Secondary School. For experienced teachers. Deals with newer concepts in curriculum and methods of instruction in physical and biological sciences in the secondary school. (3Sp, Su) Braswell


259. Supervising Student Teaching. Considers ways and means of providing desirable experiences for student teachers in the public schools. The role of the classroom teacher and the college supervisor will be analyzed. (3F, Su) Staff

264. Instructional Leadership in Education. Principles and practices of school supervision, including qualifications and responsibilities of supervisors of instruction in public education. The role of the principal, the curriculum director and other administrators in instructional leadership will be considered. (3W, Su) Alired, Farrer

266. Introduction to Research in Education. See Educ Adm 266. (3F, Su) Carlisle

267. Research in Psychology and Education. See Educ Adm 267. (3F, Su) Borg

283. Reading and Conference. Provides for individually directed study in subjects of special interest and preparation. Credit arranged. (F, W, Sp, Su) Staff


366. Internship in School Supervision. Provides extensive experience for the advanced student working on the Doctor of Education Degree in Curriculum Development and Super-
vision. The student works a minimum of one quarter full time under the direction of an administrator, in a public school or University. Credit arranged. (F, W, Sp) Staff

385. Field Studies and Thesis. Formerly 375. Individual work on research problems in the EdD program. Credit arranged. (F, W, Sp, Su) Staff

Department of

Special Education

Acting Head: Professor Helmut Hofmann
Office in Education 302

Associate Professors Frederick Berg, Frances Halstrom, Kaye Don Owens, Director of Student Teaching; Assistant Professors Gail Johnson, Phyllis Publicover, Robert Publicover; Instructors Rose Coshow, Kenneth Morgan.

The Department of Special Education offers a wide range of training opportunities for teachers, supervisors, research workers, future college teachers, psychologists and social workers. Programs on the undergraduate and graduate levels lead to specialization in:

- Mental Retardation
- Emotional and Social Maladjustment
- Remedial Reading
- Gifted
- Disadvantaged
- Hard of Hearing/Deaf (Specialists are prepared in cooperation with the Department of Audiology-Speech Pathology)

Undergraduates

The Department offers a major in Special Education which leads to a Bachelor of Arts or Bachelor of Science in Special Education. Course sequences are closely integrated with the programs in Elementary and Secondary Education. Prospective teachers thus can acquire dual certification in either Elementary Education/Special Education or Secondary Education/Special Education. In order to obtain the Bachelor of Science degree in Special Education the student must meet the following requirements:

(1) Lower Division Group Requirements (All Students)

<table>
<thead>
<tr>
<th>Natural Science</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological Science</td>
<td>10</td>
</tr>
<tr>
<td>Exact Science</td>
<td>10</td>
</tr>
<tr>
<td>Humanities</td>
<td>10</td>
</tr>
<tr>
<td>Social Sciences</td>
<td>10</td>
</tr>
<tr>
<td>General Psychology</td>
<td>5</td>
</tr>
<tr>
<td>Basic Communications</td>
<td>9</td>
</tr>
<tr>
<td>Physical Education</td>
<td>3</td>
</tr>
<tr>
<td>Fine Arts</td>
<td>63 (57)</td>
</tr>
</tbody>
</table>

(Not required from students who desire dual certification in Special Education/Secondary Education)

(2) Areas of Academic Concentration

2a. For majors in Special Education who want to certify in Special Education and Elementary Education:

Thirty-six credit hours in one field of concentration or eighteen hours in each of two are required. The selected fields must represent subject areas which are pertinent to Elementary School and Special
Education classes. (Science, Social Studies, Language Arts, Mathematics, Music, Art, Physical Education.) If two minor fields are selected, the second may be a supporting area, provided the student has secured prior approval of his advisor. Supporting areas recommended for Special Education majors are:

- Child Development
- Anthropology/Sociology
- Library Science

2b. For majors in Special Education who want to certify in Special Education and Secondary Education:

An approved teaching major of 36 credit hours (15 upper division) and an approved teaching minor of 24 hours. (For detailed description see Department of Secondary Education and consult the Handbook of Teaching Majors and Minors in Secondary Education).

Special Education majors are strongly recommended to choose their teaching majors and minors from: Psychology, Art, Industrial Arts, Home Economics, Physical Education or related areas pertinent to management and education of the exceptional student.

2c. For majors in Special Education who do not desire elementary or secondary certification:

Sixty hours chosen in blocks of 15 from the following areas:

- Psychology ................................................. (15)
- Anthropology/Sociology ............................... (15)
- Child Development/Family Life ...................... (15)
- Art .................................................................. (15)
- Music ............................................................ (15)
- Physical Education ....................................... (15)
- Industrial Education .................................... (15)

In addition the Special Education major can choose 15 hours of electives with approval of his advisor.

(3) Professional Education

3a. For majors in Special Education who want to certify in Special Education and in Elementary Education:

Professional Courses in Elementary Education:

**Group I: Understanding the Child**
- Psychology 100 ......................................... 3
- Public Health 155 ...................................... 3
- Psychology 123 ......................................... 3
- Education 100 ......................................... 4
- Education 150 ......................................... 3

**Group II: Curriculum and Methods**
- Education 104 ......................................... 5
- Education 105 ......................................... 3
- Education 106 ......................................... 12
- Education 107 ......................................... 3
- Psychology 106 ........................................ 3

**Group III: Understanding the School**
- Education 100 ......................................... 4
- Education 150 ......................................... 3
- Electives: (6 minimum)
  - Physical Education 126
  - Physical Education 177
  - Physical Education 182
  - Music 150
  - Art 151

**Special Education Courses 40 for Teachers of Mentally Retarded Children:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special Education 184</td>
<td>3</td>
</tr>
<tr>
<td>Special Education 185</td>
<td>3</td>
</tr>
<tr>
<td>Special Education 186</td>
<td>3</td>
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<tr>
<td>Special Education 187</td>
<td>3</td>
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<tr>
<td>Special Education 188</td>
<td>3</td>
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<tr>
<td>Special Education 189</td>
<td>3</td>
</tr>
<tr>
<td>Special Education 190</td>
<td>3</td>
</tr>
<tr>
<td>Special Education 191</td>
<td>6</td>
</tr>
<tr>
<td>Special Education 192</td>
<td>6</td>
</tr>
<tr>
<td>Special Education 193</td>
<td>3</td>
</tr>
<tr>
<td>Special Education 194</td>
<td>6</td>
</tr>
<tr>
<td>Psychology 181</td>
<td>5</td>
</tr>
<tr>
<td>Audiology-Speech Pathology 70</td>
<td>3</td>
</tr>
</tbody>
</table>

**For Teachers of Children with Emotional Disturbances:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Special Education 186</td>
<td>3</td>
</tr>
<tr>
<td>Special Education 188</td>
<td>3</td>
</tr>
<tr>
<td>Special Education 189</td>
<td>3</td>
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<tr>
<td>Special Education 190</td>
<td>3</td>
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<tr>
<td>Special Education 191</td>
<td>6</td>
</tr>
<tr>
<td>Special Education 192</td>
<td>6</td>
</tr>
<tr>
<td>Special Education 290</td>
<td>5</td>
</tr>
<tr>
<td>Special Education 291</td>
<td>3</td>
</tr>
<tr>
<td>Special Education 292</td>
<td>3</td>
</tr>
<tr>
<td>Psychology 181</td>
<td>5</td>
</tr>
</tbody>
</table>
3b. For majors in Special Education who want to certify in Special Education and in Secondary Education:

Group I: Understanding the Pupil
- Public Health 155: 3
- Psychology 100: 3
- Psychology 106: 3

Group II: Understanding the School
- Education 126: 3
- Education 150: 3

Group III: Student Teaching, Methods and Curriculum
- Education 127: 3
- Education 129: 3
- Education 130: 3

Group IV: Special Methods
- 3 credits in teaching major, if offered

Special Education courses 35-38
For Teachers of Mentally Retarded Children:
- Special Education 184: 3
- Special Education 185: 3
- Special Education 186: 3
- Special Education 187: 3
- Special Education 188: 3
- Special Education 189: 3
- Special Education 190: 3
- Special Education 191: 3
- Special Education 192: 3
- Psychology 181: 5
- Physical Education 126: 3

Specialization Hard of Hearing/Deaf:
- Special Education 180: 3
- Special Education 181: 3

(For complete requirements in this area see Department of Audiology—Speech Pathology)

Core Courses
- Psych 100: 3 Spec Ed 186: 3
- Psych 106: 3 Spec Ed 191: 6
- Psych 112: 3 Spec Ed 192: 6
- Psych 123: 3 Spec Ed 190: 5
- Psych 181: 5 Spec Ed 197: 3

Specialization Mental Retardation:
- Special Education 184: 3
- Special Education 185: 3
- Special Education 187: 3

Specialization Emotional Disturbance:
- Special Education 291: 3
- Special Education 292: 3
- Special Education 293: 3

Summary of Course Requirements for Majors of Special Education:

Dual Certification in Special Education and Elementary Education:
- Lower Division: 63
- Professional Education Courses in EL Education: 48
- Field of Concentration or Two Minors: 36
- Special Education Courses: 40

Total: 187

Dual Certification in Special Education and Secondary Education:
- Lower Division: 57
- Major: 36
- Minor: 24
- Professional Education Courses in Sec Education: 33
- Spec Education Courses: 35

Total: 186

Dual Certification in Special Education without Elementary or Secondary Certification:
- Lower Division: 63
- Supporting Fields: 60
- Professional Education Courses, Spec Education: 49
- Electives: 15

Total: 187

3c. For majors in Special Education: (without dual certification in Elementary or Secondary Education)

Forty-nine hours in Professional courses are required.

Graduate

The Department offers a Master's Degree Program and the
Doctor of Education Degree in cooperation with other Departments of the College.

Specialization in the Master's Program can be obtained in:

- Mental Retardation
- Emotional Disturbance
- Gifted
- Remedial Reading
- Hard of Hearing/Deaf (See Department of Audiology-Speech Pathology)

A total of 45 quarter hours is the minimum requirement for these degrees. Course work must be completed in a 7-year period and a minimum of 18 hours must be taken on the Logan Campus. Twenty-five of the 45 hours must be in the 200 series, 9 graduate hours can be transferred from other colleges.

**Core requirements for all areas:**

*(Except Hard of Hearing)*

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spec Ed 186</td>
<td>Diagnosis and Treatment of Learning Difficulties</td>
<td>3</td>
</tr>
<tr>
<td>Spec Ed 191</td>
<td>Student Teaching in Special Education and/or</td>
<td>6</td>
</tr>
<tr>
<td>Spec Ed 192</td>
<td>Laboratory Experiences with Exceptional Children</td>
<td>6</td>
</tr>
<tr>
<td>Spec Ed 288</td>
<td>Counseling of Parents of Exceptional Children</td>
<td>3</td>
</tr>
<tr>
<td>Spec Ed 294</td>
<td>Seminar in Special Education</td>
<td>3</td>
</tr>
<tr>
<td>Ed 286</td>
<td>Applied Research in Education (MED only)</td>
<td>3</td>
</tr>
<tr>
<td>Ed 267</td>
<td>Research in Psychology and Education (MS only)</td>
<td>3</td>
</tr>
<tr>
<td>Ed 285</td>
<td>Research and Thesis Writing (MS only)</td>
<td>9</td>
</tr>
<tr>
<td>Psych 123</td>
<td>Exceptional Children</td>
<td>3</td>
</tr>
</tbody>
</table>

**Course requirements in area of Mental Retardation:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spec Ed 184</td>
<td>Curriculum for Trainable and/or</td>
<td></td>
</tr>
<tr>
<td>Spec Ed 187</td>
<td>Curriculum</td>
<td></td>
</tr>
<tr>
<td>Spec Ed 287</td>
<td>Basic Problems Teaching MR</td>
<td></td>
</tr>
<tr>
<td>Spec Ed 289</td>
<td>Diagnosis of MR</td>
<td></td>
</tr>
<tr>
<td>Spec Ed 291</td>
<td>Identification of Emotionally Disturbed</td>
<td></td>
</tr>
<tr>
<td>Spec Ed 297</td>
<td>Seminar Disadvantaged</td>
<td></td>
</tr>
<tr>
<td>Psych 181</td>
<td>Psychometrics</td>
<td></td>
</tr>
<tr>
<td>Psych 224</td>
<td>Characteristics of MR</td>
<td></td>
</tr>
</tbody>
</table>

Psych 282: Individual Diagnostic Testing
Speech 70: Speech, Hearing, Language Development

**Course requirements in area of Emotional Disturbance:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spec Ed 290</td>
<td>Education for Mental Health</td>
<td></td>
</tr>
<tr>
<td>Spec Ed 291</td>
<td>Identification of Emotionally Disturbed</td>
<td></td>
</tr>
<tr>
<td>Spec Ed 292</td>
<td>Education of Emotionally Disturbed</td>
<td></td>
</tr>
<tr>
<td>Spec Ed 293</td>
<td>Socially Maladjusted Adolescent</td>
<td></td>
</tr>
<tr>
<td>Spec Ed 297</td>
<td>Seminar on Disadvantaged</td>
<td></td>
</tr>
<tr>
<td>Psych 181</td>
<td>Psychometrics</td>
<td></td>
</tr>
<tr>
<td>Psych 235</td>
<td>Play Therapy</td>
<td></td>
</tr>
<tr>
<td>Psych 238</td>
<td>Play Therapy Practicum (Elective)</td>
<td></td>
</tr>
</tbody>
</table>

**Course requirements in area of Remedial Reading:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spec Ed 188</td>
<td>Diagnosis of Remedial Reading</td>
<td></td>
</tr>
<tr>
<td>Spec Ed 189</td>
<td>Methods in Remedial Reading</td>
<td></td>
</tr>
<tr>
<td>Spec Ed 190</td>
<td>Practicum in Remedial Reading</td>
<td></td>
</tr>
<tr>
<td>Spec Ed 290</td>
<td>Educating for Mental Health</td>
<td></td>
</tr>
<tr>
<td>El Ed 225</td>
<td>Improvement of Reading</td>
<td></td>
</tr>
<tr>
<td>Psych 181</td>
<td>Psychometrics</td>
<td></td>
</tr>
</tbody>
</table>

**Course Requirements in the Area of the Gifted:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spec Ed 286</td>
<td>Curriculum for Gifted</td>
<td></td>
</tr>
<tr>
<td>Spec Ed 290</td>
<td>Educating for Mental Health</td>
<td></td>
</tr>
<tr>
<td>Spec Ed 295</td>
<td>Methods in Teaching Literature for Gifted</td>
<td></td>
</tr>
<tr>
<td>Psych 225</td>
<td>Characteristics of Gifted</td>
<td></td>
</tr>
<tr>
<td>El Ed 220</td>
<td>Creative Teaching</td>
<td></td>
</tr>
</tbody>
</table>

**Course requirements in area of Hard of Hearing/Deaf:**

See Department of Audiology-Speech Pathology.

**Doctorate Program**

For information write to Department Head or Dean of Graduate Studies.

**State Certification**

The State of Utah presently issues the following certificates in Special Education, which can be obtained in the Department upon fulfillment of required courses:

- **Mental Retardation** (Provisional Certificate, minimum 18 hours of specialized training; Professional Certificate, minimum 30 hours of specialized training)
Remedial Reading (Provisional Certificate, minimum 10 hours of specialized training; Professional Certificate, minimum 16 hours of specialized training)

Hard of Hearing/Deaf See Dr. Berg For information.

Special Education Courses

170. Fundamentals in Speech Disorders. See Speech 170. (5F) Fletcher

180. Education of the Hearing Impaired. Academic evaluation, guidance and acceleration of the hearing impaired; systematic procedures for optimal development of reading, mathematical, social, and scientific academic skills; cooperation with regular school personnel. (3W, Su) Berg

181. Characteristics of the Hearing Impaired. Evaluation techniques used in placement, education, and guidance of the hearing impaired; associated psychological, social, educational and vocational problems; special apparatus, devices, techniques and educational approaches; mental, emotional, symbolic, motor and visual problems. (3Sp, Su) Berg

182. Psychometrics. See Psychology 181. (6F) Frandsen

185. Arts and Crafts for the Mentally Retarded. A laboratory study of methods and procedures of arts and crafts in classroom and instruction for the mentally retarded. (3F, Sp, Su) Owens

186. Diagnosis and Treatment of Learning Difficulties. A study of methods of dealing with learning difficulties in basic educational skills of pupils in the elementary and secondary schools. The emphasis is upon developmental and corrective measures in the typical classroom. (3F, Sp, Su) Owens, Stone

187. Curriculum for the Mentally Retarded. A study of curricula and adaptations in methods of teaching especially suited to the needs and abilities of mentally retarded children. Provides helpful guidance both for teachers of classes for these children and for teachers who provide for them in regular school classes. Pay 123 is a prerequisite or should be taken concurrently. (3F, Su) Owens, P. Publicover

188. Diagnosis of Reading. See Elementary Education 188. (3F, Su) G. Johnson

189. Methods of Instruction in Remedial Reading. See Elementary Education 189. (3W, Su) G. Johnson

190. Practicum in Remedial Reading. See Elementary Education 190. (3W, Su) G. Johnson

191. Student Teaching in Special Education. Designed to help the teacher apply methods and techniques found to be successful with slow-learning children, emotionally disturbed children, and culturally disadvantaged. The apprentice plan is followed which requires an initial period of observation with minor responsibilities which increase as the student's ability is demonstrated. Enrollment is limited to experienced teachers or students who have completed Ed 106. Students must have completed or be concurrently taking the courses in Pay 123 and Ed 187 or Ed 291. Credit arranged. (F, W, Sp, Su) Staff

192. Field Experience with Exceptional Children. Opportunities for contracts with retarded, emotionally disturbed, gifted, mentally ill, hard of hearing, deaf and other types of exceptional children will be provided. The candidates will study the settings and work with individuals on specific problems. Internships are provided in approved settings such as Granite School District, Tooele School District, Wyoming State Mental Hospital, Utah State Mental Hospital and other approved institutions. Credit arranged. (F, W, Sp, Su) Staff


201. Compensatory Language and Reading. This course explains methods of overcoming the special reading problems which result from cultural deficiencies or differences. (2Su) G. Johnson


225. Improvement of Reading in the Elementary School. See Elementary Education 225. (3) Alired, Shaw, G. Johnson

225. Theory and Practice of Play Therapy. See Psychology 225. (3F) Doidge

238. Practicum in Play Therapy. See Psychology 238. (2W) Doidge

266. Applied Research in Education. See Educational Administration 266. (3F, Sp, Su) Carlisle, Borg

267. Research in Psychology and Education. See Educational Administration 267. (3F, Sp, Su) Borg

282. Individual Diagnostic Intelligence Testing. See Psychology 282. (3W) Frandsen, Doidge

283. Reading and Conference. Provides for individually directed study in subjects of special interest and preparation. Credit arranged. (F, W, Sp, Su) Staff

286. Curriculum and Methods for Gifted Children. A study of curriculum designs, special and enrichment programs for gifted students. (3Sp, Su) Halstrom

287. Basic Problems in Teaching the Mentally Handicapped. Analysis of the emotional and social aspects of the mentally retarded child as they relate to his perception of himself and of his learning difficulties. The necessity of understanding how these children develop concepts which are essential to their learning will be stressed. Classroom procedures which facilitate the development of such concepts will form the main body of the course. (3Sp, Su) Owens

288. Counseling and Guidance of Parents of Exceptional Children. A study of counseling practices suited for parents of exceptional children. The special psychological problems of these parents will be emphasized. Information on local, state, and national resources for parents and children forms an essential part of the course. (3W, Su) Halstrom


290. Education for Mental Health in the Classroom. Emphasizes the importance of mental health in teaching. Analysis of the concept of the healthy child in the classroom and the conditions which contribute to his growth and development. (5F, Su) Hofmann, Halstrom, R. Publicover


292. Education of Emotionally Disturbed Children. Discussion of school programs for emotionally disturbed children. Methods and procedures for these children in regular classroom, special classrooms and institutions will be studied. Field trips to Mental Institutions. Prerequisites: Ed 291. (3W, Su) P. Publicover

293. Education of the Socially Maladjusted. Specific emphasis on adolescent programs in institutions such as mental hospitals, industrial schools, etc. Legal and administrative aspects of programs for disturbed adolescents will be discussed. (3Sp, Su) P. Publicover

294. Seminar in Special Education. A seminar in special topics of exceptional children. Their education, treatment and rehabilitation. (3W, Sp, Su) Staff

295. Methods in Presenting Literature to the Gifted. Designed to review the characteristics of the gifted, to examine his reading habits, to find methods of identifying superior and creative readers, and to improve upon discussion techniques suitable for elementary and junior high school students. (3W) Halstrom

297. Seminar on Disadvantaged Children. A course for teachers and supervisors of disadvantaged children in which the advanced students will study under a team of professors and will do original work in the fields of curriculum, community action programs, tests and measurements, legal and administrative aspects of programs for disadvantaged children. (3W) R. Publicover
COLLEGE OF ENGINEERING
College of Engineering

Department of Agricultural and Irrigation Engineering, 151

Department of Civil Engineering, 154

Department of Electrical Engineering, 160

Department of Industrial and Technical Education, 164
  Industrial Teacher Education, 164
  Industrial Technology, 166
  Technical Education, 168

Department of Manufacturing Engineering, 177

Department of Mechanical Engineering, 181
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  Mechanical Engineering, 181

Degrees Offered:
  Bachelor of Science
  Master of Science
  Master of Engineering Science
  Master of Industrial Education
  Civil Engineer
  Irrigation Engineer
  Doctor of Philosophy
  Doctor of Education in Industrial Education¹

¹Offered jointly with College of Education.
The College of Engineering comprises the Departments of Agricultural and Irrigation Engineering, Civil Engineering, Electrical Engineering, Industrial and Technical Education, Manufacturing Engineering, Mechanical Engineering, and the Engineering Experiment Station.

Undergraduate and graduate degrees. The Engineering Departments offer the Bachelor of Science degree in Agricultural, Civil, Electrical, Manufacturing and Mechanical Engineering. The first two years of Chemical Engineering may be taken under the supervision of the Mechanical Engineering Department. The Master of Science and Doctor of Philosophy degrees are offered in the various graduate majors, in Irrigation Engineering, and Water Resources Engineering. The Doctor of Education degree in Industrial Education is offered jointly with the College of Education.

Master of Engineering Science. Utah State University cooperates with the University of Utah and Brigham Young University in offering a program leading to the degree of Master of Engineering Science. See "Graduate Studies" in this catalog. Prescribed courses, as outlined below, may be freely exchanged among the three cooperating universities, for this degree only, without restriction. Candidates must satisfy the admission requirements, examination procedure, and all other regulations of the Graduate School except as above amended. The thesis must satisfy the requirements of the student's Committee and his thesis director.

Following are the prescribed common courses:

### Engineering Science Curriculum

<table>
<thead>
<tr>
<th>Common Courses</th>
<th>Credit</th>
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<tbody>
<tr>
<td>Numerical Methods and Computers</td>
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<tr>
<td>Intermediate Mathematics</td>
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<td>(Math 140, 141, 142)</td>
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<tr>
<td>Modern Theoretical Physics</td>
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<td>(presently Physics 125, 126, 127)</td>
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<tr>
<td>Engineering Science of Materials</td>
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<td>Advanced Transport Phenomena</td>
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<tr>
<td>(ME 210)</td>
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</tr>
<tr>
<td>Design Problem or thesis (ME 298)</td>
<td>3-9</td>
</tr>
<tr>
<td>Approved electives (See MES brochure)</td>
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<td></td>
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</table>

In Engineering, the course of study includes mathematics and basic science, engineering science, engineering analysis and design, basic communications, and humanistic-social studies. A reasonable choice of elective subjects is allowed. If graduate study in Engineering is planned, additional mathematics and physics should be taken.

The objectives of the undergraduate Engineering curricula are to
provide thorough, fundamental, technical education necessary for professional Engineering work of the highest grade, and to assure the development of those physical, intellectual, moral, and social qualities essential to high professional achievement. The recommendations of the Engineers' Council for Professional Development have been carefully studied in planning the Engineering curricula, and the curricula in Civil, Electrical, and Mechanical Engineering are accredited by that agency.

The Department of Industrial and Technical Education offers undergraduate degrees in Industrial Teacher Education with majors in Industrial Arts, Technical, and Trade and Industrial Education; and Industrial Technology with majors in Aeronautics, Automotive, and Welding. The Master of Science and the Master of Industrial Education are offered in Industrial Teacher Education. The Doctor of Education degree in Industrial Education is offered jointly with the College of Education. Certificates of Completion are awarded in Technical Education with majors in Aeronautics, Automotive, Diesel, Drafting and Welding.

The objectives of the Department of Industrial and Technical Education are to provide competent industrial teacher educators for secondary and post high schools, and high level technical personnel for employment in industry.

Admission. For general requirements see introductory section of this catalog.

For Engineering, the following high school units are required for admission without deficiencies: English, 4; Plane Geometry, 1; Algebra, 2; Trigonometry, ½; Physics or Chemistry, 1. One unit each of Physics and of Chemistry and ½ unit of Mechanical Drawing are recommended. Foreign language in junior or senior high school is desirable. More than four years will be required for deficient students to complete the Bachelor's degree, except that minor deficiencies may be removed by attendance at Summer Quarter. See "Common Freshman and Sophomore Curriculum for Engineering." Students having major deficiencies may be placed in a pre-engineering program agreed upon by the Dean. Such students may write to the Dean regarding this program.

For Industrial and Technical Education admission requirements are the same as for general admission to the University.

Scholarship. An average of "C" or higher is required to remain in good standing in the College of Engineering and to be eligible for graduation. For graduation in the College of Engineering a 2.0 average is required in engineering courses and the supporting courses in mathematics, physics and chemistry required by the department. Courses in the departmental major for which "D" grades are received should be repeated unless otherwise recommended by the department.

The general University scholastic policy governs the College of Engineering. See "Low Scholarships and Probation" admissions section of catalog. After the first quarter, students who do not maintain a "C" average are placed on probation after one quarter's warning. Failure to achieve a "C" average after one quarter probation ordinarily results in suspension.

Graduation. Candidates for graduation must satisfy the provision of "Graduate Requirements" and "Lower Division Requirements." In addition they must satisfy the requirements of the prescribed curriculum of their major.
Graduates in the professional Engineering programs, (Agricultural, Civil, Electrical, Mechanical, and Manufacturing Engineering), also must meet the requirements of the Engineers' Council for Professional Development in the socio-humanistic field. They can do this and satisfy the social science and humanities group requirements of the University by selecting 27 hours from the following groups A and B, with not less than 10 hours in either group:

A. Social Sciences (select from two areas)
   (1) Sociology 70
   (2) Economics 51, 52
   (3) Psychology 53
   (4) Political Science 1 or 10, 101, 102
   (5) History 1, 2, 3, 4, 5, 20

B. Humanities (select from two areas)
   (1) English—any lower division literature course, any upper division literature course with approval of instructor
   (2) Language—any literature course in a foreign language.
   (3) Fine Arts—
      Music 1, 101, 102, 103;
      Theatre Arts 1, 10, 100, 102, 104;
      Art 1, 10, 35, 36, 37.

Graduates in the Department of Industrial and Technical Education must meet the university group requirements as stated elsewhere in this catalog.

Engineering College Honors. An Honors Program provides an opportunity for outstanding students to participate in advanced study or creative investigation beyond the prescribed curricula. See course No. 197 in the departmental listings.

Professional Societies. The College holds institutional membership in:
   American Society for Engineering Education
   American Society for Testing Materials
   American Concrete Institute
   Highway Research Board
   Universities Council on Hydrology

Student Chapters or Societies include:
   American Society of Civil Engineers
   Institute of Electrical and Electronic Engineers
   American Society of Tool and Manufacturing Engineers
   American Society of Mechanical Engineers
   Sigma Tau
   Theta Tau
   Industrial Education Club
   Society of Automotive Engineers
   American Welding Society
   Flying Techs-Aeronautics

The Engineering Council comprises representatives from the various student organizations and coordinates student activities. Its office is L246 Engineering Building.

Students are encouraged to affiliate with appropriate student societies.

ROTC. Many Engineering College students find satisfaction in serving their country in the Reserve Officers Training Program and as reserve officers after graduation. Junior and Senior ROTC students receive compensation equivalent to a fine scholarship. See "Military Science and Aerospace Studies." Professor Arnold Finchum, Room L236 Engineering Building, has been appointed faculty adviser to assist engineering students desiring to take ROTC to work out schedules.
150 College of Engineering

Scholarships, Fellowships and Assistantships. A number of scholarships and assistantships are available to Engineering College students, including Freshmen. Interested high school seniors are encouraged to write to the Dean regarding these. See also "Awards, Honors, Scholarships, and Grants-in-Aid." There are also opportunities for employment on research projects and other activities.

Graduate Assistantships and Fellowships. A number of excellent graduate assistantships, fellowships and scholarships are available in all departments giving graduate work. Assistantships are available both for teaching and research. Application should be made directly to the department concerned. See "Teaching and Research Assistantships."

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

Concord, Massachusetts, Radiance Laboratory. A branch of the USU Electrodynamics Laboratory is maintained at Concord, Massachusetts, under an arrangement with the Air Force Cambridge Research Center. This Laboratory is operated by staff members of the Department of Electrical Engineering and Engineering Experiment Station.

General Engineering

Students in the Agricultural, Civil, Electrical, Manufacturing, and Mechanical Engineering curriculums take the same courses during their Freshman and Sophomore years. Junior and Senior year courses of study are listed under the major departments.

Most of these courses are available every quarter including Summer.

General Engineering Courses


2. Slide Rule Instruction. Practice in the use of the Log-Log slide rule. Prerequisite or concurrently: Math 46. (1F, W, S)

3. Digital computer utilization for engineering students. Introduction to the use of digital computers in engineering problem solving and data processing utilizing assembly processor languages. Prerequisite: Math 35. (2F, W, S)

Common Freshman and Sophomore Curriculum for Engineering

FRESHMAN

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<td>Physics 20...</td>
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<td>Basic Communications, English</td>
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SOPHOMORE

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<td>Physics 21, 22, EE 71</td>
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<td>Humanities, Econ 51</td>
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<tr>
<td>Totals</td>
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<td>17</td>
</tr>
</tbody>
</table>

²Two credits are given for MS or AS.
Agricultural and Irrigation Engineering

Head: Professor A. Alvin Bishop
Office in Engineering C-213

Professors Jerald E. Christiansen, Irving S. Dunn, Joel Fletcher, Vaughn E. Hansen, Cleve H. Milligan, Dean F. Peterson, Dean, College of Engineering, Howard B. Peterson; Professor Emeritus Irving S. Dunn; Associate Professors Bruce H. Anderson, J. M. Bagley, Spencer H. Daines, Fred W. Kiefer, Richard E. Griffin, Water Use Extension Specialist, Wayne Ringer; Farm Buildings Extension Specialist; Assistant Professors Yu-Si Fok, Jack Keller; Research Assistant Frank W. Haws; Collaborators C.W. Lauritzen, Lyman S. Willardson; Research Engineers Earl Israelson, Gaylord V. Skogerboe.

Agricultural Engineering

Agricultural Engineering applies the art and science of engineering principles to the solution of agricultural problems. Basic knowledge from other fields of engineering is utilized in addition to the soil and water relationships of agricultural production under irrigation. The Agricultural Engineering curriculum at USU emphasizes irrigation and drainage and water supply and utilization. In addition the college of Agriculture offers courses in farm buildings, farm power and machinery, electrification and processing of agricultural products.

Academic work is supplemented by field trips, which are required as a part of the course work. These field trips provide, under faculty guidance, first-hand study of engineering projects in different stages of completion.

The four-year program listed here leads to the Bachelor of Science degree in Agricultural Engineering. A five-year program is available for students with inadequate background or those desiring to take Military Science, competitive athletics or part-time employment.

Because of the strong emphasis on irrigation, drainage, and water resources, the Agricultural and Irrigation Engineering program is closely integrated with Civil Engineering. Many faculty members serve on the staffs of both departments, and graduate programs are jointly planned to utilize the full resources of both.

Agricultural Engineering Curriculum

Freshman and Sophomore Years

Common to all Engineers
(see College of Engineering Introduction)

<table>
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<tr>
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Junior Year

Senior Year

Course | F | W | Sp |
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<td>AE 160, 145</td>
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<tr>
<td>Agron 56, 107, 155</td>
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<td>5</td>
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</tr>
</tbody>
</table>
Irrigation and Drainage Engineering

The scope of Irrigation Engineering extends from an understanding of the basic soil-plant-water relationships to the design and construction of control, conveyance, and distribution works with proper appreciation for the economic, administrative, and social problems involved in irrigation development. Present-day irrigation projects often require high dams, long tunnels, canals and pipelines, and pumping plants. Irrigation projects must be planned to serve other purposes as well. Overall water economy demands that the irrigation engineer give careful attention to efficiencies of conveyance, application, and consumption of available water supplies. Training in the science and art of Irrigation at Utah State University provides the breadth and depth necessary for proficiency in any or all of these aspects of Irrigation Engineering.

Close interdepartmental association with Soils and Meteorology, Civil Engineering, and Botany is achieved to strengthen the program of those wishing special emphasis in these aspects of Irrigation Engineering.

This department cooperates with the Department of Soils and Meteorology to offer a BS degree program with a major in Irrigation and Soils. This program is designed for the student whose interest is in the more applied areas of soil and water management. The course program includes many of the applied irrigation engineering courses as well as the more basic courses in mathematics, science, and soils. A complete outline of the program in Irrigation and Soils can be found within the Soils and Meteorology Department write-up.

Graduate Study

The MS and Doctor of Philosophy degrees are offered in Agricultural Engineering (Irrigation and Drainage and Water Resources fields), the Professional Engineering degree is offered in Irrigation and Drainage Engineering, and in collaboration with related departments the Doctor's degree is offered in Irrigation Science.

Curricula and research leading to an advanced degree either on the Master's degree or Doctor's degree level are supervised by a Graduate Committee appointed by the Dean of the School of Graduate Studies. Staff members of the major department and of closely related departments serve on these committees. All study and research programs must be approved by such a committee before admittance to candidacy for an advanced degree. The study and research program for a particular degree must also satisfy all of the requirements listed in this catalog under the School of Graduate Studies.

A diagnostic examination covering the undergraduate engineering subject matter will be given to all entering graduate students. The exam includes mathematics, fluid mechanics, and soil-water-plant relationships for those seeking an MS Degree in Agricultural or Irrigation Engineering. The exam includes mathematics and soil-water-plant relationships for those seeking an MS Degree in Irrigation Science.

A graduate major leading to the MS and PhD degrees is available in Hydrology and Water Resources. For more information concerning this major, see the material found in the section of this catalog for the Department of Civil Engineering.
Agricultural and Irrigation Engineering Courses

10. Irrigation Practice. Primarily for agricultural students. Principles and practices of efficient use of water, water measurement, farm surveying. Three lectures, one lab. (4Sp) Daines


110. Irrigation Principles. Primarily for upper division students in agriculture and colleges other than Engineering. Water measurement, conveyance and application, consumptive use of water and water requirements, pumping, drainage, and soil-water relationships. Prerequisite: Math 34. Two lectures, one lab. (3F) Keller

143. Irrigation Principles. For advanced engineering students. Soil, water, plant relationships; water requirements; efficiency of water use; flow of water in soil. Prerequisite: CE 162, or Math 98 and consent of instructor. Two lectures, one lab. (3F) Keller

145. Surface and Subsurface Drainage. The application of engineering principles to the design of surface and subsurface drainage facilities including open and covered drains, and drainage by pumping from wells. Soil properties, land reclamation, salinity problems and drain construction. Prerequisite: CE 142. Three lectures, one lab. (4Sp) Bishop

146. Water Conveyance and Control. Fluid and soil mechanics are applied to problems of water conveyance and control, including canals, flumes, transitions, pipe lines, diversions, drops and chutes, spillways, checks and headgates. Prerequisites: CE 142, 160; concurrently CE 106. Three lectures, one lab. (4Sp) Bishop

147. Sprinkler Irrigation Design. Design of sprinkler irrigation systems including: sprinkler head types, characteristics and design; pump and pumping plant characteristics and design; sprinkler system planning and layout; economic aspects of design and operation; system maintenance, operation and management. Prerequisites: Math 98 and approval of instructor, or AE 143. (3W) Keller

148. Design of Farm Irrigation Systems. Application of engineering principles to the planning and design of farm irrigation systems. Includes open ditch and pipe line distribution systems for application of water by surface methods. Prerequisites: AE 143 and CE 142. (3S) Bishop

149. Water Law and Institutions. Laws governing the acquisition, adjudication and administration of water rights, state water codes, interstate compacts, international agreements, federal water laws and legislation, irrigation institutions, conservancy districts, water pollution control districts, state and local organizations. Three lectures. (3W) Milligan

160. Water Management. Organization and administration of conservancy districts, metropolitan districts and other water distribution institutions. Distribution of water, financing for construction and operation, maintenance of canals, flumes, pipe lines, dams, regulating reservoirs, and other water facilities. Three lectures. (3W) Bishop, Milligan

230. Special Problems in Agricultural Engineering. Independent study of chosen problems in Agricultural Engineering. Students are expected to develop initiative in pursuing these problems. Standard, formal typewritten reports required. Credit arranged. (F, W, Sp) Staff

231. Irrigation Science. Advanced study in irrigation, including such topics as consumptive use of water, soil moisture, irrigation, erosion, infiltration, permeability, potential theory, well hydraulics, and other irrigation engineering principles and practices. (3F) Bishop, Milligan

232. Sprinkler Irrigation Engineering. Advanced study of sprinkler irrigation design problems such as economic selection of irrigation systems pumps and pumping plant analysis, water hammer and surge, uniformity of application, application rate and intensity, pipeline economics, screening and inlet devices, and special applications of sprinkler methods. (3W) Keller

233. Surface Irrigation Engineering. Advanced study of concepts utilized in surface irrigation design, such as: hydraulics of flow in furrows, hydraulics of flow in borders, uniformity of application, application efficiency, effects of irregular slopes, use of computers in land leveling calculations, water spreading, land reclamation, and waste disposal. Prerequisites: AE 148 and AE 231. (3Sp) Bishop, Milligan

245. Advanced Design of Drainage Systems. Measurements of field permeability, hydraulics of wells, pumping for drainage, leaching and reclamation of saline soils, etc. (3W) Bishop

298. Graduate Thesis. Credit arranged. (F, W, Sp) Staff
Civil Engineering consists of the economic application of the laws, forces, and materials of nature to the design, construction and operation of engineering works including bridges, buildings, highways, dams, water supply and sewerage systems.

The Department of Civil Engineering offers work leading to the Bachelor of Science, Master of Science, and Doctor of Philosophy degrees. The curriculum is accredited by the Engineering Council for Professional Development. The four-year program listed here leads to the Bachelor of Science degree in Civil Engineering. A five-year program is available for students with inadequate background or those desiring to take Military Science, competitive athletics or part-time employment.

Freshman and Sophomore Years Common to All Engineers

(see College of Engineering Introduction)

JUNIOR YEAR

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SENIOR YEAR

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<td>CE 131, 107, Humanities</td>
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</tbody>
</table>

Total ............... 18 17 17

Water Engineering

Never in the history of our country has there been more concern with water. Continuing and conflicting demands for water require that the engineer today be trained to handle highly complicated water situations.

USU has a long tradition of training and research in the varied and extensive aspects of water resource development and use. It has developed a well-balanced program, expanded and oriented to provide the training needed to cope with new demands for water resources.
with impending water problems of this country and of the world. Teaching and research staff and facilities are continually expanding. A new Engineering Building with modern and well-equipped laboratories was completed in 1960. A new 80,000 square foot Utah Water Research Laboratory was completed in 1965.

The broad scope of Water Resources Engineering is amply provided in a rich offering of “water” courses in the College of Engineering. Through interdisciplinary collaboration many excellent course offerings are available in other colleges. A long and continuing tradition of international collaboration in water resource work gives breadth and flavor to the overall program.

Hydraulic Engineering

Hydraulic Engineering at Utah State University encompasses the theory of fluid mechanics and its application in a variety of engineering fields. Fluid mechanics, based on universally valid theorems of energy and momentum, and recognizing no arbitrary boundaries between fields of engineering knowledge, forms a logical core for the Water Engineering program. Various specialties in Water Engineering draw heavily on the fundamentals of fluid mechanics in the solution of hydrology, irrigation, drainage, municipal water and sewerage, and other hydraulic design problems.

A good variety and balance of courses in theoretical fluid mechanics and hydraulic design are available at the upper division and graduate level.

Hydrology and Water Resources Engineering

Hydrology is a fundamental discipline which provides the underpinning for the orderly and unified solution of most water problems. This hydrologic foundation must be translated into policies, plans, and procedures for optimum development and utilization of the available water supply. Hydrologic considerations must be blended with a substantial body of other engineering, economic, legal, and social information in the formulation of comprehensive multipurpose plans. The problems encountered by the water resource engineer require ingenuity, imagination and skill in engineering applications.

Considerable flexibility in the arrangement of degree programs is permitted in this field. Those with particular interest in scientific or applied hydrology or in water resources administration, planning, and management may supplement the strong core of offerings in the Civil Engineering and Agricultural and Irrigation Engineering Departments by choosing from more than 130 approved courses in the departments of Mathematics, Applied Statistics and Computer Science, Economics, Political Science, Business Administration, Geology, Electrical Engineering, Soils and Meteorology, Botany, Sociology, Forest Science, Range Science, Wildlife Resources, and Bacteriology and Public Health.

Soil Mechanics Structures and Materials Engineering

Although Water Engineering is emphasized at Utah State, an outstanding staff enhances the offerings in structures, soil mechanics, highways, and materials of engineering. Productive research by staff and graduate students, particularly in materials of engineering, receive frequent recognition in international technical publications.
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Graduate Study

This Department offers the Master of Science degree in most Civil Engineering fields and the Doctor of Philosophy degree in Fluid Mechanics, Soil Mechanics, Water Resources, Hydrology, Hydraulics, and Structures.

Curricula and research leading to an advanced degree either on the Master's degree or Doctor's degree level are supervised by a Graduate Committee appointed by the Dean of the School of Graduate Studies. Staff members of the major department and of closely related departments serve on these committees. All study and research programs must be approved by such a committee before admittance to candidacy for the advanced degree. The study and research program for a particular degree must also satisfy all of the requirements listed in this catalog under the School of Graduate Studies.

A diagnostic examination covering the undergraduate engineering subject matter will be given to all entering graduate students. The exam includes mathematics, mechanics and strength of materials, fluid mechanics, soil mechanics, and structures. Depending on the candidates chosen field of study, three or four parts will be taken.

All courses with 200 number or over are reserved for graduate students. Undergraduate Senior students who have a high scholastic standing may register for them only with approval of the Department.

Civil Engineering Courses

65. Engineering Problems. How to approach the solution of an engineering problem. Application of mathematics to the solution of elementary engineering problems. Prerequisites: Math 110 or concurrently. One lecture and one lab. (2Sp) \textit{Staff}


84. Surveying. Theory of surveying. Terminology, computations, areas, volumes, field astronmony, and general surveying. Prerequisites: Math 35, 46. Two lectures, two labs. (3F) \textit{Thorpe}

85. Advanced Surveying. Problems in leveling, curves, spirals, stadia, plane table, and city surveying. Prerequisite: CE 84. One lecture and two labs. (3Sp) \textit{Daines}


103. Mechanics of Materials. Stress and strain, centric, torsional and flexural loading deflections, combined loading, columns, repeated and dynamic loadings, connections. Prerequisites: CE 91. Four lectures and one lab. (5F, W, Sp) \textit{Staff}

105. Elementary Structural Analysis. Analysis of stresses and deflections in statically indeterminant structures. Prerequisite: CE 103 or equivalent. Three lectures and one lab. (4W) \textit{Staff}

106. Elements of Structures. Principles and practices of reinforced concrete analysis and design. Prerequisite: CE 105 or equivalent. Three lectures and one lab. (4Sp) \textit{Staff}

107. Elements of Structures. Principles and practices of analysis and design of steel structures. Prerequisite: CE 105 or equivalent. Three lectures and one lab. (4W) \textit{Staff}

108. Structural Theory and Design. Design of Steel and Reinforced Concrete Structures. Prerequisite: CE 107 or equivalent. Three lectures and one lab. (4Sp) \textit{Staff}

120. Highway Engineering. Highway systems, planning, economy, finance, location, plans, rights of way, geometric design and roadside development. Prerequisite: CE 84 or 81, Senior standing or Instructor's consent. Three lectures. (3F). \textit{Cordon}


122. Introduction to Traffic Engineering. Street and highway traffic problems; principles of design and planning of thoroughfares based on operational characteristics; traffic control and regulation. Prerequisite: CE 120. Three lectures. (3Sp) \textit{Jones}
17. City Planning. Master plans, civic units, parks and playgrounds, utilities, housing, subdivisions, zoning, civic centers and airports. Prerequisite: CE 120. Two lectures, one lab. (3Sp). Staff


19. Construction Cost Estimating. Introduction to construction contracting, methods of preparing cost estimates, including an introduction to the Critical Path Method of planning and scheduling construction projects. Prerequisite: Instructor's consent. (3F) V. Christiansen, Jones

19. Indeterminate Structures. Deflections of structural elements, analysis and design of statically indeterminate beams, trusses, and frames. Prerequisite: CE 105. Three lectures, one lab. (4F) Staff

19. Indeterminate Structures. Advanced problems in the analysis of indeterminate structures. Prerequisite: CE 131. Three lectures. (3W) Staff

19. Fluid Mechanics and Hydraulics. Properties of fluids, the principles of hydrostatics, flow of ideal and real fluids, principles of similarity, flow of fluids in pipes and open channels, measurement of fluid flow and hydraulic principles underlying the design of turbines and pumps. Prerequisites: Math 110; concurrently, CE 3, CE 92. Fall, three lectures, Winter and Spring, two lectures and one lab. (37, 3W, 3Sp) Clyde, Flammer, Watters

19. Fluid Mechanics and Hydraulics. Preparatory course for graduate students majoring in fluid mechanics or irrigation who show inadequate preparation in this area. Subject matter of CE 140, 141, 142 will be covered. This course not accepted as graduate credit in fluid mechanics or irrigation engineering major. Four lectures. (4F) Watters

20. Applied Hydraulics and Pneumatics. Theory and practice in hydraulics and pneumatics as they apply to machine tools and controls. Prerequisite: CE 140. Two lectures, one lab. (3W) Keller

20. 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. Prerequisites: CE 103, 140. Two Lectures, one lab. (3F) Dunn, Kiefer

151. Soils Engineering. The application of engineering soil mechanics and of structural theory to design of foundations, dams, highways, and other engineering problems. Prerequisite: CE 150 or equivalent. Three lectures. (3W) Dunn, Kiefer

152. Foundation Analysis and Design. A study of the engineering properties of soils and their effect on the design of footings, pile foundations, cofferdams, caissons, mat foundations and retaining walls. (3Sp) Dunn

173. Hydrology and Meteorology. The hydrologic cycle, including weather elements and climate, precipitation, evaporation, transpiration, infiltration, ground water, and runoff; methods of collection of hydrologic data and their use in water supply and flood control studies. Prerequisite: CE 141, or instructor's consent. Three lectures, one lab. (4W) Staff

181. Photogrammetry. The science or art of utilizing photographs of the earth's surface for making surveys, maps, and land utilization studies. Planimetric maps, mosaic and restituted photographs, their construction and use. Prerequisites: ME 22, CE 81 or 84, or senior standing in Natural Resources, Geology, Landscape Architecture, Aeronautics, or Advanced Military Science. Two lectures, one lab. (3W) Thorpe

182. Route Surveying. Theory and practice in highway curves and earth work, including methods used in highway, street, canal, pipeline and general project surveys. One lecture, one lab. (2Sp) Staff

190. Engineering Economy. Applications of the mathematics of finance and computing techniques to the testing of alternative engineering proposals. Various methods of financing engineering construction. Prerequisites: Math 110, Economics 51, CS 1. Three lectures. (3F) Cordon


192. Aquatic Microbiology. See Bact. 192.

193. Municipal Water Supply and Waste Water Disposal. Introduction to municipal water supply and waste water disposal systems. Prerequisite: CE 142. Three lectures, one lab. (4F) Jones


197. Honors Studies. Advanced work for qualified students. Work is initiated by a
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 credits, arranged. (F, W, Sp) Staff

198. Senior Seminar. Discussion of engineering subjects. Provides opportunity for both oral and written expression. Talks by visiting engineers. Required of all Civil Engineering seniors. Two lectures. (1F, W, Sp) Dunn, Milligan

201, 202, 203. Advanced Structural Theory and Design. Advanced topics in structural theory including analysis of indeterminate frameworks, model analysis, individual problems in the design of modern structures. Prerequisite: CE 132. Three lectures. (3F, 3W, 3Sp) Rich

210. Earth and Rock-Fill Dams. Design of flexible type (earth or rock-fill) dams, utilizing naturally available materials. The theories of soil mechanics are used to check designs against criteria for structural stability and stability against seepage. Attention is given to foundations and construction details. Prerequisite: CE 150. (8W) Clyde, Milligan

211. Masonry Dams. Design of rigid type dams. Stress analysis and design of gravity, multiple arch, and deck types of masonry dams, timber, steel, and miscellaneous types. Prerequisite: CE 103. (3F) Clyde

212. Appurtenances to Dams and Operation of Reservoirs. Hydraulics and structural design of tunnels, gates, outlet channels, trash racks, etc. Operation of reservoirs for flood control and irrigation. Prerequisite: CE 142. (3Sp) Staff

215. Hydraulic Machinery. Analysis of impulse and reaction turbines, centrifugal and axial flow pumps; typical installations in hydroelectric and pumping plants. Prerequisite: CE 142. (3W) Watters

220. Asphalts and Asphalt Mixtures. The production, classification, physical and chemical properties, and uses of asphalts. Asphalt paving mixtures-properties, design, construction and performance. Prerequisite: Consent of the instructor. Three lectures. (3W) Jones

221. Principles of Pavement Design. Theories, principles and practices in the design of highway and airport pavements; including soil stabilization, base courses and bituminous and Portland-Cement concrete pavements. Prerequisite: CE 220. Three lectures. (3Sp) Jones, Cordon

222. Highway Planning and Economics. Economics of location and design, selection, improvement and maintenance, traffic control, administration and finance, and jurisdiction as applied to highways. Prerequisite: CE 120. Three lectures. (3F) Cordon

228. Advanced Concrete Engineering. Basic properties of concrete and concrete materials including the study of admixtures and pozzolans. Significance of tests and analysis of acceptance tests, performance tests, and control tests. Concrete as a construction material. Prerequisite: CE 128 or equivalent. (3W) Cordon

230. Special Problems in Civil Engineering. Independent study of a chosen problem under the direction of a member of the department staff. Students are expected to develop initiative in pursuing these problems. Formal type-written reports required. Credit arranged. (F, W, Sp) Staff

240. Advanced Fluid Mechanics Lab and Instrumentation. Experimental investigation of fluid flow phenomena. Design and development of modern laboratory equipment and instrumentation. Prerequisite: CE 142 or 143. (2 to 4F) Clyde


242. Open Channel Flow. Basic theory of uniform and varied flow in open channels and its application to the design of open channels and open channel control structures for both subcritical and supercritical flow. Prerequisite: CE 241. Three lectures, 1 lab. (4Sp) Flammer

243. Advanced Hydraulic Design. Design of pipe lines, special flumes, spillways, water control structures. Prerequisites: CE 142, AE 146. (3Sp) Staff

246. Porous Media Flow. Darcy's law and the velocity potential, stream function, flow nets, Dupuit flow, complex theory applied to seepage flow, approximate methods, analogs, seepage from canals, unsteady flow. Prerequisites: CE 141 or 153, Math 141. (3Sp) Chen

250. Advanced Soil Mechanics. Theories of seepage, capillarity, stress, consolidation, and stability are developed and applied to the practical design and construction of earth structures. Interpretation of laboratory tests is given special attention. Prerequisite: CE 150 or its equivalent. (3Sp) Dunn, Peterson

251. Advanced Soil Mechanics Laboratory. Advanced laboratory work in soil mechanics to be arranged with instructor. Prerequisites: CE 150 and 250 (may be taken concurrently). (1Sp) Dunn, Kiefer
Civil Engineering 159

255. Sediment Transport and Alluvial Channel Flow. Sedimentation problems, sediment transport, channel roughness and design of stable channels. Three lectures, 1 lab. (4F) Bishop

260. Dimensional Analysis and Similarity. The application of dimensional analysis and similarity to the solution of a variety of problems in engineering in the fields of fluid mechanics, structural analysis, vibration problems, electrical and other physical phenomena. Applications include design of experiments, interpretation of experimental data, development of equations, theory of models, and use of analogies. Prerequisite: Approval of instructor. (4F) Watkins, Flammer

262. Water Resources Engineering Systems. Relationship of development of water resources to development of other natural resources. Historical and present concepts in water development. Systems approach to development of water resources. Prerequisite: Consent of instructor. (8F) Milligan, Bagley

263. Water Resources Engineering Institutions. Current problems and policies with regard to water resource allocation and administration. Institutional factors, interstate and international compacts and commissions, federal valley authorities, coordinating mechanisms, state and federal role in water resource development. Prerequisite: Consent of instructor. (8W) Milligan, Bagley

264. Water Resources Engineering Planning. General principles and procedures of water resource planning within a regional, multipurpose context, considerations of project formulation, alternative plans, economic and financial analysis. Prerequisite: Consent of instructor. (8Sp) Milligan, Bagley

265. Directed Reading and Special Studies in Civil Engineering. Investigations into topics of special interest in fluid mechanics, hydrology, water resources, irrigation, structures, highways, soil mechanics or other Civil Engineering specialty. Appropriate direction by staff. Discussion periods are arranged. A final report or examination is required. Prerequisite: Consent of instructor. Credit arranged. (F, W, Sp) Staff

266. Hydrologic Methods. Application of mathematical, statistical and graphical techniques to the analysis of hydrologic and climatologic elements. Frequency analysis, spacial comparisons and correlations, extending records, harmonic analysis, curve fitting and smoothing computational aids (including multiple-graphical-coaxial techniques), polar graphs, monographs, electronics analog and digital devices. Prerequisite: CE 173. Three lectures. (3F) Fletcher

267. Flood Hydrology. Runoff process, hydrologic influences of climatic and physiographic features of watersheds, procedures of estimating runoff from rainfall and snowmelt, runoff hydrograph analyses, infiltration and loss rates, time of concentration and lag, unit hydrograph concepts, storage and flood routing, control methods. Prerequisite: CE 266. Three lectures. (3W) Bagley

268. Ground Water Hydrology. Ground water in hydrologic cycle; properties affecting storage and movements; field determination of transmissability and storage coefficient; ground water basin development and management; ground water inventory; safe yield concept; groundwater recharge and withdrawal; economic, legal and physical considerations; maintenance of groundwater quality; planned utilization and conjunctive use. Prerequisite: CE 173. Three lectures. (8Sp) Clyde


271. Advanced Fluid Mechanics. Linear and nonlinear theory of water waves, jets, selected topics from free surface hydrodynamics. Prerequisite: CE 270. (8W) Watters


280. 281. Theory of Plates and Shells. Analysis of stresses and deflections of various shaped plates and shells with applications to aircraft, roofs, tanks, and large pipelines. Prerequisites: CE 132 or equivalent and advanced engineering mathematics. (8W, 8Sp) Staff

293. Quality Control Problems of Sequential Water Use. Natural and man-made characteristics of water quality, effect of quality on water use planning, water quality requirements in stream pollution control, elements of physical, chemical and biological processes for treatment of water, sewage and industrial wastes. Prerequisite: Consent of Instructor. (3F) Jones


297. Industrial Wastewaters. The nature of important water using industrial processes is presented, along with the theory, design and application of appropriate unit treatment processes and operations for achieving water pollution control and abatement objectives. Prerequisite: CE 295. One lecture, one lab. (2Sp) Jones

298. Graduate Thesis. Credit arranged. (F W, Sp) Staff

299. Graduate Seminar. (1Sp) Staff
The Department of Electrical Engineering offers undergraduate and graduate training leading to the Bachelor of Science, Master of Science and Doctor of Philosophy degrees.

The curriculum is accredited by the Engineers' Council for Professional Development.

The four-year program listed here leads to the Bachelor of Science degree in Electrical Engineering. A five-year program is also available for students planning to participate in the advanced military program, in athletics, or in part time employment.

The curriculum provides a balanced program in the fundamental sciences and mathematics, engineering sciences, engineering design, humanities and communication skills. Laboratory work in small groups is an integrated part of most courses to provide physical confirmation of basic principles and experience with instruments, components and engineering techniques.

Satisfactory completion of the BS program qualifies the student for entrance into the electrical engineering field with professional status.

Electrical Engineering Curriculum

The Freshman and Sophomore common engineering curriculum is listed in the College of Engineering introduction.

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Graduate Study

The basic graduate program in Electrical Engineering includes circuits, waves, and fields, with supporting mathematics and physics.

¹Required for EE majors; optional for others.
²See College of Engineering section for humanities requirements.
Specialization is available in the fields of Antennas and Propagation, Servo-Mechanisms, Microwave Measurements, Transistor Circuitry and Semiconductor Physics, Communication Theory and Radiometry.

A possible course of study is listed below which will lead to the Master of Science degree. This is usually modified, depending on the student's preparation and objectives.

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Extended programs of study, in cooperation with the Departments of Physics, Mathematics, and Mechanical Engineering, may lead to the Doctor of Philosophy degree in Electrical Engineering. For further details on graduate study, refer to the USU Graduate Catalog.

Electrical Engineering Courses


105. Circuits and Machines. Generation, transmission, and utilization of electric power. Single and 3-phase power circuits. Magnetic circuits, transformers and protective equipment. Introduction to DC and AC machines. Prerequisite: EE 71 or equivalent. Three lectures. (3F) Embry

107. Electrical Machinery I. An introductory course covering the basic principles of electrical machinery; magnetic circuits; DC machines; AC power circuits, polyphase circuits, power transmission and distribution. Prerequisite: EE 71, 105. Three lectures, one lab. (4F) Embry

108. Electrical Machinery II. A continuation of EE 107, with special emphasis on AC machines. Transformers; single and polyphase systems and machines; control equipment. Prerequisite: EE 107. Three lectures, one lab. (4W) Embry

110. Transmission Lines. Basic transmission line theory. High frequency lines, matching stubs and sections. Wave guides and special lines. Prerequisites: EE 111, 139. Three lectures, one lab. (4W) Harris

111. Network Analysis I. Basic network conventions and topology; formulation of network equations; solutions via differential equation, LaPlace transform and operational methods. Prerequisite: EE 71 and Math 110. Three lectures. (3W) Cole

112. Network Analysis II. A continuation of EE 111; impedance and admittance functions; network functions, driving point and transfer immittances; steady state analysis from pole-zero configurations; amplifier networks. Prerequisite: EE 111. Three lectures. (3Sp) Cole

120. Antennas. Fundamentals of antennas, radiation and wave propagation; directional arrays; feed lines and matching and phasing networks; antenna and field strength measurements. Prerequisites: EE 110, 139. Three lectures, one lab. (4Sp) Clark

123. Electronics Laboratory. A laboratory course to accompany EE 124. Required of all EE majors; optional for others. Prerequisite: Concurrent enrollment in EE 124. (1F, W, Sp) Chadwick


125. Electronic Circuits. Principles, analysis and design of tube and transistor voltage amplifiers; feedback principles and feedback amplifiers. Prerequisite: EE 124. Three lectures one lab. (4Sp) Finchum

129. Electroacoustics. Fundamentals of architectural acoustics: Theory and principles of electro-mechanical transducers, including loud speakers, microphones and vibration pickups; recording methods and equipment; measurement techniques in acoustic and electro-mechanical systems. Prerequisites: EE 111, 125. Three lectures, one lab. (4F) Cole

139. Fundamentals of Electromagnetic Waves. Introduction to static electric and magnetic fields; Maxwell's equations; wave equation with emphasis on the plane wave solution. Applications to high frequency lines and wavequides. Prerequisites: Math 110 and EE 71. Three lectures. (3F) Baker
114. Microwave Generators. Microwave generators and microwave measurements; cavity resonators; radiators; applications of ferrite and semiconductor materials to microwave systems for isolation; parametric amplification, detection, and frequency multiplication. Prerequisites: EE 110, 119. Three lectures, one lab. (4Sp)

131. EE Project Laboratory. For seniors only. Individual engineering assignments involving design, development, construction and testing of various types and units of electronic and communications equipment. A formal engineering report is required of each project. Two labs. (2F, 2W, 2Sp, 2Su)


165. Analog Computers. Application of analog methods to the solution of engineering problems; principles of integrators, multipliers, function generators; time and amplitude scale factors. Prerequisite: Math 110. Two lectures, one Lab. (3F, W)

175, 176, 177. Electrical Engineering Seminar. A weekly meeting of staff and senior EE majors. Reports and discussions on recent developments in electronics and communications. Each student prepares and presents technical papers on suitable topics. (1F, 1W, 1Sp)

178. Switching Circuits. Number systems (decimal, binary, octal, etc.) Boolean algebra (postulates, theorems, applications to switching design, etc.) Logic circuit blocks (AND, OR, NAND, NOR, etc.) Logic design of switching networks; simplification methods (tabular, map, etc.) Prerequisite: Upper division standing. Three lectures. (3F, W)


185. Introduction to Semiconductor Device Theory. Basic principles of semiconductor theory; semiconducting materials; p-n junction theory, survey of new devices. Prerequisite: Modern Physics. (3F, Sp)

197. Honors Studies. Advanced work for qualified students. Work is initiated by a 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 the instructor and approval of the College of Engineering Honors Committee. This course may be repeated. 1-3 credits, arranged. (F, W, Sp)

200. Special Studies in Electrical Engineering. Preparation of professional papers and reports, research, and special problems. Credit arranged. (F W, Sp)

211. Amplifier Circuit Theory. Gain and stability analysis of tuned transistor amplifiers; design of filter amplifiers using feedback techniques; low noise amplification. Prerequisite: EE 180. (4W)

212. High-speed Switching Devices and Circuits. Semiconductor device transient analysis, the relationship of circuit switching properties to device physics. Prerequisites: EE 185, EE 245. (4Su)


231, 232, 233. Electromagnetic Fields and Waves. Advanced static and dynamic electric, current, and magnetic field theory; Maxwell's equations: wave equations; solution of electromagnetic field and wave problems in coordinates appropriate to various wave structures; nonclassical electrodynamics. Prerequisite: EE 139 or Physics 175. Three lectures. (3F, 3W, 3Sp)

235. Introduction to Radio Wave Propagation. Radio wave transmission through dielectric and ionized mediums. Calculation of effects of
reflection and absorption of radio waves from the earth's ionosphere with practical problems encountered in long distance communication. Introduction to magnetotonic theory. Prerequisites: EE 139 or equivalent. (3Su) Clark


237. Magnetospheric Studies. Electromagnetic wave propagation in dispersive anisotropic media with applications to the earth's ionosphere and magnetosphere. Three lectures. (3W, 3Sp)

238. Selected Reading in Radio Science. Lecture arranged. (2 arr) Clark

239. Selected Reading in Radio Science. Lecture arranged. (2 arr) Clark

240. Microwave Measurements. Theory and practice in measurement of impedance, power, frequency and wave length at frequencies above 500 mc. Oscillators and detectors will be studied along with the characteristics of certain types of transmission lines and associated equipment in the microwave region. Prerequisites: EE 139, 141 or equivalent. One lecture, one lab. (2Su) Clark

242, 243. Applied Plasma Dynamics. Characteristics of the plasma-state; velocity distribution functions; Boltzmann Equation; Plasma kinetic theory, collisions, diffusion, mobility and transport theory; orbit theory; interaction of plasmas and electromagnetic waves; plasma oscillations and instabilities; plasma generation; Hydromagnetic waves. (3F, 3W) Harris

245. Transistors and Integrated Circuits. Transistor theory, transistor characteristics, and fabrication techniques used in integrated circuits. (3Sp) Jones


261. Space Science and Engineering. A survey course covering aerospace environment; orbital mechanics; vehicles and propulsion systems; instrumentation and communication systems; power sources; satellites; space exploration. Prerequisites: Physics 22, Math 99. (2W) Barlow

265. Particle Interactions. Collision phenomena in ionized gases; elastic scattering in central force field; scattering cross sections; ionization, excitation, and charge transfer by electron and ion impact; photoabsorption; negative ions; mobility and diffusion of electrons and ions; electronic energy distributions and drift velocities; recombination; surface phenomena; plasmas. Three lectures. (3F) Brown

275, 276, 277. Graduate EE Seminar. A weekly meeting of staff and graduate EE students. Each student prepares and presents technical papers on suitable topics. One lecture. (1F, 1W, 1Sp) Staff

278. Seminar in Radio Science. One lecture (1 arr) Clark

281. Radiometry. Principles of thermal emission, transmission and detection of radiant energy; detection and measurement systems. Prerequisites: Physics 22, Math 99, and EE 126. Three lectures. (3Sp) Wyatt


298. Graduate Thesis. Credit arranged. (F, W, Sp) Staff

The Department of Industrial and Technical Education offers undergraduate training and education leading to the Bachelor of Science degree in Industrial Teacher Education and Industrial Technology. The Department also offers a two-year program leading to a Certificate of Completion in Technical Education.

Facilities of the Department include buildings designed and built to fit the specific needs of curricula taught. The laboratories contain modern and up-to-date equipment for instructional use.

A graduate program is offered by the Department for industrial educators who plan to take advanced work beyond the Bachelor's Degree. The graduate program includes two types of Master's Degrees, which are Master of Science in Industrial Education and the Master of Industrial Education. The Doctor of Education Degree in Industrial Education is offered jointly with the College of Education.

Industrial Teacher Education

The Industrial Teacher Education Curriculum provides professional training for instructors, supervisors, and administrators preparing for Industrial Education positions. Courses included in the Industrial Teacher Education Curriculum are offered during the regular school year and summer quarter, both on and off-campus.

The completion of Industrial Teacher Education curriculum leads to the degree of Bachelor of Science in Industrial Teacher Education with majors in Industrial Arts Education, Trade and Industrial Education, or Technical Education.

Industrial Teacher Education Curriculum

Industrial Arts Teacher Education. A Bachelor's degree in Industrial Teacher Education with a major in Industrial Arts Teacher Education prepares one to teach in junior and senior high school positions. The curriculum is designed to meet State Certification requirements. Courses emphasize laboratory skills and technical knowledges included in basic American industries. The curriculum also includes courses in the arts, sciences, education, and professional Industrial
Education. The Industrial Teacher Education curriculum with a major in Industrial Arts Teacher Education is as follows:

### Industrial Arts Education Major

#### FRESHMAN YEAR

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#### SOPHOMORE YEAR

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#### JUNIOR YEAR

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#### SENIOR YEAR

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### Trade and Industrial Education Major

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Technical Teacher Education. A Bachelor's degree in Industrial Teacher Education with a major in Technical Teacher Education prepares one to teach in high school and post high school technical programs. A candidate for the degree must show evidence of successful occupational experience in the specific technical area in which he is preparing to teach. As part of the degree requirement, a student must meet the occupational experience requirement as stated in the State Plan of the State Board for Vocational Education. The curriculum is designed to meet State Certification requirements. The Industrial Teacher Education Curriculum with a major in Technical Teacher Education is as follows:

Technical Education Major

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SOPHOMORE YEAR

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Industrial Technology

Programs in Industrial Technology provide university training for high level industrial technicians for technical, supervisory, and managerial positions in industry. Excellent foundation is provided for entrance into Civil Service positions and for private business and industry.

The completion of the Four-Year Industrial Technology curriculum leads to a Bachelor's degree in Industrial Technology with majors in Aeronautics, Automotive and Diesel, or Welding.

Industrial Technology Curriculum

Aeronautics Technology. A Bachelor's degree in Industrial Technology with a major in Aeronautics prepares one to enter the Aerospace industry as a high level technician and to assume responsible supervisory and administrative positions in maintenance management, transportation research, and design; and the missile industry. The Aeronautics Technology curriculum is fully certified with Air Agency, complying with Federal Aviation Agency regulations.

Students desiring to enter industry in technical maintenance fields should successfully accomplish the written and practical FAA examinations of the Air Frame and Power Plant rating. The Four-year Industrial Technology curriculum with a major in Aeronautics is as follows:

Aeronautics Major

FRESHMAN YEAR

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Econ 51, ITE 51 ......................................... 5 3  
ITE 1, 48 .................................................. 1 3  
AS, MS, or PE ........................................... 1 1 1  

Total.................................................. 19 18 18

**SOPHOMORE YEAR**

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Total.................................................. 17 19 16

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Total.................................................. 18 16 17

**Automotive and Diesel Technology.** A Bachelor’s degree in Industrial Technology with a major in Automotive and Diesel prepares one to enter industrial positions which are directly or indirectly related to Automotive and Diesel, and to assume responsible supervisory and administrative positions in such industries.

A successful graduate of this program will be a well qualified high-level technician capable of interpreting the designs of engineers and directing the work of skilled craftsmen. The Four-year Industrial Technology Curriculum with a major in Automotive and Diesel is as follows:

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Total.................................................. 16 16 16

**Welding Technology.** A Bachelor’s degree in Industrial Technology with a major in Welding prepares one to enter industry in which highly technical welding skills and knowledge are required.

A successful graduate of this program will be a well qualified high level technician in all phases of Welding Technology. The Four-year Industrial Technology curriculum with a major in Welding is as follows:
## Welding Major

### FRESHMAN YEAR

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### SENIOR YEAR

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Total: 18 18 18

## Two-Year Technical Education

Programs in Technical Education provide university training of a non-degree nature. It is designed to prepare persons to enter into modern industry as technicians.

The completion of the Two-year Technical Education curriculum leads to a Certificate of Completion in one of the following areas of specialization: Aeronautics, Automotive, Diesel, Drafting, and Welding. Qualified students may apply most of the credits earned under this program toward a degree at a later date.

Students interested in this program should contact the Industrial and Technical Education Department Head.

## Minors Administered by the Department

**Driver Education.** The Driver Education minor is administered and approved by the Industrial and Technical Education Department. The minor is designed to meet State Driver Education Certification requirements.

A minimum of twelve quarter hours are required in the area of Driver and Safety Education. Also a minimum of six quarter hours are required in related safety work. An approved minor consists of twenty-four quarter hours. Check with Department advisers for approved courses.

**Industrial Arts Education.** The Industrial Arts Education minor may be taken only by persons who have majors outside of the Department of Industrial and Technical Education and are planning to teach in small schools in Industrial Arts programs for less than half of a teaching load.

A Department approved minor consists of a minimum of twenty-seven quarter hours. Check with the Department advisers for approved courses.

## Graduate Study

Two types of Master's degree programs are available to students doing graduate work in the Department of Industrial and Technical Education. These programs are the Master of Science Degree in Industrial Education and the Master of Industrial Education Degree.

The Doctor of Education degree in Industrial Education is available to those students who desire to do
advanced work beyond the Master's Degree. This degree program is designed for professional instructors in the field of Industrial Arts, Technical, and Trade and Industrial Education. The Doctor of Education degree in Industrial Education is an interdisciplinary degree program administered jointly by the College of Education and the College of Engineering.

The degree programs are sufficiently flexible to meet the needs of individuals engaged in the various phases of Industrial Education work. Candidates are given assistance in planning a program which will provide them with technical and professional development considered essential. For information on the programs for these degrees, see the Graduate School Catalog.

Industrial and Technical Education Courses

General Courses

1. Orientation. The study of the various occupational opportunities in Industrial and Technical Education, including the necessary preparation for entrance into these occupations. (1F, W) Staff

2. Applied Shop Mathematics. Simple mathematical formulas are used in solving problems in mechanical work. These include speed ratios, steel square, micrometer reading, and area and volume problems (3F, 8p) Mortimer

3. Building Maintenance. Discussion of materials used in maintaining modern school buildings and their proper use. Required of all persons doing part-time custodial work on campus. Two lectures, lab arranged. (3F, W, 8p) Wadsworth

90. Industrial Crafts. Basic craft materials, processes and applications in educational and recreational programs. (3W) Hailes

91. Industrial Crafts-Metal. Principles and practices of industrial crafts that pertain to the metal area. Design and production of functional metal objects as well as fundamental of lapidary processes will be stressed. (3W, Su) Hailes

92. Technical Plastics. Use and performance requirements of plastic products. Production, techniques, optimum uses, maintenance, shapes, colors, strengths, and design. (3F) Hailes

93. Technical Plastics. The techniques, rules and standards for the use of plastic materials in construction. Selection of materials, setting up production (dyes and molds) methods of fabrication, surface finishing, and tooling. (3Sp) Hailes

94. Graphic Arts Technology Fundamentals of letterpress printing, intaglio printing, lithography, screen process printing, binding and finishing operations. (3Sp) Staff

Aeronautics Courses

5. 5a. Composite Aircraft Structure. Theory of flight, design, construction, repair, and maintenance of aircraft structures. Textile skins, protective finishes, primary aircraft wood structures in accordance with Air Federal Regulations. (3 and 3F) Merrill

6. 6a. All-metal Aircraft Structures. Design, construction, repair, and maintenance of all-metal aircraft, including layout, template and flat plate development, bend allowance, hand forming, riveting procedure, alignment and jiggng, power press and power shear operation, heat treatment, corrosion prevention, and pertinent Federal Air Regulations. (3 and 3W) Merrill

7. 7a. Aircraft Maintenance. The maintenance, repair, and alteration of modern aircraft including primary and secondary structures, and the various systems and appliances. Rigging, assembly, and general servicing is included. Pertinent Federal Aviation Regulations are studied. (3 and 3Sp) Merrill

8. 8a. Aircraft Powerplants. Introduction, operation, maintenance and repair of modern air cooled aircraft engines, including design, disassembly and reassembly procedures, special tools and their application to power sections, accessory sections, supercharger sections. Basic related material includes a study of specifications and tolerances, horsepower curves, BMEP, BHP, design factors, inspection methods, materials and processes, volumetric efficiency, compression ratios, oil and lubrication systems, and pertinent Civil Air Regulations. Five lectures, five labs. (4 and 4F) Hill

9. 9a. Aircraft Powerplant Accessories. Operation, repair and maintenance of modern aircraft engine accessories, including design, fuel systems, carburetion and carburetors, fuel, injection systems, magneto, Generators, and voltage control systems, batteries and starters, and fuel pumps. Application and compliance with pertinent Civil Air Regulations. Basic related material includes combustion and combustible mixtures, electricity and magne-
tism, induction systems and superchargers, fuels and lubricants. Five lectures, five labs. (4 and 4W) Hill

10. 10a. Aircraft Powerplant Maintenance. Training in alteration, maintenance and operation of aircraft powerplants, including periodic inspections, servicing, diagnosis of engine malfunctioning, and engine installation. Theory of operation and design characteristics of controllable, constant speed, hydromatic, electric and reversible propellers. Overhaul and maintenance of propellers. Pertinent Civil Air regulations. Five lectures, five labs. (4 and 4Sp) Hill

11. Civil Air Regulations, Radio and Airway Procedures. Rules and regulations pertaining to operation of aircraft, radio, and airway procedures. Open to all students. (2F, W, Sp) Staff


105. Aircraft Materials. Analysis of materials as applied to aircraft. Emphasis on investigation and development of methods involving design criteria. (2W) Staff


107. Flight Engineering. Principles underlying relationships between altitude, power output, airplane performance, and the use of engine power curves, take-off and climb charts, cruising charts and flight logs. Three lectures, one lab. (4F) Summers

108. Advanced Turbo-Jet Propulsion and Gas Turbines. Extension of fundamental theory, axial and centrifugal flow compressors, gas turbines, jet propulsion, turbo-prop engines. Two lectures, one lab. (3W) Summers

109. Elementary Aircraft Design. Basic constructional concepts relating to aircraft design. (3F) Summers


111. Airline Maintenance and Fixed Base Operations. Administrative problems of airline and airport management; unit organization; personnel problems; relationships with Civil Aeronautics Adm.; interline agreements, promotion and publicity. (3Sp) Staff

112. Aeronautics Seminar. Current topics in production methods, cost, design, supply and organization of interest to aeronautical technicians. (2F, W, Sp) Staff

113. Airport Planning. The airport and the community airway and airport traffic control. Airport types, fundamental requirements, planning and construction. Lighting, building and hangar design. Special problems and miscellaneous facilities. (3Sp) Staff

114. Aircraft Electrical Systems and Equipment. The more complex electrical systems used in larger aircraft. Prerequisite: ITE 10, 71. Three lectures, one lab. (4Sp) Staff


117. Aerospace Vehicle Weight Analysis. A study of the control of weight and balance of flight vehicles in their empty and loaded weight conditions, and the relationship of the center of balance to the flight characteristics of the airfoil. (3F) Merrill

118. Aircraft Hydraulics and Servos. Basic principles related to fluid power transmission, covering a wide range of industrial and aerospace applications including servo mechanisms. Course is open to all majors in the ITE Department. (3W) Merrill

119. Airworthiness Procedures. A study of airworthiness standards in the manufacture of new aircraft and the in-service airworthiness standards prescribed by the manufacturers and the Federal Aviation Agency. (3Sp.) Merrill

Automotive Courses

20. Driver Education. How to drive an automobile correctly and safely. Traffic rules and regulations essential to sound driving; physical qualifications and tests of drivers; and actual supervised training in dual-control cars. Two lectures, lab arranged. (F, Sp, Su) Willey

21. Heavy Duty Chassis. Steering devices, suspension systems, brakes, frames, and alignment factors on trucks and tractors. (5Sp) Staff

22. Automotive Diesel Engines. Four-stroke cycle and two-stroke cycle Diesel engines used in trucks and tractors. (4W) Wright

23. Heavy-duty Drives. Power transmission units used on trucks and tractors. (5F) Staff

Slaugh

25. Auto Electrics. Ignition, batteries, generating systems, and cranking motors. (4F)

Slaugh

26. Motor Tune-up. Trouble diagnosis and testing procedures. Covers horns, lighting systems, and other electrical units along with engines and carburetion units. Prerequisites: ITE 24, 25. (4Sp)

Slaugh

27. Steering Correction. Brakes, steering mechanisms, suspension systems, frames, balance, and alignment. (4F)

Willey

28. Automotive Engines. Covers modern automobile engines, including cooling and lubrication. (4W)

Willey

29. Driving Mechanisms. Clutches, transmissions, U-joints, drive lines, and rear axle assemblies. (4Sp)

Wright

30. Automotive Chassis. A general course on brakes and steering units. Open to any student who wishes to learn minor service procedures (3F)

Staff

31. Automobile and Farm Power Plants. Provides actual experience in many of the service operations on the engine and its accessories. Includes spark-ignition and diesel engines. (3Sp)

Staff

32. Automobile and Farm Engine Electricity. Stress service and repair procedures within the reach of the average driver. Covers battery and magneto ignition and includes the major electrical systems. (3Sp)

Staff

33. Auto Mechanics for the Driver. For teachers of driver education and others interested in economical and prudent operation of the automobile. Includes: how the automobile runs; preventive maintenance, safety inspection requirements, exterior and interior finishes and their care, fuels, lubricants, tires, accessories, liability, insurance, driving economy, and car purchasing judgment. (3W)

Wright

34. Fender Reconditioning. Modern processes of straightening and priming fenders. (6F)

Willey

36. Body Reconditioning. Complete body rebuilding procedures. Prerequisite: ITE 35. (5W)

Willey

37. Body and Fender Repair. Covers basic fender and body repair processes for insurance adjusters and those who desire to do their own work. (3W)

Willey

38. Power Mechanics. A study of the development and utilization of power sources such as natural power, external combustion converters, electrical converters, fluid power, and technical power transfer devices. Designed especially for teachers of the industrial arts. Two lectures and one lab. (3F)

Wright

39. Power Mechanics. Covers concepts of various internal combustion engines such as their function; methods of converting energy; utilization; and power distribution, control, output, and measurement. Opportunity is provided for planning, developing, and organizing materials and projects for use in teaching power mechanics in the secondary school system. Two lectures and one lab. Prerequisite: ITE 38 (3Sp)

Wright

121. Frame, Suspension, and Steering Systems. An advanced course in steering geometry and steering problems. Power brakes and power steering devices are included. Prerequisites: ITE 27, Math 34, 44. (3F)

Wright

122. Internal Combustion Engines. Manufacturing and design characteristics of different engines. Attention is given to precision reconditioning of cylinders, crankshafts, and other engine units. Balance and force problems are included. Prerequisites: ITE 28, Math 44. (3W)

Willey

123. Automatic Transmissions. Includes modern automatic transmissions and torque converters, electric clutches, and hydraulic systems. Prerequisite: ITE 29. (3Sp)

Wright

124. Fuel Injection Systems. Various types of Diesel and gasoline injection systems are included. Modern testing equipment is used. Prerequisite ITE 22. (3W)

Wright

125. Carburetion. Combustion processes, heat cycles, and fuel characteristics are studied in connection with internal combustion engine carburetion problems. Prerequisites: ITE 24, Math 36. (3F)

Slaugh

126. Motors, Generators, and Magneto. An advanced course covering technical phases of these units. Laws of Physics are applied. Prerequisites: ITE 25 and preferably Physics 19. (3W)

Slaugh

127. Metal Refinishing. Principles and practices in metal preparation and refining processes are discussed. Lacquer, enamel, novelty finishes, and special protective applications are included. Attention is given to paint mixing and color balance problems. Prerequisite: Physics 19 or equivalent work on light and color. (3Sp)

Willey

128. Engine Testing Procedures. A study of engine testing and analysis procedures in determining the performance of the internal combustion engine. Provides actual experience in working with many of the scientific instruments used in engine testing. (3W)

Wright
To acquaint prospective teachers and others with available instructional materials, techniques, procedures and problems related to a driver education course. (3F, Sp, Su) Willey

Teaching Driver and Safety Education. A practical application of classroom and behind-the-wheel teaching techniques in driver education. Consideration is given to nationally recognized methods of demonstration. (3F, Sp, Su) Willey

Problems in Driver and Safety Education. Formerly IE 114. For teachers, school administrators, and others responsible for directing or supervising safe driving programs in the school or community. The course includes traffic and liability law, insurance, stimulants and depressants, public relations, safety research, and applied psychology. (3W, Su) Slaughter

Drafting Courses

Technical Drawing. Lettering, use of instruments, geometric construction, sketching, multiview drawings, dimensioning theory and practice, sectional views, and auxiliary views. 1 lecture, 2 labs. (3F, W) Wallis

Technical Drawing. Screw threads and threaded fasteners, keys, working drawings and specifications, intersections, developments, and pictorials. 1 lecture and 2 labs. (3W, Sp) Wallis

Technical Drawing. View relationship, spatial visualization, and problems relating to points, lines, and planes. 1 lecture, 2 labs. (3Sp) Wallis

Industrial Design. Principles involved in industrial design. Analysis, creation, and development of functional design in terms of tools, processes, forms, and materials of industry. (3F, Sp) Wallis

Aircraft Drawing. Aircraft drafting techniques, numbering systems, change methods, and technical specifications. Prerequisite: ITE 82. One lecture, two labs. (3Sp) Staff

Architectural Drafting and Specifications. Fundamentals of architectural drafting; plans, details, conventions, specifications; units of structure and their representation. Prerequisite: ITE 82 (3F) Staff

Machine Drafting. Drafting techniques, symbols, conventions used in the representation of gears, cams, jigs, and fixtures. Prerequisite: ITE 82 (3W) Staff

Technical Illustration. Methods of converting orthographic drawings into three-dimensional drawings. Shading, inking, and air-brush techniques are introduced. Prerequisite: ITE 82 (3Sp) Staff

Production Drawings. Advanced techniques of production drawings; detail, assembly, production dimensions, tolerances, position tolerances, classes of fits, surface quality, and specifications. Prerequisite ITE 82 (3Sp, Su) Staff

Electricity-Electronics Course

Direct Current Electricity. Fundamentals of direct current electricity. Includes a study of the basic concepts, circuits, laws, measurements, and electrical energy sources as they relate to DC electricity. Practical applications are given in laboratory exercises. Prerequisite: Math 34 or equivalent. (3F, W, Sp) France

Alternating Current Electricity. Fundamentals of alternating current electricity. Includes a study of the basic concepts, circuits, laws, measurements and electrical energy sources as they relate to AC electricity. Practical applications are given in laboratory exercises. Prerequisite: ITE 71, Math 44. (3W) France

Vacuum Tubes and Semiconductors. Fundamentals of vacuum tubes and semiconductors. Includes a study of the basic concepts, characteristics, parameters, specifications and applications of vacuum tubes and semiconductors. Practical analysis is accomplished through laboratory exercises. Prerequisite: ITE 72. (3Sp) France

Practical Electric Wiring. Includes a study of basic circuits, materials, inspection procedures, electrical codes and practices related to the installation of electrical wiring in the home and small public buildings. Practical application will be centered around the actual wiring of a mock-up home. Two lectures, one lab. (3W) France

Basic Electronic Circuits. An introduction to and analysis of the basic electronic circuits commonly found in a wide variety of electronic devices. The concepts of power supplies, oscillators, amplifiers, and other basic circuits will be studied as they may relate to such devices. Practical analysis is accomplished through laboratory exercises. Prerequisite: ITE 73 (3W) France

Electronic Circuits and Systems for Radio. A study of the fundamentals of radio communication and of the concepts of electronic circuits and systems employed in the modern radio receiver. Practical application will be centered around the construction, and testing of a radio receiver. The principles of radio transmission and transmitters will also be introduced. Prerequisite: ITE 73 (3W) France
Welding Courses

40. Fundamentals of Welding. A basic service course designed to acquaint the student with the more common welding processes for metals joining. Units include fusion welding of mild steel sheet and plate with the oxyacetylene and arc processes, brazing of ferrous and non-ferrous metals, silver soldering and oxyacetylene cutting. Two lectures, two two-hour labs. (3F, Sp) Palmer

41. Oxy-Acetylene Welding. Principles and practices of oxy-acetylene welding in the flat and horizontal positions on mild steel plate. Mechanical and physical properties of ferrous metals, basic joint design and flame cutting procedures. (3F) McCormick


44. Electric Arc Welding. A basic course providing the principles and practices in the latest types of electric arc welding equipment. Emphasizes safety measures and methods used in the welding of mild steel in the flat position. (3F) McCormick

45. Electric Arc Welding. Presents the principles and practices of electric arc welding on mild steel in the horizontal and vertical positions. Emphasis on various processes using the principle of the electric arc. Prerequisite: ITE 44. (3W) McCormick

46. Electric Arc Welding. Designed to present the principles and practices of electric arc welding on mild steel in the overhead position. Technical information on the various metals used in industry today. Prerequisite: ITE 46 (3W) McCormick

47. Acetylene Welding. Principles and practices in fundamentals of oxyacetylene welding and cutting. A general service course open to all university students. Two lectures, two two-hour labs. (3F, W, Sp) Staff

48. Aero Welding. A basic course providing an introduction to the fundamental principles of oxyacetylene welding and cutting as it applies to aircraft production and repair as set forth by Civil Air Regulations. Two lectures, two two-hour labs. (3W) Staff

49. Electric Arc Welding. The basic course providing for principles and practices in the latest types of electric arc welding equipment. Emphasizes safety measures and methods used in the welding of mild steel in the flat position. A general service course open to all university students. (3F, W, Sp) Staff

175. Industrial Electronics. An introduction to and study of the concepts of electronic devices and circuits used in industrial applications for measurement and control purposes. Practical application will be accomplished through laboratory exercises. Prerequisite: ITE 73 (3Sp) France

Metals Courses


51. Machine Shop Operations. A fundamental course covering the design, function, care, setup and operation of the basic machine shop equipment. Emphasis on the theory and skill in layout, drilling, tapping, turning, threading, shaping, tool grinding, and precision measuring. Prerequisite: ITE 50. (3W, Sp) Palmer

52. Machine Tool Maintenance. Construction, operating principles and maintenance problems of machines used is the school shop. Grinding the various machine cutting tools, repair and development of various tools and equipment that are used in the school shops. Prerequisite ITE 51. (3F) Palmer

53. Foundry Principles and Practices. Principles and practices of basic foundry work. Castings are made using common non-ferrous metals, such as aluminum, copper, brass, and bronze. Two three-hour labs. (2F) Palmer

54. Machine Tool Operations. Practice in the operations on Engine lathe, Milling machine, contour band saw and shaper. Emphasis is placed on design of cutters, feeds, and speeds, and holding devices as used in school shops. Prerequisite ITE 51. (3Sp) Palmer


Welding Courses
Welding Design and Inspection Methods. Principles and processes involved in the design and inspection of welded structure. Laboratory work consists of making design drawings of assigned mechanical objects and running inspection test on sample welds to prove the useability of the designed weld joints. Prerequisite: ITE 141. (3W) Staff

143. Advanced Welding Processes. Designed to acquaint students with the principles and processes involved in the various inert gas welding methods. Laboratory practice includes work with the various inert gas welding machines. Prerequisite: ITE 142. (3 Sp) Staff

144. Welding Metallurgy-Ferrous. A detailed analysis of different heat effects and treatments of ferrous metals. Laboratory exercises include polishing and etching of metal specimens and microscopic study of their internal structures. Prerequisite: A basic welding course. (3F) Staff

144-A. Welding Metallurgy—Non-Ferrous. A detailed analysis of different heat effects and treatments of non-ferrous metals. Laboratory exercises include the polishing and etching of metal specimens and microscopic study of their internal structures. Prerequisite: ITE 144. (3W) Staff

145. Resistance Welding. Designed for detailed study of the principles involved in resistance welding. Laboratory practice includes the making of resistance welds, and the inspection of them by physical and microscopic tests. Prerequisite: 144 and 144-A. (3 Sp) Staff

146. Weldability of Ferrous Metals. Designed for detailed study of the weldability of ferrous metals in terms of the metallurgy involved. Laboratory work consists of making sample welds and the inspection and testing of these welds by various methods. Prerequisite ITE 144. (3W) Staff

146-A. Weldability of Non-Ferrous Metals. Designed for detailed study of the weldability of non-ferrous metals in terms of the metallurgy involved. Laboratory work consists of making sample welds and the inspection and testing of these welds by various methods. Prerequisite: ITE 144-A. (3 Sp) Staff

147. Advanced Electric Arc Welding. Formerly Weld 191. A continuation of ITE 49. Information and instruction is given for welding in the vertical and overhead positions. Consideration is given to basic welding metallurgy and the weldability of metals. Prerequisite: ITE 49. (3F) Staff

149. Heat Treating of Ferrous & Non-Ferrous Metals. Designed to provide training and some research work in the field of heat-treatment of Ferrous and non-ferrous metals. Laboratory work includes exercises in the various methods of Heat-treating ferrous and non-ferrous metals. Prerequisite ITE 144-A. Staff

Woods Courses

61. Technical Woods. Study of the types of woods, finishes, abrasives and adhesives of the woods industry and practice in the fundamental handtool processes. (3F) Slack

62. Technical Woods. Practice in the operation of basic machine woodworking equipment with study of their uses and nomenclature. (3W) Slack

63. Technical Woods. Continued practice in woodworking machinery and on attachments with emphasis on design and construction of articles made of wood. (3Sp) Slack

64. Upholstering. Modern automobile and furniture upholstering processes. Students upholster their own units as they learn. (3W) Slack

65. Woodwork for Everyone. Open to all, both men and women, who have a desire to work with wood. Instruction is given in the fundamentals of woodworking and includes training in the use of both hand tools and woodworking machines. Projects are selected and built by students; a wide latitude in the selection of projects is afforded. Instruction is given in furniture repair and in the basic principles of wood finishing and re-finishing. (2 to 6F, W, Sp) Staff

160. Cabinet Making and Furniture Construction. Advanced cabinet and furniture making including construction design and opportunity for application of original designs. Practical work is provided in the construction of fine furniture and built-in cabinet work. Prerequisite: ITE 63 (3F) Slack

162. Industrial Woods. In this course, considerable time is spent in the development, construction and uses of woodworking projects designed for high school teaching purposes. The development of jigs and fixtures for use in mass production techniques in high school shops is introduced through practice in production line runs. Prerequisite: ITE 63 (3W) Slack

163. Dwelling Construction and Estimating. A study of the principles of carpentry and construction as they apply to dwellings. The building codes, specifications and regulations for construction are applied to the making of a scale model structural home. Layout, strength of materials and procedure emphasized. Prerequisite: ITE 63 (3 Sp) Slack

164. Wood Finishing. Study and practice in the kinds of opaque and transparent finishes for woods as applied by brush, spray or wipe on methods. Attention is given to the types of finishes, stains and methods of polishing as well as application. Prerequisite: ITE 61 (3W) Staff
168. Industrial Arts for Elementary Schools. Objectives and theory of Industrial Arts in the elementary school. Suitable instructional content will be presented for each grade level and methods of teaching and organizing instructional materials will be carefully considered. Instruction is given on the use of tools and materials in the shop where projects suitable for the elementary school will be constructed from modern industrial materials. Two lectures, one lab. (3W) Staff

169. General Shop Laboratory. Comprehensive laboratory course covering the manipulation of the General Shop. Emphasis will be given in all areas of metal work, woodwork, and crafts. Designed especially for teachers needing special work in one or more areas. (5Su) Staff

Professional Courses

100. 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. (3Sp) Staff

101. Observation in Student Teaching. Serves as a preliminary to the regular student teaching in Industrial Education. Students are assigned to various schools within the area to observe teaching in Industrial Education. (1W) Staff

102. Instructional Aids. Instruction in the purpose, types, sources, preparation and proper use of instructional aids, including samples, models, charts, graphs, slides, still film, movie film, sound film graphics and other aids suitable for classroom and laboratory use. (3F) Staff

103. The General Shop. Comprehensive study of the types of "General Shop," its advantages and limitations; content and organization of subject matter; method of teaching and shop plans. General shop projects, shop plans and new trends in content and equipment are given special consideration. (3Su) Staff

104. Occupational Analysis. Principles and practice in analyzing occupations. Students complete an analysis of one unit for a trade or occupation. (3F, W, Su) Staff

190. Special Industrial Education Workshop. Allows for conducting special workshops, as needed, especially for the in-service training of Industrial Education teachers, supervisors, and administrators. May be repeated as needed providing the workshops are different, but if the credit is to be used toward a Baccalaureate or Master's Degree, limitations shall be placed by the department or a student's Graduate Committee. Credit arranged. (F, W, Sp, Su) Staff

191. Industrial Safety Education. The psychology and philosophy of accident causation and prevention in school, home, community, and industry. Stresses the various aspects of safety in many areas and includes organization. Students observe and teach in Industrial education programs. (3W, Sp, Su) Staff

192. Personnel Relations. Training for leadership in industry as foremen, supervisors, and directors. Problems in organizing, supervising, training, and directing personnel. Directed conferences based on student experiences and directed studies in leadership problems and principles. (3F, Sp) Staff

193. Shop Organization and Management. Teaches students to organize and manage an Industrial Education Shop of the unit, general, or multiple activity type. Students prepare for one type of shop, a complete plan of organization and management dealing with the necessary equipment, materials, supplies, methods of purchasing, financial control, and problems of shop arrangement. (3W) Staff

194. Student Teaching in Industrial Education, administration, and coordination of safety Education programs throughout the state. Under close supervision, they do practice teaching in various Industrial Education courses in junior, senior or post high schools. (3W) Staff

195. Methods in Industrial Education. Latest techniques of teaching applied to individual and group instruction in Industrial Education. Students have opportunity to use these different methods in presenting lessons before the class. (3W) Staff

196. Organization and Development of Instruction Materials. Selection and arrangement of teaching materials to be used in Industrial Education course work. (3Sp) Staff

197. Honors Studies. Advanced work for qualified students. Work is initiated by a 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 credits arranged. (F, W, Sp) Staff

198. Special Problems in Industrial Education. For qualified students majoring in Industrial Education who wish to do specialized work not covered by other courses. Credit arranged. (F, W, Sp, Su) Staff

199. Related Technical Training in Vocational Education. A course provided for students enrolling in industry and factory schools conducted on the university level, wherein instructors, course content, and facilities have been approved by a committee functioning through
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the Industrial and Technical Education Department. This course may be repeated for a maximum of nine quarter hours credit, to be acquired at a rate not to exceed one and a half quarter hour credits per 40 clock-hour week. Students should not expect to acquire more than three credits in this course in any one calendar year except where teacher training courses are of longer duration. Regular university fees must be paid, and registration procedures followed. Credit arranged. Staff

Graduate Courses

200. Industrial Education Experimental Lab. Designed to give selected senior students and graduate students in Industrial Education opportunity for experimental work with new tools, equipment, materials and processes for improved program development and teaching techniques. May be repeated up to a total of six hours credit. Credit Arranged. (F, W, Sp, Su) Staff

205. Trade, Industrial, and Technical Workshop. Provides opportunity for professional improvement and upgrading of trade, industrial, and technical teachers. Dissemination of current technical and professional material that the instructors must be aware of to maintain their position in the teaching of industrial subjects. Credit arranged. Staff

206. Vocational and Technical Administration Workshop. Provides opportunity for professional improvement of Administrators and Supervisors of Vocational and Technical Programs. Credit arranged. (Sp) Staff

207. Philosophy of Vocational Education and the Practical Arts. Designed to enrich and expand understanding of the nature and purposes of vocational education and practical arts, their relationships and differences, and the place each phase of the work should have in a public school program (3F, Su) Staff

209. Curriculum Development in Industrial Education. The significance, importance, and use of the course of study in industrial education. Actual construction of a comprehensive course of study for one of the phases of industrial education. Prerequisite: ITE 104. Three lectures. (3W, Su) Staff

210. Trends in Industrial Education. A preview of industrial education tomorrow: what industrial education will do. The evaluation of educational and industrial thought: the source of materials to meet present day trends. (3Sp, Su) Staff

224. History of Industrial Education. Historical developments of manual and industrial education from the early leaders to the present. Emphasis is given to the influence that various leaders and movements in both Europe and America have had upon present-day objectives of industrial arts and vocational industrial education. (3W, Su) Staff

232. Aerospace Education. An introduction to aerospace for teachers in elementary and secondary schools, to include such content areas as: (1) A study of the principles of flight, (2) Knowledge of the earth's atmosphere, (3) The control of aircraft in flight, (4) Information on the federal airways and airports, (5) The principles of jet propulsion, and (6) An opportunity to take an orientation flight, and also receive some basic instruction in handling an aircraft in flight. Nationally known speakers will be used as resource specialists throughout the course. (3Su) Summers Staff

240. Cooperative Industrial Programs. For potential coordinators of part-time cooperative industrial and technical classes. Essential information for conducting federally and non-federally reimbursed work experience industrial classes in secondary and post-high schools. (3Su) Staff

245. Organization of Industrial Education Programs. The laws, regulations, and policies affecting industrial and technical education programs; organization of industrial and technical programs at the secondary and post high vocational and technical institute level; local, state, and federal relationships. (3Sp, Su) Staff

251. Administration and Supervision of Industrial Education. Administration, supervision and management necessary for successful operation of Industrial Education programs. (3Sp, Su) Staff

254. Measurement in Industrial Education. Construction and use of the various types of tests and rating scales used in Industrial Education. Emphasizes measurable factors in industrial education and the types of tests best suited to this field. The elements of statistical methods necessary for intelligent use of the tests. Prerequisite: Psychology 112. (3Sp, Su) Staff

261. Problems of Adult Education. Development of Adult Education movements; learning abilities, educational interests, needs of adults, organization of evening school programs, apprenticeship training, and related instruction for trade programs. (3W, Su) Staff

267. Reading and Conference. Provides for study in advanced and specialized problems in Industrial Education. Problems are selected with approval of department adviser; investigation is carried on under direction of the major professor. Credit arranged. (F, W, Sp, Su) Staff
270. Seminar in Industrial Education. Gives opportunity for investigation and reporting of individual problems. (1 to 2 Sp, Su) Staff


275. Research in Industrial and Technical Education. To provide teachers, supervisors and directors of industrial and technical programs with research methods and techniques which are applicable to their programs. Includes interpretation of various kinds of research. The conducting of a research project is part of the class activity. (3F, Su) Staff

355. Internship in Industrial and Technical Programs. Designed for the advanced student working toward the Doctor of Education degree in Industrial Education. Student works under the direct guidance of an administrator or supervisor of Industrial and Technical programs in the public schools. Credit arranged. (F, W, Sp, Su) Staff

365. Advanced Independent Study in Industrial Education. Provides opportunity for advanced student to do independent study in the field of Industrial and Technical education. Credit arranged. (F, W, Sp, Su) Staff

371. Research for the Doctorate Thesis in Industrial Education. Credit arranged. (F, W, Sp, Su) Staff

Department of Manufacturing Engineering

Head: Associate Professor W. Karl Somers
Office in Mechanic Arts 126

Professor Emeritus Frederick Preator; Associate Professors Rawson D. Child, G. Merrill Shaw, Owen K. Shupe, Lecturer Allan H. Nelson.

The Department of Manufacturing Engineering offers curricula leading to the Bachelor of Science and Master of Science Degrees.

Manufacturing Engineering is a branch of engineering in industry whose function is to plan the processes of economic manufacture, to specify or design the manufacturing tools and equipment, and to integrate the facilities required for producing given products with minimal expenditure of time, labor, and materials. Some typical responsibilities of manufacturing engineers are: to develop the manufacturing plan for each product so that it can be made with a minimum of time, labor, and materials; to interpret product designs to the shop, and inform product designers of shop limitations and capabilities; to coordinate manufacturing projects so that products are delivered on schedule and within costs; to exploit new processes, materials and methods that lead to lower costs and a better product; to provide and allocate facilities so that the company maintains a competitive advantage.

Manufacturing engineers act as catalysts in today's industry, translating the exacting concepts of the product designer into reality. With the rapid development of new technology, the education of the manufacturing engineer takes on new importance.

National surveys indicate that increasing numbers of manufacturing engineers are needed. As industrial production expands in Utah and across the nation, opportunities will continue to increase.

The Manufacturing Engineering Laboratories, the Metallurgy, Inspection and Senior Students' Design room are all equipped with modern facilities for teaching, for
engineering experimentation and for student development in Manufacturing Engineering.

The Department coordinates a program of summer employment for Junior students. This industrial experience greatly benefits the student in his understanding and application of the engineering concepts studied in classes. Field trips to industrial plants are conducted each year for Junior and Senior students.

The Department is closely affiliated with the American Society of Tool and Manufacturing Engineers. There is an active student Chapter of the Society on Campus which promotes the professional and social interest of the Manufacturing Engineering students.

Manufacturing Engineering Curriculum

The following curriculum leading to the Bachelor of Science degree in Manufacturing Engineering resulted in Utah State University receiving the American Society of Tool and Manufacturing Engineers 1965 National Education Award. This award connotes recognition and acceptance of the curriculum by the National Society.

Freshman and Sophomore courses follow the common engineering curriculum listed in the College of Engineering introduction.

The Junior and Senior curricula are as follows:

<table>
<thead>
<tr>
<th>Course</th>
<th>JUNIOR YEAR</th>
<th>F</th>
<th>W</th>
<th>Sp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mfg E 151, 152</td>
<td>5</td>
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<td>5</td>
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</tr>
<tr>
<td>Mfg E 148, 150</td>
<td>3</td>
<td>4</td>
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<td></td>
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<tr>
<td>Mfg E 157, 158</td>
<td>3</td>
<td>5</td>
<td></td>
<td></td>
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<tr>
<td>CE 103</td>
<td>5</td>
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<td></td>
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<tr>
<td>EE 105, 124</td>
<td>3</td>
<td>3</td>
<td></td>
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<tr>
<td>English 113</td>
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<tr>
<td>Humanities(^1)</td>
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<td>Total</td>
<td>16</td>
<td>17</td>
<td>18</td>
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</tbody>
</table>

\(^1\)See College of Engineering Section for Humanities requirements.

<table>
<thead>
<tr>
<th>Course</th>
<th>SENIOR YEAR</th>
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<tr>
<td>Mfg E 158, 182</td>
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</tr>
<tr>
<td>Mfg E 187, 188, 184</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
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<tr>
<td>Mfg E 180, 183</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ME 130, 134</td>
<td>4</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mfg E 185</td>
<td>3</td>
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<td></td>
<td></td>
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<tr>
<td>CE 140, 144</td>
<td>3</td>
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<tr>
<td>ME 111</td>
<td>3</td>
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<td>Humanities(^1)</td>
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<tr>
<td>Total</td>
<td>17</td>
<td>16</td>
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</tbody>
</table>

Graduate Study

The graduate program in Manufacturing Engineering provides course work leading to the Master of Science Degree. To meet individual interests, the graduate student may select one of three options to be taken along with the Manufacturing Engineering core. These options are: Engineering Administration, Manufacturing Systems Design, Applied Statistics and Computer Science. General requirements for the Master's degree are:

1. To be accepted as a candidate an applicant must: (a) hold a Bachelor of Science degree from an institution of recognized standing in one of the fields of engineering or physical science; (b) have had adequate preparation for graduate study in the chosen field of specialization; and (c) show promise of doing well in advanced study as judged by previous scholastic record and other achievements.

2. The Master of Science curriculum must include at least 45 credits numbered 100 or above, with at least 10 credits in courses numbered 200 or above. A total of 9 credits of acceptable graduate work may be transferred from another approved graduate school. A maximum of 18 credits may be taken at off-campus residence centers maintained by Utah State University. A minimum of 15 credits, exclusive of thesis, must be completed on the Logan Campus. Additional
requirements such as qualifying examination, final examination, time limit, etc., as outlined by the School of Graduate Studies, are included.

3. Selection of specific courses in the curriculum will be under advisement of a Supervisory Committee which is appointed by the Dean of the Graduate School.

The candidate's program will include a selection of courses in the following areas:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturing Engineering Core</td>
<td>21</td>
</tr>
<tr>
<td>Thesis</td>
<td>9</td>
</tr>
<tr>
<td>Minor—option in Engineering Administration, Manufacturing Systems Design, or Applied Statistics and Computer Science</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>45</td>
</tr>
</tbody>
</table>

An integrated program may be selected from the following courses:

Manufacturing Engineering Core:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applied Statistics (Ap St 131, 132, 171)</td>
<td>11</td>
</tr>
<tr>
<td>Computer Science (CS 167)</td>
<td>3</td>
</tr>
<tr>
<td>Mfg Processes &amp; Materials (Mfg E 168)</td>
<td>3</td>
</tr>
<tr>
<td>Adv Production Engineering (Mfg E 288)</td>
<td>3</td>
</tr>
<tr>
<td>Methods Engineering (Mfg E 289)</td>
<td>3</td>
</tr>
<tr>
<td>Manufacturing Seminar (Mfg E 287)</td>
<td>2</td>
</tr>
<tr>
<td>Special Problems (Mfg E 288)</td>
<td>3</td>
</tr>
<tr>
<td>Automation Systems (Mfg E 290)</td>
<td>3</td>
</tr>
<tr>
<td>Thesis (Mfg E 298)</td>
<td>9</td>
</tr>
</tbody>
</table>

Engineering Administration:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production Management (BA 136)</td>
<td>5</td>
</tr>
<tr>
<td>Accounting for Mgt Control (Acct 209, 210)</td>
<td>6</td>
</tr>
<tr>
<td>Managerial Economics (BS 260)</td>
<td>3</td>
</tr>
<tr>
<td>Seminar in Theories of Management (BA 291)</td>
<td>3</td>
</tr>
</tbody>
</table>

Manufacturing Systems Designs:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machine Frame Analysis (ME 106)</td>
<td>6</td>
</tr>
<tr>
<td>Mechanical Analysis (ME 131)</td>
<td>4</td>
</tr>
<tr>
<td>Mechanical Design (ME 132)</td>
<td>4</td>
</tr>
<tr>
<td>Mechanical Design Projects (ME 133)</td>
<td>4</td>
</tr>
<tr>
<td>Dynamics of Machinery (ME 135)</td>
<td>4</td>
</tr>
<tr>
<td>Feedback Control (EE 160)</td>
<td>4</td>
</tr>
<tr>
<td>Advanced Mechanics of Materials (ME 165)</td>
<td>4</td>
</tr>
<tr>
<td>Dimensional Analysis and Similitude (CE 260)</td>
<td>4</td>
</tr>
</tbody>
</table>

Manufacturing Engineering Courses

50. Orientation. Lectures, and films to acquaint the student with the work of the Manufacturing Engineer. (1Sp) Staff

52, 53. Production Processes. Lathe, shaper, milling, and grinding operations. Two lectures, one lab. (3 taught on demand) Staff

54. Machine Lab for Engineers. Acquaints the student with basic machine tool operations. Two lectures, one lab. (3F, W, Sp) Staff


137. Work Simplification and Layout. A study of management techniques with emphasis on methods improvement, time study analysis, plant layout and material handling procedures, particularly adapted to Business Administration majors. (4W) Staff

148. Manufacturing Processes. Fundamentals of manufacturing processes; shows possibilities and limitation of these processes and their application to fabrication of industrial products. (3F, Sp) Child

150. Engineering Metallurgy. A study of the physical properties, composition, constituents, and heat treatment of metals and metal alloys. Material specifications, tests, and places of applications in industry are reviewed. Prerequisite: Chemistry 10. Three lectures, one lab. (4F, Sp) Shupe

151. Tooling Systems—Operations. Develops an understanding of the capacity and versatile usefulness of the fundamental machines and equipment used in manufacturing engineering. Three lectures, two labs. (5F) Somers

152. Tooling Systems—Planning. Deals with the analysis of the product design, planning procedures, routing methods, and the organization of the operational sequence. Prerequisite: Mfg E 151. Three lectures, two labs. (5W) Shaw

153. Tool Systems—Production. Studies the utilization of standard production equipment, including numerical controlled machines, automatic production machines and specialized
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equipment. Prerequisite: Mfg E 152. Three lectures, two labs. (SSp)

157. Quality Control. A study of quality control systems in manufacturing: dimensional, non-destructive, and statistical systems are emphasized. Prerequisite: ME 120 (3W) Staff


168. Manufacturing Processes and Materials. Emphasis is placed on materials composition and structures, and their adaptability to manufacturing processes and maximum production. Prerequisites: Mfg E 150, 158. (3Sp) Shaw

180. Motion and Time Study. An analysis of motion and time study as applied to manufacturing procedures, with emphasis given on work simplification, motion economy, time standards, and performance ratings. (3W, Sp) Child

181. Tool Design. The study and design of production tools such as gages, jigs, and fixtures. Includes tool design standards, tolerance, springs, cam layout, and techniques of preparing tooling for production. Three lectures, two labs. Prerequisites: Mfg E 152, CE 103. (SSp) Somers

182. Die Design. Emphasizes design and application of tooling to materials and products fabricated by press working production methods. Prerequisite: Mfg E 181. Three lectures, two labs. (5W) Somers

183. Plant Layout. A study of the utilization of space, machines, materials handling methods, and equipment for economical production. Laboratory consists of organization and planning details for layout of production facilities. Prerequisites: Mfg E 148, 180. Two lectures, one lab. (3Sp) Shaw


187. 188. Senior Project Laboratory. Each student is required to work with a manufacturing problem involving design, development, construction, and testing. A formal technical report is required of each student. (2F, W) Staff

197. Honors Studies. Advanced work for qualified students. Work is initiated by a 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 credits arranged. (F, W, Sp)

258. Advanced Production Engineering. Techniques of value analysis and application to production planning. Includes techniques of cost estimating and the preparation of manufacturing proposals. Prerequisite: Mfg E 158. Three lectures. (3F) Shaw

280. Methods Engineering. Work measurement methods; the application of work simplification methods in industrial organizations. Prerequisite: Mfg E 180. Two lectures, one lab. (3W) Child

287. Manufacturing Seminar. Students prepare technical papers on suitable topics and present to Mfg E staff and graduate students. Two lectures. (2F) Somers

288. Special Problems. Special studies in Manufacturing Engineering. Preparations of technical reports based on individual research on special problems. Credit arranged. (F, W, Sp, Su) Staff

290. Automation Systems. Design of automated production systems; special emphasis on electronic, hydraulic and pneumatic controls as applied to numerically controlled and other automated production equipment. Prerequisites: EE 124, CE 144, Mfg E 151. Three lectures. (3Sp) Staff

298. Graduate Thesis. Credit arranged. (F, W, Sp, Su) Staff
Department of

Mechanical Engineering

(Mechanical Engineering, Chemical Engineering)

Head: Professor Reynold K. Watkins
Office in Engineering L180

Associate Professors Izydor Eisenstein, Russell M. Holdredge, A. R. McKay, Owen K. Shupe; Assistant Professors J. Clair Batty, Alma P. Moser, Albert B. Smith, Dan H. Swenson, Edward W. Vendell; Instructors Ross A. Nyman, Byard D. Wood.

The Department of Mechanical Engineering offers curricula leading to the Bachelor of Science, Master of Science and Doctor of Philosophy degrees.

Mechanical Engineering is the development of energy and its utilization in machines and systems that serve mankind. A machine may be anything from a crowbar to an aero-spaceplane. Engineering firms, industries, utilities, many government agencies, and research foundations require mechanical engineers who specialize in areas such as: Aeronautics, Automotive Engineering, Nuclear Engineering, Petroleum Engineering, Industrial Engineering, Space Engineering, Thermodynamics, Heat Transfer, Machine Design, Power Production, Systems Engineering, Management, Equipment Sales, Refrigeration, and Air Conditioning.

Limited specialization in these areas can be achieved in the undergraduate technical elective program in the Senior year, but most firms prefer that additional specialization be obtained in industry or on a graduate level. Consequently undergraduate emphasis is placed on basic engineering fundamentals such as mathematics, chemistry, physics, and basic engineering sciences. On graduation the student is qualified to become an engineer-in-training in industry or to continue specialization in graduate study.

Up-to-date laboratory facilities, including a sub-critical nuclear reactor, are available.

Mechanical Engineering Curriculum

The following curriculum leading to the Bachelor of Science degree in Mechanical Engineering is accredited by Engineer's Council for Professional Development. Freshman and Sophomore common Engineering curriculum are listed under “College of Engineering.”

The Junior and Senior curricula are as follows:

<table>
<thead>
<tr>
<th>JUNIOR YEAR</th>
<th>F</th>
<th>W</th>
<th>Sp</th>
</tr>
</thead>
<tbody>
<tr>
<td>ME 111, 112, 116</td>
<td>3</td>
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</tr>
<tr>
<td>CE 103</td>
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<tr>
<td>EE 105, 124</td>
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<td>3</td>
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<tr>
<td>CE 140, 141</td>
<td>3</td>
<td>3</td>
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<tr>
<td>ME 143</td>
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<td></td>
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<tr>
<td>ME 130</td>
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<tr>
<td>ME 160</td>
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<tr>
<td>ME 161</td>
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<tr>
<td>Mfg E 148</td>
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<tr>
<td>Group Reqs&lt;sup&gt;1&lt;/sup&gt;</td>
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<tr>
<td>Total</td>
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<td>17</td>
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</tbody>
</table>

<sup>1</sup>See College of Engineering for details of group requirements.
Chemical Engineering Curriculum

A two-year pre-Chemical Engineering curriculum is offered with the same required courses as the two-year core curriculum in Engineering except for the substitution of Chemistry 3, 4, and 5 for Chemistry 10, 11 and Economics 51.

Graduate Study

The Department offers a graduate program leading to the MS and PhD degrees in Mechanical Engineering. The program is designed for specialization in Applied Mechanics, Materials, Fluid Mechanics, Nuclear Engineering, and Propulsion and Energy Conversion.

In addition to the common requirements, 9 credit hours of mathematics are required beyond that required for a BS degree.

Following is a typical course of study leading to the degree of Master of Science in Mechanical Engineering with specialization in Applied Mechanics:

<table>
<thead>
<tr>
<th>Course</th>
<th>F</th>
<th>W</th>
<th>Sp</th>
<th>Su</th>
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<tbody>
<tr>
<td>Math 140, 141, 142</td>
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<td>3</td>
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<tr>
<td>ME 214, 210, 210</td>
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<td>ME 240, 241, 242</td>
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<td>3</td>
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<tr>
<td>ME 261</td>
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<td>ME 230</td>
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<tr>
<td>CE 260</td>
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<tr>
<td>ME 298</td>
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<td><strong>Total</strong></td>
<td>15</td>
<td>14</td>
<td>14</td>
<td>9</td>
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</table>

Depending on the student's specialization some of the above courses may be replaced by such courses as: ME 202, 203; CE 201, 202, 203; CE 270, 271, 272, and CE 241.

Mechanical Engineering Courses

Note: Do not purchase drafting instruments before first class in the next three courses:

6. Elementary Drafting. Lettering, use of instruments, and fundamentals of drafting. One lab. (1W) Nyman, Smith


111, 112, 113. Engineering Thermodynamics. Basic concepts and laws are covered from both macroscopic and microscopic viewpoints. Also included are an introduction to heat transfer, available energy, combustion, and application. Prerequisites: Math 110 and Physics 22. Three lectures. (3F, 3W, 3Sp) Holdredge, Staff

116, 117. Engineering Heat Transfer. One and two-dimensional steady state conduction, laminar and turbulent flow, convective heat transfer, natural convection, radiation, transient and periodic heat transfer, applications and laboratory tests. Prerequisites: ME 160 and CE 141. Classes must be taken in sequence. Three lectures. (3F, 3Sp) Holdredge

119. Thermodynamic Systems. Application of the laws, concepts, and procedures of thermodynamics, and gas dynamics to turbo-machinery, propulsion, gas and vapor turbine cycles, expanders and compressors, and other apparatus. Both analytical and experimental approaches. Prerequisites: ME 117 and 143 concurrently. Three lectures and one lab. (3Sp) Wood

120. Engineering Measurements. Basic engineering measurements, theory and techniques; error analysis, data reduction and rejection; analysis of data by graphical, statistical, and mathematical means; experiment planning. Prerequisite: Math 40 and 99. Three lectures, one lab. (4W, Sp, Su) Watkins

130. Kinematics of Machines. Analysis of displacement, velocity, and acceleration in
Mechanical Engineering 183

Mechanisms by graphical and analytical methods. Velocity and acceleration polygons. Kinematic design of cams, belted toothed gearings, gear trains, computing mechanisms, etc. Introduction to synthesis. Complex numbers in kinematics. Calculation of velocities and accelerations by complex numbers. Prerequisite: CE 92. Two lectures, two labs. (4F, 4Sp)

Watkins

131. Machine Analysis. Basic analytical tools for the design of machines. Application of principles of engineering mechanics, strength of materials, and kinematics in machine analysis. Combined stresses; theories of failure; variable loads, repeated and impact; fatigue; stress concentration; statically indeterminate members; deflection-energy methods; curved beams; thick shell cylinders; flat plates; critical speeds. Prerequisites: CE 103, ME 130. Three lectures, one lab. (4F)

Watkins

132. Machine Design. Application of the method of stress analysis to the design of machine components. Analysis of static and dynamic forces and stresses in machine elements. Design of machine part by rationalization and empiricism. The main topics are: fastenings, power screws, pressure vessels, springs, shafting, coupling, clutches and brakes, bearings with sliding and rolling contact, lubrication, etc. Prerequisite: ME 131. Two lectures, two labs. (4W)

Watkins

133. Machine Design Projects. Analysis and design of power transmitting devices, gearing, Flywheel analysis. Introduction to experimental stress analysis theory and technique. Design project and report course covering design procedure and application of general theories of machine design including design of mechanical systems involving stress analysis and dynamic. Students work individually or in small groups under active guidance of staff members on substantial approved projects. References are made to research publications and experimental procedures. Prerequisite: ME 132. Two lectures, two labs. (4Sp)

Watkins

134. Fundamentals of Machine Design. Application of principles of mechanics, strength of materials and kinematics to the design of basic machine elements. Force and stress analysis. Introduction to general design of major machine members; fastenings, power transmitting devices, shafts, bearings, gearing. Prerequisites: ME 130 and CE 103. Three lectures, one lab. (4W)

Shupe

135. Dynamics of Machinery. Analysis of motion arising from vibrations of systems of one or more degrees of freedom; free and forced vibration. Application of theory to practical problems of rotating and reciprocating machines; balancing of machinery. Analysis of dynamic forces in machinery. Two lectures and one lab. (3F)

Wood

143. Gas Dynamics. Fundamental concepts of fluid mechanics and thermodynamics, isentropic flow, shock waves, constant area flow, flow with heating, generalized one dimensional flow. Prerequisites: ME 112, CE 92 and CE 141. Three lectures, one lab. (4Sp)

Wood

150, 151. Science of Materials. The basic principles of solid state physics are used to explain the engineering properties of materials including metals, alloys, ceramics, plastics, etc., with temperature range from ultra-high to cryogenic. Prerequisite: Physics 22. ME 150 is prerequisite to ME 151. Three lectures. (3W, 3Sp)

Shupe

160. Engineering Analysis. Many of the mathematical tools which are used in senior and graduate courses are introduced and applied to sample problems from fluid mechanics, advanced dynamics, gas dynamics, thermodynamics, and heat transfer. Specific topics include the mean value theorems, vector calculus, derivation of differential equations, line integrals, and Fourier Series. Prerequisite: Math 110. Four lectures. (4F)

Vendelli


Batty

162. Mechanical Vibrations. Free, damped, and forced vibration of systems within degrees of freedom, matrix iteration technique, the method of Holzer, vibration of elastic bodies. Prerequisite: ME 161. Four lectures. (4Sp)

Batty

165. Mechanics of Materials. Development of various theories of failure and stress-strain relationships as they apply to problems of direct and shearing loads, flexure, and torsion; and with special application to thick-walled cylinders, discs, curved beams, unsymmetrically and eccentrically loaded members; and photoelastic analysis. Prerequisites: Math 110 and CE 103. Four lectures (4W)

Batty

166. Introduction to Continuum Mechanics. Introduction and application of tensors as applied to the mechanics of solid or fluid continua. Tensor properties of stress, strain, and strain rate. General discussion of Cartesian tensors. Equations of motion and compatibility. Relations between stress, strain, and strain rate; for anisotropic and isotropic elastic, plastic, and visous solids; and for compressible viscous fluids. Beltrami-Mitchell equations and Navier-Stokes equations. Prerequisite: CE 103. Recommended ME 165. (Three lectures) (3F)

Batty
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185. Rocket Engines. Basic principles of rocket engines including control mechanisms for both solid and liquid propellant engines. Prerequisites: Chemistry 12, and ME 160 or concurrent registration for ME 160. ME 143 and ME 116. Three lectures, one lab. (4F)

Staff


190, 191, 192. Nuclear Engineering. Atomic and nuclear theory; nuclear reactions and radiations; nuclear reactor theory; reactor instrumentation and control; radiation monitoring and safety; radiation shielding; reactor fuels and fuel processing; thermal analysis of reactors; type of reactors. Three lectures. (8W, 3Sp, 3F) Shupe

193, 194, 195. Nuclear Reactor Laboratory. May be taken concurrently with ME 190, 191, 192. One lab. (1F, 1W, 1Sp) Shupe

197. Honors Studies. Advanced work for qualified students. Work is initiated by a 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. (F, W, Sp) 1-3 credits, arranged.

Staff

198. Mechanical Engineering Seminar. Selected topics of interest to Mechanical Engineers are presented and discussed by members of the class and specially qualified visitors. Prerequisite: Senior standing in Mechanical Engineering. Two lectures. (1F, W, Sp) Shupe

199. Special Problems. Formulation and solution of theoretical or practical problems which relate to mechanical engineering. Comprehensive report required. Prerequisite: senior classification and permission of head of department. (3F, W, Sp) Staff

201. Introduction to Elasticity. The inter-relationships of stresses and/or strains, properties of the material, and the configuration of an elastic media under a given load. Prerequisite: ME 166. Three lectures. (3W) Batty

202. Introduction to Plasticity. The analysis of stresses, deformation, and collapse in devices constructed of plastic material. Prerequisites: ME 166. Three lectures. (3Sp) Staff

210. Transport Phenomena. Systematic and parallel treatment of momentum transport (viscous flow), energy transport (conduction, convection, and radiation), and mass transport (diffusion). Treatment will stress similarities between the three phenomena. Applications to complex engineering systems. Prerequisites: ME 117, 166, 214. Five lectures. (5Sp) Holdredge

211. Intermediate Thermodynamics. Advanced First and Second Law Topics, Complex Equations of State, and Property Determination. Prerequisites: ME 143 and ME 117. (Note: may be taken as undergraduate elective with instructor’s approval.) Five lectures. (5F) Holdredge

230. Advanced Kinematics. Review of vector analysis; Analytical methods; complex numbers and their application in kinematic analysis and synthesis; geometry of constrained motion: The Euler-Savary equation; Hartmann’s Construction; Bloch Synthesis; Freudenstein’s Theorem; The Hrones-Nelson synthesis of the four-bar linkage; the analysis of space mechanism. Prerequisite: ME 150. Three lectures. (8Sp) Watkins


251. Propellants. The physical chemistry of propellants and propellant combustion with special emphasis on the performance of solid and liquid propellants in rocket engines. Three lectures. (3F) Staff


290, 291, 292. Nuclear Reactor Engineering Principles. Transport theory and neutron diffusion; homogeneous reactors with and without reflector; heterogenous reactors; reactor materials; design, operation, and control of nuclear reactors; reactor kinetics. Three lectures. (3F, 3W, 3Sp) Shupe

293, 294, 295. Nuclear Reactor Laboratory. One laboratory. (1F, 1W, 1Sp) Shupe

298. Graduate Thesis. Credit arranged. (F, W, Sp, Su) Staff
COLLEGE OF FAMILY LIFE
College of

Family Life

Department of Clothing and Textiles, 188
Department of Family and Child Development, 192
Department of Food and Nutrition, 195
Department of Homemaking Education, 199
Department of Household Economics and Management, 201
Combination Major in Family Life and Office Administration, 203
General Major in Family Life, 204

Degrees Offered:

  Bachelor of Arts
  Bachelor of Science
  Master of Science
  Doctor of Philosophy
The College of Family Life provides a well rounded educational program, emphasizing human relationships as well as theory and skills. The major purpose of the College is two-fold: first, to help one prepare for more effective living in the home and the community; second, to help one prepare for a professional career in an area of choice.

Professional opportunities open to a graduate of the College of Family Life include teaching, extension service, business, institutional management, dietetics, research in Family Life, and work with children in nursery schools, day-care centers, and hospitals.

The five departments in this college are: Clothing and Textiles, Family and Child Development, Food and Nutrition, Homemaking Education, and Household Economics and Management.

Bachelor's and Master's degrees are offered in each department. Courses may be arranged so that an MS degree can be obtained through Summer Quarter work, providing that the research project is done on the job during the winter months. The PhD degree is offered in the Clothing and Textiles and the Food and Nutrition Departments. Graduate assistantships are offered in four of the five departments.

Curricula for the College of Family Life are based on the various departmental major and minor requirements together with the University group requirements.

The following Family Life courses are available for students in each department of the College:

197. Honor Studies. Advanced work for students approved by the College of Family Life Honors Committee. Special projects initiated by the student may be conducted under the direction of a faculty member or advanced study may be pursued in connection with an established departmental course. (3F, W, Sp) 

Staff

198. Honors Seminar. For qualified students approved by the College of Family Life Honors Committee. Exploration of concepts and problems of an interdisciplinary nature which have a common core within the various fields of Family Life, such as creativity, consumership, and problems of people at various stages of the family life cycle. Emphasis is placed on the dynamic interrelations between all processes in the behavior and development of the individual within a family setting. (2W) 

Staff

293. Research Methods. Research methodology for case studies, surveys and experiments; design and style for thesis and research reports; application of measurements and statistical techniques to professional problems in Family Life. A research report presenting and analyzing findings of a study in the student's major field is required. (3F) 

Compton

Men and women in all colleges and departments of the University may take courses in the College of Family Life provided they have the prerequisite courses where these are required. Students may select courses most appropriate to their personal needs and interests.
Department of

Clothing and Textiles

Head: Professor Norma H. Compton
Office in Family Life 303

Associate Professors Theta Johnson, Extension Specialist, Lillian Matthews; Assistant Professors Virginia Lewis, Haruko Moriyasu; Instructor Ruth V. Clayton.

Undergraduate Study

The Department of Clothing and Textiles offers work leading to the Bachelor of Science and Bachelor of Arts Degrees with the following specializations:

1) General Clothing and Textiles
2) Fashion Merchandising
3) Fashion Design
4) Textile Technology and Research

Clothing and Textiles Major

The major in General Clothing and Textiles leads to opportunities in many areas such as work with commercial companies as consultant or educational director; teaching in stores, extension or trade schools; and custom dressmaking. The curriculum includes the following courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT 5</td>
<td>Design in Everyday Living</td>
</tr>
<tr>
<td>CT 10</td>
<td>Pattern Designing and Clothing Construction</td>
</tr>
<tr>
<td>CT 24</td>
<td>Introduction to Textiles</td>
</tr>
<tr>
<td>CT 105</td>
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</tr>
<tr>
<td>CT 106</td>
<td>Behavioral Science Aspects of Clothing</td>
</tr>
<tr>
<td>CT 115</td>
<td>Fashion Design</td>
</tr>
<tr>
<td>CT 120</td>
<td>Comparative Construction Techniques</td>
</tr>
<tr>
<td>CT 135</td>
<td>History of Costume and Textiles</td>
</tr>
<tr>
<td>CT 140</td>
<td>Draping</td>
</tr>
<tr>
<td>CT 170</td>
<td>Flat Pattern Designing</td>
</tr>
<tr>
<td>CT 174</td>
<td>Advanced Textile Problems</td>
</tr>
<tr>
<td>CT 180</td>
<td>Tailoring</td>
</tr>
<tr>
<td>CT 186</td>
<td>Fashion Analysis</td>
</tr>
<tr>
<td>CT 191</td>
<td>Seminar</td>
</tr>
<tr>
<td>CT 195</td>
<td>Couturier Design</td>
</tr>
</tbody>
</table>

It is advised that majors take extra work in one or more of the following areas after consultation with their adviser: Anthropology, Art, Psychology, Sociology, Economics, Philosophy, Political Science and History. It is recommended that majors also take courses in other departments within the College of Family Life.

Fashion Merchandising Major

The major in Fashion Merchandising prepares students for such positions as buyer or assistant buyer, comparison shopper, fashion stylist or coordinator, merchandise manager, fashion market reporter, fashion promotion work, owner-manager of small store. A minor should be completed in Business Administration. The curriculum includes the following courses:

**Major:**

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>CT 5</td>
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<tr>
<td>CT 135</td>
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<tr>
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</tr>
<tr>
<td>CT 180</td>
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</tr>
<tr>
<td>CT 186</td>
<td>Fashion Analysis</td>
</tr>
<tr>
<td>CT 191</td>
<td>Seminar</td>
</tr>
<tr>
<td>CT 192</td>
<td>Field Experience in Clothing &amp; Textiles</td>
</tr>
</tbody>
</table>

**Minor:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acct 100</td>
<td>Survey of Accounting Principles</td>
</tr>
<tr>
<td>BA 63</td>
<td>Salesmanship</td>
</tr>
</tbody>
</table>
An additional ten credits should be selected from Anthropology, Art, Psychology, Sociology, and Economics.

Fashion Merchandising for Men

Men majoring in fashion merchandising will be exempt from the two courses in clothing construction which are required of women majors.

Fashion Design Major

The major in Fashion Design is planned for students interested in apparel designing. A minor should be completed in Fine Arts. The curriculum includes the following courses:

**Major:**

<table>
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<th>Course</th>
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<tbody>
<tr>
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<tr>
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</tr>
<tr>
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<td>CT 186</td>
<td>Fashion Analysis</td>
</tr>
<tr>
<td>CT 191</td>
<td>Seminar</td>
</tr>
<tr>
<td>CT 192</td>
<td>Field Experience in Clothing &amp; Textiles</td>
</tr>
<tr>
<td>CT 195</td>
<td>Couturier Design</td>
</tr>
</tbody>
</table>

**Minor:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 5</td>
<td>Beginning Design</td>
</tr>
<tr>
<td>A 15</td>
<td>Water Coloring</td>
</tr>
<tr>
<td>A 16</td>
<td>Figure Drawing</td>
</tr>
<tr>
<td>A 70</td>
<td>Fashion Illustration</td>
</tr>
<tr>
<td>A 115</td>
<td>Fabric Design</td>
</tr>
<tr>
<td>BA 151</td>
<td>Marketing Principles</td>
</tr>
<tr>
<td>BA 156</td>
<td>Advertising</td>
</tr>
</tbody>
</table>

Textile Technology and Research Major

Students preparing for Textile Technology and Research should complete a major in Textiles and a minor in Chemistry. This major is designed for students who wish to prepare for textile testing and research work in textile laboratories. It provides an excellent background for graduate work in Clothing and Textiles. The curriculum includes the following:

**Major:**

<table>
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<tr>
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</tr>
<tr>
<td>CT 135</td>
<td>History of Costume and Textiles</td>
</tr>
<tr>
<td>CT 174</td>
<td>Advanced Textile Problems</td>
</tr>
<tr>
<td>CT 190</td>
<td>Independent Study</td>
</tr>
<tr>
<td>CT 191</td>
<td>Seminar</td>
</tr>
<tr>
<td>AS 175</td>
<td>Wool Technology</td>
</tr>
<tr>
<td>Ap St</td>
<td>Statistical Methods</td>
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</tbody>
</table>

**Minor:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chem</td>
<td>Chemical Principles and Qualitative Analysis</td>
</tr>
<tr>
<td>3, 4, 5</td>
<td>Analysis</td>
</tr>
<tr>
<td>Chem</td>
<td>Quantitative Analysis</td>
</tr>
<tr>
<td>115</td>
<td>Organic Chemistry</td>
</tr>
<tr>
<td>121, 122</td>
<td></td>
</tr>
<tr>
<td>Engl</td>
<td>Technical Writing</td>
</tr>
</tbody>
</table>

Clothing and Textiles Minor

Students wishing a minor in Clothing and Textiles should take Clothing and Textiles 5, 10, 24, 105, 106, and six credits selected from other courses included in the Clothing and Textiles major.

Graduate Study

*Master of Science Degree. The Clothing and Textiles Department*
offers the Master of Science Degree with research in the fields of Clothing or Textiles.

Doctor of Philosophy Degree. The Clothing and Textiles Department offers advanced study and research leading to the degree of Doctor of Philosophy in the Behavioral Science Aspects of Clothing and Textiles. To fulfill the requirements for the degree, the student must (a) Demonstrate a reading comprehension of either French or German. (b) Pass a comprehensive examination in the field of specialization and in the minor field of Psychology or Sociology and Anthropology. (c) Successfully complete a research problem and a satisfactory dissertation. The student should consult the Graduate Catalog or the Head of the Department concerning other requirements.

Clothing and Textiles Courses

5. Design in Everyday Living. A study of the principles of design and color as related to the individual, the home, and family living. Recommended for all students in the University. (3F, W, Sp) Staff


15. Clothing Selection for Men. Men's apparel as related to the wearer. Consideration is given to fundamentals of fabric and garment selection. Organized to meet the needs of students in all colleges of the University. (2F, W, Sp) Moriyasu


75. Home Furnishings. Characteristics of home furnishings in relation to their classification, design, respective quality, use and care. Local field trips. (3F, W, Sp) Lewis

105. Clothing Selection and Consumption. Analysis of clothing needs of men, women, and children at various stages of the life cycle. Factors affecting clothing expendi-

tures; production and distribution of textile products for the consumer market. Emphasis is placed upon clothing selection in relation to aesthetic and economic influences. (2W) Moriyasu

106. Behavioral Science Aspects of Clothing. Clothing as a reflection of culture and personality. Analysis of clothing within selected primitive and contemporary cultures in relation to societal value structures. Study of the effects of clothing on the development, and adjustment of the individual self. (2F) Compton

115. Fashion Design. Fashion designing for reproduction, considering the wearer, the fabric, and the ensemble. Sources of inspiration for fashion designing. Individual experimentation through sketching with application directly to fabrics. (3Sp) Lewis

120. Comparative Construction Techniques. Development of judgment, originality, and skill in clothing construction with emphasis on alternative techniques and intricate constructions detail. Prerequisite: CT 10. (3F, W, Sp) Lewis

135. History of Costume and Textiles. A study of costume and textiles development from ancient times to the present as related to the socio-economic, cultural, and political influences of the times and their importance in the evolution and inspiration of modern textiles and dress. (3F) Clayton

140. Draping. Creative experiences in dress design by draping fabric on the dress form. Emphasis is placed on fitting and the effect of pattern, grain, and textures on design and dress. Problems consist of making a French lining and draping two garments. Prerequisite: Clothing and Textiles 120. (3W) Moriyasu

170. Flat Pattern Designing. Application of the principles of dress design to the construction of patterns by flat pattern method. Emphasis is placed on the development and use of a basic sloper, and on the interpretation of a design in relation to clothing construction principles and in the making and designing of patterns. Prerequisite: Clothing and Textiles 120. Recommended: Clothing and Textiles 140. (3Sp) Moriyasu

174. Advanced Textile Problems. Emphasis is placed on recent textile advances and research techniques. Consideration is given to physical and chemical testing and use of the microscope in identification of fibers. Prerequisite: Clothing and Textiles 24. Recommended: Chem 10, 11, 12. (3W) Matthews

180. Tailoring. Application of tailoring techniques in the construction of suits and coats. Emphasis is placed on developing judgment and skill in the use of alternative
techniques. Prerequisite: Clothing and Textiles 120. Recommended: Clothing and Textiles 170. (3F) Moriyasu

186. Fashion Analysis. Socio-economic factors underlying fashion: fashion designers and markets; analysis of fashion media—industry publications, magazines, newspapers, radio and television; merchandise displays and fashion show production. Prerequisite: Clothing and Textiles 105, 106 or consent of department. Recommended: Speech 81, 184, Business Administration 156. (3Sp) Matthews

190. Independent Study. Credit arranged. (F, W, Sp, Su) Staff

191. Seminar. Reports and discussions on newer developments in the Clothing and Textiles field. (2Sp) Staff

192. Field Experience in Clothing and Textiles. Provides practical experience with fashion retail and design firms in the Utah area. Students work approximately six hours a week under the direction of a manager of an approved firm. A university supervisor will direct the program and meet periodically with students on a seminar basis. Credit arranged. (F, W, Sp, Su) Staff

195. Couturier Design. A comprehensive analysis of the synthesis of knowledge and skill in clothing construction and design. Prerequisites: Clothing and Textiles 120, 140, 170. (1Sp) Staff

197. Honors Studies. See Family Life Staff

198. Honors Seminar. See Family Life Staff

204. Economics of Clothing and Textiles. Study of current theories and research on consumer clothing-oriented behavior; factors affecting the production, distribution, and consumption of clothing and textile products; the role of the clothing and textile industries in the national economy. (3Sp) Matthews

205. Consumer Problems in Clothing and Textiles. A study of the problems encountered by consumers in the purchase and care of clothing and textiles. Emphasis is placed on current developments in textile legislation and in labeling, fitting of ready-to-wear, and advances in textiles technology relative to product utilization. (3F) Matthews

206. Advanced Behavioral Science Concepts in Clothing. Analysis and synthesis of basic concepts of cultural anthropology, sociology, and psychology with implications for clothing and textiles. Interpretation of research findings. Formation of new hypotheses based upon the conceptualizations studied. (3F) Compton

208. Cultural Bases of Clothing. Study of clothing as a communicative device with respect to technological advancement, societal values, and social role enactment. Analysis includes detailed consideration of the concepts of beauty, acculturation, symbolism, modesty, social stratification, and reference group theory applied to clothing-oriented behavior. Prerequisite: CT 206. (3W) Compton

210. Personality Projection Through Clothing. A developmental approach to the study of clothing. Emphasis is placed upon the inter-relationships among the self, the body, and clothing at each stage of the life cycle. Detailed consideration will be given to the processes of differentiation-integration, identification, self structure, self valuation, and self adjustment in relation to clothing-oriented behavior. Prerequisite: CT 206. (3Sp) Compton

290. Independent Study. Credit arranged. (F, W, Sp, Su) Staff

291. Graduate Seminar. Open to graduate students. Credit Arranged (Maximum 5). (W, Sp) Staff

293. Research Methods. See Family Life Staff

295. Research and Thesis. Credit arranged. (F, W, Sp, Su) Staff
Family and Child Development

Head: Professor Don C. Carter
Office in Family Life 215

Associate Professors Dorothy B. Lewis, C. J. Skidmore; Assistant Professor Carroll C. Lambert; Instructors Kristine Beers, Connie Sims; Lecturer Alison Thorne; Head Teacher Cooperative Nursery School Valera G. Holman.

The Department of Family and Child Development offers work leading to the Bachelor of Science and Master of Science degrees. See the Graduate School Catalog for the Master’s degree program.

Three separate majors are available for graduate or undergraduate study. Students may select the one in which they are most interested:

1) Composite major in Child Development and Elementary Education
2) Child Development
3) Marriage and Family Relations

Each major represents a desirable area of study if one is interested in children or family life either professionally or as parent or future parent.

Undergraduate Study

The composite Major in Child Development and Elementary Education. The curriculum for a major in Child Development for students who wish to be certified to teach in Elementary Education includes:

Required: FCD 108, 174 and 175. Electives: 18 hours selected from the following courses, to be approved by adviser—Family and Child Development 77, 115, 120, 125, 140, 150, 164, 185, 187; English 112; Education 116; Art 50 or 151; Music 150; Theatre Arts 54, 56;

Food and Nutrition 22; Physical Education 81, 83, 111; Psychology 112, 123, 127, 135, 145, 161, 170; Speech 57, 118, 122; Sociology 92, 160, 171; SW 165, 170; Zoology 102.

Teacher Certification. To teach in kindergarten or elementary school, as a Child Development major, a student must meet the state requirements for teacher certification.

Child Development Major. The curriculum for a major in Child Development includes:

Required: Family and Child Development 108 (3), 174 and 175 (9). Electives: 18 hours selected from the following courses, to be approved by adviser. Family and Child Development 67, 68, 77, 100, 115, 120, 125, 140, 150, 164, 180, 185, 187; Clothing and Textiles 5, 106; English 122; Food and Nutrition 22; Art 50, 151; Music 150; Household Economics and Management 149, 155; Industrial Education 168; Physical Education 81, 83, 84; Psychology 112, 123, 135, 145; Sociology 90, 130, 156, 160, 171, 172; Zoology 102.

Child Development Minor. To minor in Child Development one should take Family and Child Development 67, 108, 174, 175, plus three hours of elective credit in the department.

The minor is recommended for men in such fields as Social Work and Elementary Education who, per-
haps more than women in our culture, may benefit from an opportunity to study the young child in the setting of a child development laboratory.

Marriage and Family Relations Major. The curriculum for a major in Marriage and Family Relations includes: Family and Child Development 67 or 100, 120, 140, 150, 180, 187; Household Economics and Management 149, 155; Sociology 160 or Social Work 165; Psychology 112; Zoology 102; plus 9 hours selected from supporting courses in related fields.

Marriage and Family Relations Minor. The curriculum for a minor includes: Family and Child Development 120, 140, 180, 187, and either 67 or 100 with six credit hours selected from the other courses included in the Marriage and Family Relations major.

Counseling Service. The Department of Family and Child Development provides premarital, marriage, and family counseling for students as part of a university-wide counseling program under the direction of the Coordinator of Counseling Services. Application for counseling on such problems as mate selection, husband-wife relationships, and parent-child relationships may be made to the department, or to the Coordinator of Counseling Services.

Graduate Study

At the graduate level, programs are offered leading to the MS degree in either Child Development or Marriage and Family Relations. Individualization of emphasis may be provided by the selection of courses in such departments as Education, Psychology, and Sociology as well as the other departments in the College of Family Life.

Family and Child Development Courses


77. The Child from Six to Twelve. Growth and development of the normal child from six to twelve years. Guidance principles implicit in the normal behavior of children at these age levels. Laboratory experience and observation. Prerequisite: FCD 67. (3F) Lewis

100. Human Growth and Development. Growth and development from birth to maturity. General behavior patterns characteristic of different levels of maturity; individual differences and needs. Prerequisites: Psychology 53 and FCD 67. (3F, W, Sp) Carter


109. Play-School Education. Methods and materials for play-school in high school home economics programs. Laboratory experience in working with preschool children in play-school situations. Prerequisite: FCD 67. FCD 108 to be a prerequisite or parallel course. (5F, Sp) Lewis


120. Marriage. Engagement; marriage relationships; understanding of self. For men and women. (3F, W, Sp) Carter

125. Materials and Procedures in Family Life Education. Study of parent, teacher, and community needs in relation to problems of education for family life. In-service training for teachers and group leaders in family life programs. Methods of family life education. (3Sp) Skidmore

127. Family Life Workshop. Designed for teachers and leaders to study the needs of parent, teacher, youth and community in relation to problems of education for family life. Resources, procedures, and organization techniques for initiation of and planning on-
194 College of Family Life

going programs. Offered as needed. (1-3
Su)

140. The Family in its Social Setting. Family
interaction with the environment. Family
influences on children's creativity. Impact on
families of our technological, affluent society.
Family and technical change in other cultures.
(3F, W, Sp)

Thorne

150. Seminar. Study of topics in current litera-
ture plus independent reading selected accord-
ing to interest. (2Sp)

Carter

164. Nursery School Planning and Admin-
istration. Development of the nursery school
movement. Problems of physical plant,
equipment, public relations, staff and bud-
geting of the child care center. (3Sp)

Lewis

and techniques of guidance of pre-school
children individually and in groups, with
emphasis on the study of one child. Read-
ings in research on pre-school children.
Must parallel Family and Child Development
175. (3F, W, Sp, Su)

Lambert

175. Practice Teaching in the Nursery
School. Experience in application of gen-
eralizations regarding guidance, growth, and
development of children in the nursery
school. For juniors and seniors who have had
a substantial amount of professional course
work, including Family and Child Develop-
ment 108 and 164. Arrangements must be made
for practice teaching well in advance of regis-
tration. (6F, W, Sp, Su)

Lambert

180. Marriage Counseling. The philosophy,
principles, and techniques of pre-marital
and marriage counseling. (3W)

Lambert

185. The Family in the Middle and Later
Years. Family development, and problems of
grown children and their parents; parents
on their own; understanding older family
members. (3Sp)

Skidmore

187. Family Theory. Differential concep-
tual approaches to the study of the family.
Analysis of theories and points of view from
various schools of thought. (3F) Staff

190. Independent Study. For qualified students
upon consultation with the instructor. Credit
arranged. (F, W, Sp, Su) Staff

205. Child Psychology and Guidance. See
Psychology 205. (3F, W, Sp)

Frandsen, Hofmann

208. Seminar in Child Guidance. Study
and analysis of theories and philosophies of
central importance in defining the nature,
process, and structure of child guidance.
(3Su) Staff

215. Seminar in Family Relations. Anal-
ysis of selected topics in family rela-
tions. (2F)

Carter

225. Seminar in Child Development. Anal-
ysis of selected topics dealing with growth,
behavior, and development of the child.
(3W)

Carter

Development. Review of new research dealing
with the growth and development of young
children. (3F)

Staff

243. Seminar. Current Research in the Fam-
ily. Review of new research dealing with
family relationships. (3W)

Staff

267. Deprivation in Early Childhood. Effects
of deprivation on the preschool child; applica-
tion of nursery school methods and curriculum
to children with restricted and limited back-
grounds; the child and his family. (3Sp)

Staff

275. Internship in Nursery Education.
Work with young children in a situation in-
volving limited supervision and personal re-
ponsibility for program planning and direc-
tion. Emphasizes experimental methods
in working with children, and development of
insight into children's behavior. Credit
arranged. (W, Sp, Su)

Lambert

278. Practicum in Agencies Serving Chil-
dren. Experience in working in agencies
serving children. Limited to advanced stu-
dents who have completed Family and Child
Development 174 and 175. Time and credit
arranged. (F, W, Sp)

Lambert

290. Independent Study. For qualified students
upon consultation with the instructor. Credit
arranged. (F, W, Sp, Su)

Staff

295. Research for Master's Thesis. Credit
arranged. (F, W, Sp, Su) Staff
Department of

Food and Nutrition

Head: Professor Ethelwyn B. Wilcox
Office in Family Life 111

Professor Phyllis R. Snow; Associate Professor Flora Bardwell, Extension Specialist, Amy R. Kearsley, Associate Extension State 4-H Club Leader, Margaret Merkley, Extension Program Leader in Home Economics; Assistant Professors Kaye Funk, Elveda Smith; Instructors Georgia Lauritzen, Grace Smith.

Undergraduate Study

The Department offers a Bachelor of Science degree with the following specializations:

1. Foods
2. Food Service and Business
3. Nutrition and Dietetics
4. Research in Food and Nutrition

Foods

The Foods program prepares the student for professional opportunities in food laboratories and equipment manufacturing companies; also for magazine and newspaper writing and in advertising and public relations provided an extended sequence of courses in communication arts is elected.

The following courses are included in the curriculum:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 35</td>
<td>College Algebra</td>
<td>5</td>
</tr>
<tr>
<td>Math 46</td>
<td>Trigonometry</td>
<td>5</td>
</tr>
<tr>
<td>Chem 3, 4, 5</td>
<td>Chemical Principles and Qualitative Analysis</td>
<td>15</td>
</tr>
<tr>
<td>Chem 121</td>
<td>Organic Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>Bact 70, 71</td>
<td>General Bacteriology</td>
<td>6</td>
</tr>
<tr>
<td>FN 22</td>
<td>Principles of Nutrition</td>
<td>3</td>
</tr>
<tr>
<td>FN 23</td>
<td>Principles of Food Preparation</td>
<td>3</td>
</tr>
<tr>
<td>FN 25</td>
<td>Meal Management for the Family</td>
<td>3</td>
</tr>
<tr>
<td>FN 107, 108</td>
<td>Science in Relation to Food Preparation</td>
<td>6</td>
</tr>
<tr>
<td>FN 109</td>
<td>Experimental Foods</td>
<td>3</td>
</tr>
<tr>
<td>FN 143</td>
<td>Advanced Nutrition</td>
<td>4</td>
</tr>
<tr>
<td>FN 146</td>
<td>Food Technology and Economics</td>
<td>3</td>
</tr>
<tr>
<td>FN 150</td>
<td>Seminar-Foods</td>
<td>1</td>
</tr>
<tr>
<td>FN 180</td>
<td>Quantity Food Preparation</td>
<td>5</td>
</tr>
</tbody>
</table>

Other courses that are recommended include:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chem 122</td>
<td>Organic Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>Chem 180</td>
<td>Elementary Biochemistry</td>
<td>5</td>
</tr>
<tr>
<td>HEM 100</td>
<td>Equipment</td>
<td>3</td>
</tr>
<tr>
<td>HEM 149</td>
<td>Home Management</td>
<td>3</td>
</tr>
<tr>
<td>CT 5</td>
<td>Design in Everyday Living</td>
<td>3</td>
</tr>
<tr>
<td>An Sci 15</td>
<td>Meats</td>
<td>3</td>
</tr>
<tr>
<td>Acct 100</td>
<td>Survey of Accounting</td>
<td>4</td>
</tr>
<tr>
<td>BA 151</td>
<td>Marketing Principles</td>
<td>4</td>
</tr>
<tr>
<td>Econ 51</td>
<td>General Economics</td>
<td>5</td>
</tr>
<tr>
<td>Econ 52</td>
<td>Economic Problems</td>
<td>5</td>
</tr>
<tr>
<td>Econ 107</td>
<td>Micro Econ Theory</td>
<td>4</td>
</tr>
<tr>
<td>Ag Ec 163</td>
<td>Intermediate Agricultural Marketing</td>
<td>3</td>
</tr>
<tr>
<td>Physics</td>
<td>General Physics</td>
<td>15</td>
</tr>
<tr>
<td>20, 21, 22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engl 112</td>
<td>Expository Writing</td>
<td>3</td>
</tr>
</tbody>
</table>

Minors in Food Marketing and Economics, Journalism, Chemistry, or Physics are recommended for this major.

Food Service and Business

This program prepares the student for work in profit making food service units: cafeterias, catering units, coffee shops, and restaurants. A double major is required.

The following courses are included in the Foods portion of this curriculum:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chem 10, 11</td>
<td>General Chemistry and</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Elementary Organic</td>
<td>15</td>
</tr>
<tr>
<td>Bact 70, 71</td>
<td>General Bacteriology</td>
<td>6</td>
</tr>
<tr>
<td>FN 22</td>
<td>Principles of Nutrition</td>
<td>3</td>
</tr>
</tbody>
</table>
Nutrition and Dietetics

This program prepares the student for work in dietetics in hospitals, clinics, school lunch programs, or large food service units. Basic courses in foods, nutrition, chemistry, and physiology are required for the professional rank of dietitian. The following courses are included in the curriculum:

<table>
<thead>
<tr>
<th>Course Code</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Math 35</td>
<td>College Algebra</td>
<td>5</td>
</tr>
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<td>Trigonometry</td>
<td>5</td>
</tr>
<tr>
<td>Chem 3, 4, 5</td>
<td>Chemical Principles and Qualitative Analysis</td>
<td>15</td>
</tr>
</tbody>
</table>

1Practical experience in an approved food service unit during summer

Other courses that are recommended include:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chem 121</td>
<td>Organic Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>Chem 180</td>
<td>Elementary Biochemistry</td>
<td>5</td>
</tr>
<tr>
<td>Bact 70</td>
<td>General Bacteriology</td>
<td>4</td>
</tr>
<tr>
<td>Bact 71</td>
<td>General Bacteriology Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>Physiol 4</td>
<td>Human Physiology</td>
<td>5</td>
</tr>
<tr>
<td>Psych 53</td>
<td>Elementary General Psychology</td>
<td>5</td>
</tr>
<tr>
<td>Psych 102</td>
<td>Educational Psychology for Secondary Teachers</td>
<td>3</td>
</tr>
<tr>
<td>Psych 155</td>
<td>Psychology for Business and Industry</td>
<td>3</td>
</tr>
<tr>
<td>Acct 100</td>
<td>Survey of Accounting Principles</td>
<td>4</td>
</tr>
<tr>
<td>BA 151</td>
<td>Marketing Principles</td>
<td>5</td>
</tr>
<tr>
<td>FN 22</td>
<td>Principles of Nutrition</td>
<td>3</td>
</tr>
<tr>
<td>FN 23</td>
<td>Principles of Food Preparation</td>
<td>3</td>
</tr>
<tr>
<td>FN 25</td>
<td>Meal Management</td>
<td>3</td>
</tr>
<tr>
<td>FN 107, 108</td>
<td>Science in Relation to Food</td>
<td>6</td>
</tr>
<tr>
<td>FN 140</td>
<td>Nutrition</td>
<td>4</td>
</tr>
<tr>
<td>FN 145</td>
<td>Diet Therapy</td>
<td>5</td>
</tr>
<tr>
<td>FN 146</td>
<td>Food Technology and Econ</td>
<td>3</td>
</tr>
<tr>
<td>FN 150</td>
<td>Seminar-Nutrition</td>
<td>1</td>
</tr>
<tr>
<td>FN 182</td>
<td>Institutional Organization Management and Cost Control</td>
<td>4</td>
</tr>
<tr>
<td>FN 183</td>
<td>Institutional Equipment</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Selection, Maintenance, and Layout</td>
<td>3</td>
</tr>
</tbody>
</table>

Other courses that are recommended include:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FN 109</td>
<td>Experimental Foods</td>
<td>3</td>
</tr>
<tr>
<td>CT 5</td>
<td>Design in Everyday Living</td>
<td>3</td>
</tr>
<tr>
<td>FCD 100</td>
<td>Human Growth and Development</td>
<td>3</td>
</tr>
<tr>
<td>HEM 149</td>
<td>Home Management</td>
<td>3</td>
</tr>
<tr>
<td>HEM 100</td>
<td>Equipment</td>
<td>3</td>
</tr>
<tr>
<td>Hmg Ed 120</td>
<td>Methods in Teaching</td>
<td>3</td>
</tr>
<tr>
<td>Econ 51</td>
<td>General Economics</td>
<td>6</td>
</tr>
<tr>
<td>Econ 52</td>
<td>Economic Problems</td>
<td>6</td>
</tr>
<tr>
<td>BA 171</td>
<td>Personnel Administration</td>
<td>5</td>
</tr>
<tr>
<td>An Sci 185</td>
<td>Meats</td>
<td>3</td>
</tr>
<tr>
<td>Engl 112</td>
<td>Expository Writing</td>
<td>3</td>
</tr>
<tr>
<td>Physics 6</td>
<td>Introductory Physics</td>
<td>5</td>
</tr>
<tr>
<td>Chem 122</td>
<td>Organic Chemistry</td>
<td>4</td>
</tr>
</tbody>
</table>

Minors in Food Marketing, Economics, Chemistry, or Physics are recommended to strengthen this major.

Research in Food and Nutrition

The Research program prepares for graduate work in the field of Food and Nutrition or for technical laboratory positions. Basic courses in foods, nutrition, chemistry, mathematics, physics, and physiolo-
are required of all students in this specialization. The following courses are included in the curriculum:

- Math 35 College Algebra ........................................ 5
- Math 46 Trigonometry ........................................... 5
- Chem 3, 4, 5 Chemical Principles and Qualitative Analysis .... 15
- Chem 115 Quantitative Analysis .................................. 5
- Chem 121 Organic Chemistry ...................................... 8
- Chem 180 Elementary Biochemistry ................................ 5
- Bact 70, 71 General Bacteriology ................................... 6
- Physiol 4 Human Physiology ....................................... 5
- FN 22 Principles of Nutrition ...................................... 3
- FN 23 Principles of Food Preparation .......................... 3
- FN 107, 108 Science in Relation to Food Preparation ........ 6
- FN 109 Experimental Foods ........................................ 3
- FN 143 Advanced Nutrition ......................................... 4
- FN 150 Seminar-Foods Nutrition .................................. 1

Other courses that are recommended include:

- FN 146 Food Technology and Economics ......................... 3
- An Sci 185 Meats .................................................. 3
- Physiol 20, 21, 22 General Physics ................................ 15
- Math 96, 97, 98, 99 Analytical Geometry and Calculus ........ 20
- Stat 51 Elementary Statistics ...................................... 4

Minors to complement this major are: Physics, Chemistry, Physiology, or Statistics.

Food and Nutrition Minor

Students from all other colleges, as well as students from other departments of the College of Family Life, may select a minor in Food and Nutrition. A minimum of 18 hours is required.

Graduate Study

The MS degree is offered in Food and Nutrition. Through interdepartmental committees the MS and the PhD degrees are offered in Nutrition and Biochemistry and in Food Science and Technology. Curricula are arranged by the Graduate student's committee to meet special interests and the general requirements of the Graduate School. General requirements are given in the section on the Graduate School in this catalog. Detailed requirements may be obtained upon request from the department.

Food and Nutrition Courses

15. Numbers and Units for Food Science. This course is designed to teach a variety of topics common to basic courses in food chemistry and nutrition: use of the metric system; use of units and dimensions in the labeling of physical quantities; molecular basis of heat and use of different scales of temperature; use of numbers expressed in exponent form; and use of slide rule. Laboratory experiments are designed to illustrate and emphasize the use of these concepts in food preparation and nutrition calculations. One lecture and one laboratory (2F).

Lauritzen

22. Principles of Nutrition. The relation of food to health: factors influencing nutritive requirements; problems applicable to individual interests and needs. (3F, W, Sp)

Lauritzen

23. Principles of Food Preparation. The influence of such factors as kind and proportion of ingredients, manipulation, and method of cooking on nutritive value and acceptability of foods. One lecture and two laboratories. Prerequisite or parallel: FN 22. (3F, W, Sp)

Lauritzen

25. 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. Prerequisite: FN 22, 23. (3F, W, Sp)

G. Smith, Snow

107. Science in Relation to Food Preparation. Scientific principles underlying modern food theory and practice. The relation to food preparation of the physical and chemical properties of proteins, starches, sugars, leavening agents, and pigments: the properties of true solutions and principles of crystallization; colloidal systems—gels, sols, foams, and emulsions. Laboratory experiments designed to illustrate the effect of varying ingredients and preparation procedures on the quality of food products. Prerequisite: Organic Chemistry, FN 23. (3F, W)

Funk, G. Smith

108. Science in Relation to Food Preparation. Continuation of FN 107. (3W, Sp)

Funk

109. Experimental Foods. Objective tests in food research. Development, execution, written and oral interpretations of individual problems. Prerequisite: FN 108, or permission of instructor. (3Sp)

Funk

1May be exempt by successfully passing a pretest.
140. Nutrition. Fundamental principles of human nutrition and their application to the individual and family group. Laboratory problems include a dietary study, animal experimentation, and certain chemical analyses. For Home Ed majors. Three lectures and one laboratory. Prerequisites: FN 22, Organic Chemistry, and Physiol 4. (4F, Sp) G. Smith

143. Advanced Nutrition. The study of the various nutrients and their interrelations. Laboratory problems include energy and dietary requirements of humans, small animal studies, and some laboratory methods of nutritional analysis. For FN major and graduate students. Three lectures and two labs. Prerequisites: FN 22, biochemistry, and Physiol 4. (5W) G. Smith

145. Diet Therapy. Application of dietetic principles to health maintenance including dietary modifications necessary in pathological conditions, pregnancy, and childhood. Four lectures and one laboratory. Prerequisites: FN 143. (5Sp) Lauritzen

*146. Food Technology and Economics. Manufacture and preservation of food products and the influence of these products on physical, chemical, and nutritive value of foods; legal requirements and specifications; labeling; implications for the consumer in shopping for food. Prerequisite: FN 108. (3W) Funk

150. Seminar. Reports and discussion on current literature. (1Sp) Staff

*180. Quantity Foods Preparation. Principles of food preparation applied to large quantity production; standardization of food quality, menu planning and study of production costs. The course is planned particularly for juniors and seniors majoring in dietetics and institutional management. Prerequisite: FN 108. (6W) Funk

*182. Institutional Organization, Management and Cost Control. Principles of scientific management applied to large service units. Emphasis on organization of large food service units, on personnel management and human relationships, sanitation problems, food purchasing, record keeping and varied aspects of money management as it affects food service in institutions. Prerequisite: FN 180. (4W) Funk

183. Determination of large and small equipment requirements for food service units; factors governing quality, capacity, care of operation and maintenance of institutional equipment; and arrangement of working units for maximum efficiency. Prerequisite: FN 182. (3Sp) Funk

190. Independent Study. Credit arranged. (F, W, Sp, Su) Staff

197. Honors Studies. See Family Life 197. Credit arranged. (F, W, Sp, Su) Staff

198. Honors Seminar. See Family Life 198. (2W) Staff

200. Laboratory Methods in Nutrition Research. This course is designed to teach basic techniques used in nutrition research through the chemical determinations of constituents in blood and urine of human subjects. Prerequisites: Organic and Biochemistry. (3W) E. Smith

201. Laboratory Methods in Nutrition. Nitrogen balance study; mineral, and vitamin determinations. Prerequisites: FN 200. (2Sp) E. Smith


230. Human Nutrition. Metabolism of carbohydrates and minerals as applied to nutritional requirements and food supplies of people. Prerequisites: FN 120 and 143 or Biochemistry. (3F) G. Smith

231. Human Nutrition. Metabolism of lipids and proteins as applied to nutritional requirements and food supplies of people. Prerequisites: FN 140 and 143 or Biochemistry. (3W) Wilcox

232. Human Nutrition. Metabolism of vitamins; critical analyses of methods used in assessing human nutrition status; evaluation of nutritional problems of current interest. Prerequisites: FN 140 or 150 and Biochemistry. (3Sp) E. Smith

233. Readings in Foods. A critical review of scientific literature in the field of foods. Prerequisite: FN 109. Taught as needed. (3) Funk

243. Nutrition and Growth. Relation of nutrition to growth from the prenatal period to old age. Prerequisite: FN 150. Taught as needed. 3 credits. E. Smith

275. Problems in Institutional Administration. Directed study on selected problems in quantity foods or institutional management for graduate students. Credit arranged. Taught as needed. Funk

290. Independent Study. Credit arranged. (F, W, Sp, Su) Staff

291. Graduate Seminar. Reports and discussions on current literature. (1F, W, Sp) Staff

295. Research and Thesis. Credit arranged. (F, W, Sp, Su) Staff

*Taught 1966-67
Homemaking Education

Head: Assistant Professor Virginia H. Harder
Office in Family Life 318

Instructor Gwen Biddulph.

Homemaking Education provides professional training for teaching homemaking in the secondary schools or for extension work.

Undergraduate Study

Composite major for Secondary School Teaching. The Composite major requirements include 72 hours of subject matter courses with 18-19 in each of four departments:

CT: 10, 24, 75, 105, 106, 120
FCD: 67, 109, 120 plus six hours selected from FCD 77, 115, 140, 150, 180, 185, 187; Psy 202; Soc 160, 171
FN: 22, 23, 25, 107, 108, 140
HEM: 65, 100, 149, 150 or 151, 155, 175

In addition to filling University group requirements students should keep in mind Homemaking Education prerequisites: Psychology 53 and Chemistry 10, 11, 12; Art 5 or CT 5.

Students may gain depth in department areas by electing classes beyond the requirements.

It is recommended that a subject interest be developed into a teaching minor: e.g. English, Business, Music, Physical Education, Social Science, Chemistry, Journalism, and so on.

2) State Certification: Thirty-three credits in professional education are needed to meet requirements for the General Secondary Certificate: Family and Child Development 100 or Psychology 100; Psychology 106, Public Health 155; Education 126 and 150; Homemaking Education 120, 121, 122, and 124; also Family Health 152.

Services available to teachers are:

1. Guidance and help in meeting requirements for (a) renewing certificates. (b) meeting certification requirements.
2. Advanced study leading to the Master of Science degree in Homemaking Education.
3. In-service education.

Extension Service Curriculum. Courses required for entering the USU Extension Service as a County Home Agent are as outlined in the Homemaking Education Curriculum. Other recommended courses are: Extension Methods 151; Journalism 12 or 112; Speech 21; and Sociology 141. A three-month supervised training period in a county is advised for prospective Home Agents. Plans for this training are made with the Director of Extension Services.

Graduate Study

The Department offers two programs for the Master of Science degree. Plan I gives emphasis to general Home Economics subject matter and Plan II gives a major emphasis to the supervisory functions of homemaking teachers in the student teaching experience.
Plan I. This program is flexible to meet individual needs and is particularly applicable for extension specialists and those who need subject matter strength. The basic plan requires 45 credit hours and may be completed in any three quarters on campus within a five-year period. Included is research and thesis or Plan B reports.

Plan II. This program has been designed especially for those who wish to supervise the student teaching experience or take other home economics supervisory positions. The basic plan requires 45 credit hours and must be completed within 5 summers. Research and thesis or the Plan B reports may be conducted during the school year in on-going classroom situations. Evidence of a minimum of two years of successful teaching on the secondary level must be presented before the degree is granted.

See the Graduate Catalog for a more detailed accounting of the two plans.

Homemaking Education Courses


121. Problems in Teaching Homemaking. Opportunity to structure Homemaking units for off-campus classroom teaching in 122. Visual aids are developed; demonstrations, projects, and related activities are planned. This course is taken with Homemaking Education 122. It is important that students register with the instructor of Homemaking Education 121 and 122 one quarter prior to student teaching. This provides the time necessary to arrange teaching assignments with cooperating schools. (4F, W) Harder

122. Student Teaching in Homemaking Education. Observation and teaching of homemaking under supervision in public schools having cooperative arrangements with this University. Student teacher leaves campus the middle five or six weeks of the quarter and teaches a full homemaking program each day in an approved school. Prerequisites: Homemaking Education 120, 121. (9F, W) Staff

123. Demonstration Techniques. Purpose and techniques of demonstrations with application to Family Life teaching in schools, extension and business. Field trips to nearby areas may be planned. Taught as needed. 2 credits. Snow

124. Curriculum Problems. Independent or group study of problems developed in terms of curriculum units for student teaching assignments and within the scope and sequence of the Utah State Curriculum Guide for Homemaking. (2F, W) Staff

190. Independent Study. Credit arranged. (F, W, Sp, Su) Staff

217. Current Developments in Homemaking Education. Newer developments in home economics education at the secondary level. Offered as needed. (3) Harder

237. Seminar. Opportunity for investigations and reporting on individual problems. Credit arranged. (F, W, Sp, Su) Staff

290. Independent Study. Credit arranged. (F, W, Sp, Su) Staff

295. Research for Master's Thesis. Credit arranged. (F, W, Sp, Su) Staff
Courses in this Department help students to understand the theory of management and decision-making in terms of personal values and goals. The management theory is applied to specific aspects of management in the home: housing, family finance, and selection of household equipment. Course content gives meaning to the relationship between general economic conditions and economic problems of families.

A major in this Department contributes to professional preparation in Consumer Economics, Family Financial Counseling, Extension Service, Home Service and other Home Economics positions in business.

### Household Economics and Management

#### Major:

- **HEM 65** Housing ........................................ 3
- **HEM 100** Household Equipment .......................... 3
- **HEM 149** Home Management .............................. 3
- **HEM 150** Home Mgt House or Home Mgt Problems HEM 151 4
- **HEM 155** Family Finance .................................. 3
- **HEM 160** Seminar ......................................... 2
- **HEM 175** Consumer Education .......................... 3
- **FCD 67** Early Childhood ................................ 3
- **FCD 120** Marriage ........................................ 3

Plus an additional 15 hours selected from the following courses and approved by the adviser:

- **CT 75** Home Furnishings .................................. 3
- **Econ 106** Hist of Econ Thought ......................... 3

- **Econ 107** Micro-economic Theory ..................... 4
- **Econ 108** Income and Employment Theory ............. 4
- **Econ 127** Social Security ................................ 3
- **Econ 155** Public Finance and Fiscal Policies ....... 3
- **Econ 156** Spec Prob State and Local Finance ...... 2
- **Econ 165** Money and Banking ........................... 5
- **Acct 100** Survey Accounting Prin .................... 4
- **BA 140** Insurance ...................................... 3
- **BA 156** Prin of Advertising ............................ 5
- **BA 161** Prin and Problems in Retailing ............. 5
- **BA 184** Credit Administration ........................ 3
- **BA 151** Marketing Principles .......................... 5
- **Soc 160** Family in Various Cultures .................. 3
- **Soc 171** Juvenile Delinquency .......................... 3
- **SW 180** Group Dynamics .................................. 3
- **SW 178** Adolescence ..................................... 3
- **SW 199** Public Welfare ................................... 3
- **SW 50** Social Welfare Agencies ....................... 3
- **Anthr 160** Comparative Family Systems ............. 3
- **Psy 155** Psy of Business and Industry ............... 3
- **Psy 161** Social Psychology ............................ 3
- **Psy 180** Motivation ..................................... 3
- **Mfg E 137** Work Simplification and Layout ......... 4
- **ITE 79** Pract Elect Wiring ............................... 3
- **Philos 45** Intro to Problems of Philos .............. 5
- **Philos 50** Beginning Logic .............................. 5
- **Chem 10** General Chemistry ............................ 15
- **11, 12** .................................................. 5 (each)
- **Phys 6** General Physics ................................ 5
- **HmgEd 123** Demonstration Tech ....................... 2

#### Minor:

- **HEM 65** Housing ......................................... 3
- **HEM 100** Household Equipment ........................ 3
- **HEM 149** Home Management ................................ 3
- **HEM 155** Family Finance ................................ 3

Plus an additional 6 credits in the Department or related support-
ing course work approved by the Department Head.

A minor developed in the area of Economics, Sociology, Psychology, Radio-TV, Journalism, Speech, Food and Nutrition, Clothing and Textiles, or Family and Child Development provides additional training for the type of employment desired.

Graduate Study

The Department of Household Economics and Management offers work leading to the Master of Science degree, emphasizing the areas of Housing, Household Equipment, Home Management, or Family Finance. Flexibility in program planning provides opportunity for developing individual strengths and interests. Course work is arranged in cooperation with other departments of the University, including: Economics, Sociology, Psychology, Philosophy, Business Administration, Physics, Statistics, Chemistry, Family and Child Development, Food and Nutrition, and Clothing and Textiles. A Master's Degree prepares students for University teaching.

Household Economics and Management Courses

65. Housing. A consideration of factors involved in housing the family: financing, population increase, location, site planning and orientation; criteria for evaluating homes; housing trends; renting vs. buying, and building vs. buying a used home; kitchen planning. (3F, W, Sp) Fowler

100. Household Equipment. Principles of selection, use, care, and arrangement of kitchen and laundry equipment. (3F, W, Sp) Fowler

149. Home Management. The theory of effective home management; concerns values and goals as reflected in decision-making about family resources. (3F, W, Sp) Nyman

150. Home Management House. The application of the theory of management in a living situation. Residence in a Home Management House provided for a five-week period. Application must be made with instructor in advance of registration. Students who are employed must check their working schedule with the faculty adviser before planning to move into the House. Prerequisites: Food and Nutrition 22, 23, 25 or its equivalent; Household Economics and Management 149. (4F, W, Sp) Fowler

151. Home Management Problems. Substitute for HEM 150 for married students only. The application of the theory of management as applied to students' homes. Prerequisites: Foods and Nutrition 22, 23, 25 or equivalent; Household Economics and Management 149. (4F) Nyman

155. Family Finance. Consideration of major financial alternatives available to families and some factors that determine financial decisions. (3F, W, Sp) Nyman

160. Seminar. Reports and discussions on current readings in Household Economics and Management. (2Sp) Staff

175. Consumer Education. The role of the family and its members as consumers; current aspects of consumer behavior; agents involved, i.e. government, the market, consumer interest groups, etc. (3W, Sp) Nyman

190. Independent Study. For qualified students upon consultation with the instructor. Credit arranged. (F, W, Sp, Su) Staff

260. Graduate Seminar. Review of current literature in Household Economics and Management. (2W) Staff

290. Independent Study. For qualified students upon consultation with the instructor. Credit arranged. (F, W, Sp, Su) Staff

295. Research for Master's Thesis. Credit arranged. (F, W, Sp, Su) Staff
Combination Major in

Family Life and Office Administration

This is a program for women who desire basic education for Family Life plus sufficient secretarial training to provide for professional opportunities outside the home. For a Bachelor's degree with this combination major, students complete the Family Life and Secretarial courses here listed, plus the University group requirements listed in the Catalog.

Family Life Courses

42 hours with not less than 9 in any department.

<table>
<thead>
<tr>
<th>CLOTHING AND TEXTILES</th>
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<tbody>
<tr>
<td>CT 10 Pattern Designing and Clothing Construction</td>
<td>3</td>
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<tr>
<td>CT 24 Introduction to Textiles</td>
<td>3</td>
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<tr>
<td>CT 75 Home Furnishings</td>
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<tr>
<td>CT 106 Clothing Selection and Consumption</td>
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<tr>
<td>CT 120 Behavioral Science Aspects of Clothing</td>
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<tr>
<td>CT 135 Comparative Construction Techniques</td>
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<tr>
<td>CT 140 Draping</td>
<td>3</td>
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<tr>
<td>CT 170 Flat Pattern Designing</td>
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<td>CT 180 Tailoring</td>
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<tr>
<th>FAMILY AND CHILD DEVELOPMENT</th>
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<tr>
<td>FCD 20 Preparation for Marriage and Family Relations</td>
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<tr>
<td>FCD 67 Early Childhood</td>
<td>5</td>
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<tr>
<td>FCD 77 Child from 6-12</td>
<td>3</td>
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<tr>
<td>FCD 100 Human Growth and Development</td>
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<td>FCD 108 Guidance of the Young Child</td>
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<td>FCD 109 Play-School Education</td>
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<td>FCD 115 Growth of the Infant</td>
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<td>FCD 120 Marriage</td>
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<td>FCD 140 The Family in its Social Setting</td>
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<tr>
<td>FCD 150 Seminar</td>
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<tr>
<td>FCD 185 Family in Middle and Later Years</td>
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**FOOD AND NUTRITION**

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<tr>
<td>FN 22 Principles of Nutrition</td>
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<tr>
<td>FN 23 Laboratory of Nutrition and Food Preparation</td>
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<tr>
<td>FN 25 Meal Preparation for the Family</td>
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<tr>
<td>FN 107 Science in Relation to Food Preparation</td>
<td>3</td>
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<tr>
<td>FN 108 Science in Relation to Food Preparation</td>
<td>3</td>
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<tr>
<td>FN 109 Experimental Foods</td>
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<td>FN 135 Weight Control</td>
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<td>FN 140 Nutrition</td>
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<td>FN 146 Food Technology</td>
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<td>FN 150 Seminar</td>
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**HOUSEHOLD ECONOMICS AND MANAGEMENT**

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<tr>
<th>HOUSEHOLD ECONOMICS AND MANAGEMENT</th>
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<tr>
<td>HEM 65 Housing</td>
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<tr>
<td>HEM 100 Household Equipment</td>
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<tr>
<td>HEM 149 Home Management</td>
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<tr>
<td>HEM 150 Home Management House</td>
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<tr>
<td>or HEM 151 Home Management Problems</td>
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<td>HEM 155 Family Finances</td>
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<td>HEM 175 Consumer Education</td>
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**Office Administration Courses**

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<tr>
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<tr>
<td>OA 42 Intermediate Type</td>
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<tr>
<td>OA 43 Advanced Type</td>
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<tr>
<td>OA 65 Records Administration</td>
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<td>OA 85 Office Data Systems</td>
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<tr>
<td>OA 92 Business Machines</td>
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<tr>
<td>OA 141 Dictation and Transcription I</td>
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<tr>
<td>OA 142 Dictation and Transcription II</td>
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<tr>
<td>OA 167 Office Practice</td>
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<td>OA 175 Office Management</td>
<td>3</td>
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<td>OA 186 Secretarial Procedures</td>
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<td>1Acct 1 Introduction to Accounting</td>
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<tr>
<td>BA 4 Business Law</td>
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<tr>
<td>BA 5 Business Law</td>
<td>2</td>
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<tr>
<td>BA 29 Introduction to Business</td>
<td>3</td>
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<tr>
<td>BA 143 Business Communications</td>
<td>3</td>
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Total 43 hours

1It is recommended that Acct 2 also be completed—3 hours.
General Major in Family Life

Coordinator: Dean Phyllis Snow
Adviser: Any staff member in any department in the College of Family Life

This program is designed for the student interested in a general education for Family Living and in a broad cultural education. Students in this curriculum may plan it as a basis for business and professional positions for which a general background is required. Or they may develop a program with emphasis in international service, or for participation in government or agency programs, such as Vista and Peace Corps, or to become oriented to national and international affairs as part of their responsibility of citizenship.

Fifty credits, taken in no less than three departments, are required for a major. The minor may be chosen from any division on campus but should be selected to complement the major. Minors in the social, physical or biological sciences, modern languages, English or journalism, or mathematics are especially recommended.

As soon as possible after choosing this curriculum the student should plan with the adviser for the selection of a series of courses that will insure a well-balanced program.
COLLEGE OF HUMANITIES AND ARTS
College of

Humanities and Arts

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Degrees Offered:
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  Bachelor of Fine Arts
  Bachelor of Music
  Bachelor of Science
  Master of Arts
  Master of Fine Arts
  Master of Music
  Master of Science
Scope of College of Humanities and Arts. Besides providing basic preparation courses for students who will graduate from other divisions of the institution, the College of Humanities and Arts assists all students in the University toward a liberal education. The need to understand our own culture and the culture of other nations has never been so urgent as now, and for this understanding, languages, philosophy, literature, and the arts are essential. These are the means by which individuals and peoples speak to each other, whether in an individual conversation, a public address, a television documentary, a story, a painting, a statue, a musical work. To know the work of Aeschylus, Plato, and Praxiteles is essential if we would know Greece, for example, and understand the significant parts of our culture which we have inherited from her.

The curricula of the College also enable a student to prepare for a career with a major in any of several departments:

Art, Audiology-Speech Pathology, English and Journalism (English, American Studies, Journalism), Landscape Architecture and Environmental Planning, Languages (and Philosophy), Music, Speech, and Theatre Arts. For teachers, composite majors in English-Speech and Speech-Theatre Arts are offered.

Those interested in a broad education rather than a specific career preparation may take a degree in Liberal Studies. Sufficient concentration in languages, literature, history, or one of the sciences is required to provide sound preparation for graduate work, but emphasis is on a good introduction to several areas.

General principles which may help guide Humanities and Arts students and their advisers in fashioning study programs are these:

A student should seek a true liberal education including both the arts and the sciences. At least two years of a foreign language are advisable. Besides the major and minor areas of concentration, a student should choose as many courses as possible from those designed to aid in discerning meanings, relating significant ideas, and forming sound patterns of thought and action. These are exemplified in philosophy and other courses which seek to emphasize central, unifying principles.

Liberal Arts

T. Y. Booth, Adviser
Office in Main 132D

The Liberal Arts program provides a course of study combining elements of both the humanities and the sciences and leading to a degree in Liberal Arts. Considerable flexibility is afforded
through choice among several curricula. The goal is substantial, orderly, well balanced mental development of a broad type. Eventual selection of a field of concentration in the general area of either the sciences or the humanities is required for a degree.

Curricula in Liberal Arts

The following three courses of study, each leading to a Bachelor's degree, are available in Liberal Arts. Students are not required to complete a separate minor. Because of the requirements for basic courses in several fields, upper division requirements for graduation may be reduced to a minimum of fifty credit hours.

I. Main Currents in Western Civilization. Two years of a foreign language; a concentration of forty credits in either history or literature and fifteen credits in the one not chosen for concentration; fourteen credits in Philosophy\(^1\); fifteen credits in one of the sciences or in mathematics.

(A) Literature. (1) For concentration: English 40, 41, 147, 148, 149; and 15 hours selected from English 46, 150, 151, 152, 190, 191 and classes in the literature of a foreign language. (2) For the fifteen credit requirement: any fifteen credits from the above courses.

(B) History. (1) For concentration: History 4, 5; and 30 hours in History, chiefly upper division, chosen in consultation with a member of the History faculty. (2) For the fifteen credit requirement: History 4, 5, 20.

(C) Philosophy. Fourteen credits from the following: Philosophy 45, 50, 140, 141, 142, 160, 161; Political Science 145, 146, 147.

(D) Mathematics and Science. Complete one of the following series: (1) Biological science: Biology 15 or Bacteriology 10; Zoology 31 and 107; Public Health 50. (2) Chemistry: Chemistry 3-4-5 or 10-11-12. (3) Mathematics: Mathematics 35, 46, 96. (4) Physics: Physics 17-18-19, or 20-21-22. If students select the series in physics they should fill the exact science group requirement with Mathematics 35 and 46, and are advised to complete Mathematics 96 also.

II. Languages and World Literature. Thirty-nine credits in foreign languages; forty credits in Literature; thirty credits in Philosophy.

(A) Languages: Two years in one foreign language; one year in a second foreign language.

(B) Literature (40 credits): (1) At least 25 credits selected from English 40, 41, 46, 140, 141, 147, 148, 149, 168, 169. (2) At least nine credits in the literature of one or more foreign languages.

(C) Philosophy: Philosophy 45, 50, 140, 141, 142, 160; History 4, 5; any two (six credits) of Political Science 145, 146, 147.

III. Science and Philosophy. Two years of a foreign language; a concentration in either Mathematics and Physical Science or in Biological Sciences as specified below; 30 credits in History, Philosophy and Literature.

(A) Science: Complete one of the following programs: (1) Physical Science and Mathematics. Mathematics 35, 46, 96, 97, 98, 99, and either (a) or (b). (a) Chemistry 3-4-5, or 10-11-12; Physics 17-18-19, or 20-21-22; 153-154-155, or 175-176-177. (b) Physics 17-18-19, or 20-21-22; Chemistry 3-4-5, or 10-

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\(^1\)See Philosophy Division of Department of Languages. Political Science 145, 146 and 147 deal with political philosophies and are therefore relevant.

\(^2\)Ten of these credits may be applied toward the group requirement in the field.
11-12; 104-105-106, or 121-122-123, or 134.

(2) Biological Sciences. \(^2\) Biology 15, Zoology 16, 107, 112, and 131; Botany 26, 102, 118; Bacteriology 10, 160; Public Health 50, 155; Physiology 104. Students selecting this series should fill the physical science group requirements with classes in Chemistry or Physics.

(B) History, Literature, Philosophy. Thirty credits from among the following, shared among at least three departments: English, American or Comparative Literature or the literature of a foreign language; Philosophy 45, 50, 140, 141, 142, 160; History; Political Science 145, 146, 147; Sociology 70; Economics 51, 52.

Liberal Studies

T. Y. Booth, Coordinator
Office in Main 132D

The chief function of the Liberal Studies program is the advisement of students who have not decided upon a major subject or area of specialization. The Liberal Studies Coordinator finds a suitable adviser for each of these students. With the aid of this adviser he looks after the student's academic interests, encouraging him to pursue a general Liberal Studies program while he explores his own aptitudes and various career opportunities so that he can choose a major field. Advisers are selected from all colleges of the University on the basis of personality qualifications and student interests.

Students who are enrolled in another department but believe that they have chosen their major unwise may transfer to the Liberal Studies program upon receiving permission from the Dean of the College of Humanities and Arts.

Department of

Art

Head: Associate Professor Harrison T. Groutage
Office in University Annex 205A

Professors Jessie Larson, Everett C. Thorpe; Professor Emeritus H. Reuben Reynolds; Associate Professor Gaell Lindstrom; Assistant Professors Jon Anderson, Ralph T. Clark, Larry Elsner, Arlen Hansen.

Art

General Education Requirements. A general education in the visual arts is of lasting value to most university students. Several courses are offered which satisfy the Humanities and Arts group requirements: Art 1, 10, 35, 36, 37 and 40.

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\(^2\)Ten of these credits may be applied toward the group requirement in the field.
Bachelor of Arts Degree

It is strongly recommended that Art majors complete all general education group requirements, and the modern language requirement, by the end of the Sophomore year. This will allow students to intensively work in their art studio courses during the Junior and Senior years. Art majors must satisfactorily complete the core of basic art courses: Art 1, 5, 6, 7, 8, 10, 12, 14, 35, 36, and/or 37 with at least a grade of "C" or better. The design courses Art 5 and 6 are fundamental prerequisites and should be completed before registering for other studio classes.

Art majors may specialize in any one of the following areas: Painting and Drawing, Advertising Design and Illustration, Sculpture, Fabric Design, Ceramics, Jewelry & Metalsmithing, Printmaking, Interior Design, Photography, or Art Education which includes some work in all of these areas. With the permission of the major adviser, and the Head of the Department, it is also possible to undertake a composite major program. The detailed outline of course requirements for each of these specializations is available at the Art Department Office. The major professor may also prescribe other courses to serve the particular needs of different students.

The quality, as well as the quantity of student art work is of great importance. Students must demonstrate their competence in original, creative expression. In the area of specialization, the major professor may require that certain upper division studio courses be repeated several times in order to more fully develop student abilities. With the exception of Art 135, 140, 151 and 152, all upper division courses may be repeated for additional credit.

During the final quarter, before graduation, each student will participate in a Senior Exhibition. The best art works created during the Junior and Senior years should be retained for this important exhibition. These may include paintings, drawings, sculpture, crafts, commercial designs, etc. They should be well framed or displayed in such a manner that a student's understanding of careful selection of quality work and well designed presentation are evident.

Utah State University Department of Art Faculty reserve the right to retain any student works of their choice for purpose of display and exhibition.

Bachelor of Fine Arts Degree

This is a professional art degree requiring above average accomplishment in art, intensive application and the consistent production of creative works of high quality. There is no modern language requirement. General education requirements must be completed in the Freshman and Sophomore years in order that students can devote their Junior and Senior years to intensive work in studio art courses in the areas of their specialization.

Instead of the usual major and minor requirements, students for this degree are required to satisfactorily complete a composite Art major in closely related art areas. This is a highly individualized program of study, and major advisers will establish the specific requirements of greatest value to each individual student. The basic art courses, Art 1, 5, 6, 7, 8, 10, 12, 14, 35, 36, and/or 37 must be completed with at least a “B” average. Design classes Art 5 and 6 must be completed before registering for other studio courses.
In order to be accepted into the BFA program, a portfolio of art work completed during the Freshman and Sophomore years must be submitted for review by the art faculty. Only students demonstrating considerable promise will be accepted for this more demanding professional degree. Transferring students must also submit a portfolio and demonstrate the same level of proficiency as Utah State University undergraduates in Art.

All BFA students are also required to participate in a Senior Exhibit during the final quarter before graduation.

Art Minor Requirements

The requirements for a minor in Art are flexible and can be completed in any area of specialization. Generally, the minimum requirements include: Art 1, 5, 8, 14, plus 3 hours from the art history group (10, 35, 36, 37) and 3 hours from the hand crafts group (19, 30, 66).

Undergraduate Program

Advertising Design and Illustration. One of the most vital areas of art, advertising design and illustration keeps constant pace with our economy. It is through the creative work of successful designers that products are advertised and sold. Courses place heavy stress on design and layout. To prepare for a professional job in this field, one must acquire proficiency in lettering, design, rendering techniques and production methods. He also prepares a portfolio of work to show prospective employers his ability to produce tasteful and imaginative solutions to advertising and illustration problems. In addition to the basic courses, Advertising Design and Illustration majors are required to take the following: Art 9, 13, 16 (Figure Drawing for Illustration), 81, 82, 83, 84, 104, 105, 111, 112, 181, 182, 183, 184, 192. Additional prescribed classes to be selected on consultation with advisers are: Art 57, 58, 59, 70, 85, 185, 136, 137, 138, 191.

Art Education. To teach art in the secondary schools students should major in Art Education. Prospective teachers are encouraged to acquire an extensive background in several art areas. Their own creative work should demonstrate better than average ability. Broad understanding and creative production are great assets to the art teacher who wants to be a motivating example to his students and sensitive to different student possibilities. In addition to the basic core, Art Education majors are required to take the following classes: Art 30, 37, 40, 60, 81, 111, 115 or 116, 127, 135, 152, 191, 192 plus additional classes prescribed by the adviser.

Minimum requirements for an Art minor for students majoring in Elementary Education: Art 1, 5, 8, 14, 50 and 151.

Ceramics. Ceramics is the third largest industry in America today. The study of Ceramics includes pottery, tile, terra cotta sculpture, brick making, etc. and is used in the forming of many porcelain parts in technical and electronic equipment. Ceramic crafts as taught at USU are rapidly becoming an important part of artistic training recognized by both the artist and industry. The University has one of the most complete and well equipped ceramic workshops in the nation. Excellent tools and equipment are provided for each student. The lab is accessible during the day for classes and special work and two evenings per week. Special high-fire kilns are available for student work as well as a variety of clays and glazes. Programs in this area are tailored to fit needs of
an individual student, both beginning and advanced. In addition to the basic courses Ceramic majors are required to take: Art 19, 30, 60, 119, 130, 131, 132, 160, plus additional classes to be prescribed by the major professor.

Fabric Design. Through the ages man has employed fabrics for dual purposes of utility and esthetic expression. In today’s living, fabrics are achieving an increasing importance and their traditional uses in personal adornment and home furnishing are expanding. Fabrics have become essential units in contemporary architectural and industrial design. New commercial products constantly suggest new areas of interest for the weaver and fabric designer. Students develop creative fabric design projects which include experimentation with new fibers and techniques of enrichment, both applied and structural, and give fresh and original application of known and satisfactorily proven techniques. In addition to the basic core of art courses, Fabric Design majors are required to complete the following: Art 40, 66, 115, 116, 135, 166, 169 and C&T 24. Additional prescribed classes are to be selected on consultation with their adviser.

Interior Design. Never before has there been such widespread interest in home planning nor such varied materials from which to choose. Interior Design courses are planned to help those who wish to make their own home appropriate to their kind of family life as well as to prepare adequately those who wish to enter the Interior Design field professionally. In addition to the basic courses, Interior Design Majors are required to take the following: Art 11, 40, 66, 85, 115 or 116, 135, 140, 142, 143, 144, and C&T 24. Additional prescribed classes to be selected on consulta-

Jewelry and Metalsmithing. Various metals provide exciting possibilities for the creative artist. For centuries molten metal has been used to cast sculpture. Now hammered sheets of metal can be formed into exciting sculptural pieces. Welding techniques can be used to create art of three dimensional design. There are unlimited possibilities for artistic design in creation of modern jewelry. In addition to the basic nine courses, Jewelry and Metalsmithing majors are required to take: Art 30, 31, 19, 119, 120, plus additional classes according to individual needs as prescribed by the major professor.

Painting and Drawing. When most people think of art, it is painting and drawing that they generally have in mind. Contemporary artists are utilizing all of the historical approaches to painting and drawing and are exploring new ideas, techniques, and materials in order to make new contributions. A student is not required to follow any one approach to drawing or painting but his own individuality is encouraged. In addition to the basic nine he is required to take Art 9, 13, 104, 105, 109, 111, 112, 127. Additional classes prescribed: Art 25, 30, 40.

Photography. Photography is one of the most recent art forms. National and international exhibits of photographs in color and black and white have aroused great interest. There are many opportunities for photographers in the commercial world of advertising and illustration, industry, portraiture, medical, etc. Photography majors should take Art 1, 5, 8, 35, 36 and/or 37, and 135 as a basic art minimum.
Photography courses should include Art 53, 54, 56, 57, 58, 59, 164, 165, and 170. In order to develop professional competence, several of these upper division studio courses can be repeated for additional credit.

Students planning on operating their own photography studio as a business, should take Acct 100, Survey of Accounting Principles, and BA 147, Managing a Small Business. Social Psychology 161, Sociology 70, and Landscape Architecture 3 are also recommended for all Photography majors.

During the final quarter of the Junior year, students must plan a display of their photography portfolio. The required Senior Exhibition will display the best black and white and color photography prints in a well-designed show given during the final quarter before graduation.

Printmaking. Printmaking is enjoying a powerful renaissance in America at present. Prints are competing with other art forms as they never have before and they give the artists advantages that other art forms do not. Printmaking is perhaps man's most interesting art in that it encompasses so many of the other art activities. To make a fine print a student must draw, design, carve, and print. In addition to the basic courses, Printmaking majors are required to take: Art 9, 12, 13, 30, 104, 105, 109, 111, 112, 183, 191, 193, 194, 195 plus additional courses prescribed by major professor.

Sculpture. Sculpture is one of the oldest forms of artistic expression and the contemporary sculptor is still utilizing the ancient materials of wood, stone, clay and metal but with new insights. New materials and new techniques have broadened the range of sculptural expression. Proficiency in drawing and modeling and plaster casting are first objectives. At the same time some understanding of the structural nature of the various sculptural media is expected to be developed. In addition to the basic requirements for all Art majors, Sculpture majors are required to complete satisfactorily with a "B" average the following courses: Art 9, 13, 19, 30, 31, 104, 105, 60, 160, plus additional courses based on individual needs as recommended by the major professor.

Fine Arts Tours

Art majors and minors should plan to participate in some of the excellent Fine Arts Tours available. These include the annual Fall tour to San Francisco to visit the art galleries, museums and attend operas, Broadway plays, and musicals. The annual Fine Arts Tours to Europe, Mexico, and Hawaii are conducted during Summer Quarter. Students can attend plays in New York City and London. These tours are planned for a maximum learning experience and are possible at minimum cost. Up to nine hours of University credit may be earned on these summer tours. Detailed information is available in the office of the Director of Tours.

Graduate Study

Challenging opportunities for graduate study and creative performance are available in many areas of Art. Students may choose to qualify for either the general Master of Arts degree or the more specialized Master of Fine Arts degree.

Master of Arts Degree. This is the liberal studies degree at the graduate level and general requirements are listed in Part I of the Graduate Catalog. Additional re-
requirements specified by the Department include: (1) Minimum proficiency in one foreign language must be demonstrated in tests administered by the Department of Languages. All graduate majors in art are encouraged to participate in the annual Fine Arts Tours to Europe and Latin America to further develop their language proficiency while experiencing original masterpieces of art firsthand. (2) Initially a portfolio of art work must be presented to the Art staff for its consideration. The art faculty will determine whether a student will be required to take certain courses to correct any apparent deficiencies. Credit in such courses cannot be counted toward the Master's degree. Also determined at this time will be the student's graduate status. (3) A thesis project should be selected during the first quarter of graduate study with the aid of the graduate committee. No more than three hours of thesis credit can be carried per quarter. A written and illustrated record must be kept of the progress on this creative thesis project. (4) Before the time of graduation the student must design a comprehensive exhibit of his graduate work which has been approved by the graduate committee as most representative of the best work done under faculty supervision. The thesis project should be an important part of this display. (5) At their discretion, the art faculty may select finished works for the permanent collection of Utah State University. (6) Prior to the final examination, colored 35mm slides of the "Master's Exhibit" should be presented to the Art Department as a permanent visual record of the graduate work.

Master of Fine Arts Degree. This is a specialized professional degree. In 1959 the College Art Association of America approved the MFA, rather than the PhD as the terminal degree in the Studio Arts. Whereas an exceptional student devoting full time might qualify after four quarters, it is generally considered to require an average of two years to produce enough art works of sufficient quality to be recommended for this degree. The accumulation of credit hours and the number of quarters in residence are not major factors in granting the MFA degree. However, four quarters in residence are minimum for all MFA degree students. Emphasis will be upon creative and technical achievements by students with considerable ability. Only students whose previous work indicates promising potential in art will be accepted for admission to the MFA art program.

Because the MFA degree is highly individualized, the student should consult the Department or his graduate committee for more detailed information on requirements.

Art Courses

1. Exploring Art. Designed to increase enjoyment of living through the sense of sight. Develops understanding of basic principles underlying the visual forms of art in everyday life. (3F, W, Sp) Staff

2. Beginning Design. Introduces the basic art elements and is comprised of projects largely in two dimensions. Required of Art Majors. (3F, W, Sp) Prerequisite to Art 14.

3. Intermediate Design. Composition of spatial volume with points, lines, planes and color, and shapes with color and texture. Also sculptural experience with handles, stabiles, and mobiles. Prerequisite: Art 5. (3W) Staff

4. Advanced Design. Introduction of the potential and limitations of various creative media. Prerequisite: Art 6. (3Sp) Staff

5. Basic Drawing. An individually creative approach to drawing natural forms from observation and memory. Various media are used. Prerequisite to all painting courses. (3F, W, Sp) Groutage, Thorpe

6. Anatomy for Artists. Analysis of bone structure of the body, with emphasis on surface characteristics. Prerequisite to life drawing. (3W) Elsner
10. Analyzing Contemporary Painting. There are many kinds of "Modern Painting" because artists are highly individual and they strive to achieve different purposes. A text and other illustrative materials are used to help understand contemporary trends in art. (3F, W, Sp) Tippets

11. Beginning Watercolor. Experimental approaches with transparent watercolor, casein, gouache. Part of the quarter will be spent out-of-doors sketching directly from nature. Prerequisite: Beginning Drawing, Art 8. (3F, Sp) Lindstrom

12. Intermediate Drawing. A continuation of Basic Drawing emphasizing more complex drawing problems and requiring a deeper analysis of the essentials in the subject matter. All drawing media are used. Prerequisite: Art 8. (3F, W, Sp) Staff

13. Drawing and Composition. Prerequisite, Basic Drawing and Intermediate Drawing. Intensive drawing in all media emphasizing various approaches to composition. (3W, Sp) Staff

14. Introduction to Painting. Basic approaches to painting which develop freedom of expression. Tempera and related media. Recommended as prerequisite to all other painting courses. (3F, W) Prerequisite: Art 5. Thorpe

16. Figure Drawing. Figure drawing for the student going into the professional field of fashion, book and newspaper illustration—flat diagram and mannikin, figure in action and imagination, block forms, balance and rhythm, variety in pose, and ideal proportion. (3W, Sp) Thorpe

19. Jewelry and Metalsmithing. The design and production of objects in nonferrous metals, using the basic techniques of metalsmithing. Emphasis on raising and fabricating metal hollowware in conjunction with the various technical means to that end: sawing, filing, soldering, buffing, etc. Prerequisites: Art 6, 7. (3F, W) Staff

30. Introduction to Ceramics. Beginning course in ceramics. Techniques of throwing, slab and coil building, carving, pinching. Introduction to the complete ceramic process, through the use of films, slides, and lectures. Desirable prerequisites: Art 1, 5. (3F, W, Sp) Staff


35, 36, 37. Art History. A three-quarter sequence for Art majors. A thorough survey of the lasting contributions of each major art movement. Through use of visual aids, artists and their enduring works are discussed and observed: Primitiye, classical, medieval, rennaissance, neoclassical, the important schools of modern art, and contemporary works. (3F, 3W, 3Sp) Reynolds

40. Essentials in Interior Design. A study in basic philosophy of interior design both domestic and public. Analysis of art elements and principles of design applied to home planning and furnishing. (3F, W, Sp) Larson

50. Art for Young Children. For child development majors, mothers, kindergarten and first grade teachers. (3Sp) Staff

53. Color Photography. Actual project assignments teach proper exposure of color transparencies and color negatives for projection, print and reproduction purposes. Various filters are used for color correction and creative effects. Prerequisites: Art 57, 58, and 54. (3Sp) Clark

54. Photo Lighting. Basic indoor and outdoor lighting methods. Practical projects are assigned which emphasize flood-lighting, flash, strobe and natural lighting. Prerequisites: Art 57 and 58. (3F) Clark

56. Basic Photo Portraiture. Using relatively simple methods students learn to reveal personality and character, not just a likeness. Study of the subject, desirable backgrounds, composition, types of lighting, films, papers, and darkroom techniques are stressed. Prerequisites: Art 54, 57, 58. (3F) Clark

57. Photo Fundamentals. Correct camera operation, landscape and simple portrait picture taking, preparation and care of chemical solutions, negative development, contact printing and elementary enlarging. (3F, W, Sp) Clark

58. Picture Taking. Students seriously interested in photography will complete many picture taking assignments under a wide variety of conditions emphasizing proper exposure, careful composition and the creation of photographic prints which convey personal feeling. Prerequisite: Art 57. (3F, Sp) Clark

59. Photo Lab Techniques. Correct darkroom methods are stressed. A variety of problems in developing and printing are investigated; over and under development with necessary compensations in printing, spotting, etching, burning, dodging, retouching and toning are taught. Special negative control methods are introduced, such as: intensification, reduction, solarization and montage. Prerequisites: Art 57 and 58. (3W) Clark

60. Beginning Sculpture. Study of anatomy in various plastic media; clay, plaster and wax. Analysis of skeletal structure and surface form. Introduction to various media, wood, stone and clay for sculptural expression. Prerequisite: Anatomy for Artists. (3F, W, Sp) Elsner
66. Creative Handweaving. Introduction to basic elements and procedures of handweaving, providing a foundation for the creation of original design projects—place mats, rugs, wall hangings, room dividers, etc. (3F, W) Larson

70. Fashion Illustration. Brush, pencil and wash techniques for the complete statement of various fabrics and textures to the final figure in costume in halftone; line and shadow, for reproduction and professional use. (3W, Sp) Thorpe

81. Beginning Lettering. Introduction to basic letter forms such as Roman, Gothic, and Scripts. (3F) Anderson

82. Beginning Advertising Design. A class to introduce the student to the many different kinds of advertising media and techniques. An assignment is met in each media, as newspaper, magazine, outdoor advertising, trademarks, letterheads, brochures, and an understanding of lettering and type in advertising design. (3F) Anderson

83. Beginning Illustration. Basic technique in illustration. The course trains the student in producing professional advertising and illustrating art which would enable him to find employment in this field. (3F) Anderson

84. Postermaking. Techniques and methods of constructing posters. Useful for education majors. (3W) Anderson

85. Beginning Architectural Rendering. To explore different media for architectural and landscape renderings. To do finished renderings and begin to perfect a style of their own. (3W) (By special arrangement) Anderson

101. Contemporary European Arts and Crafts. An art appreciation course devoted to an investigation of current European creative efforts in painting, sculpture, and the varied crafts. Taught only on the summer art tour of Europe. (3Su) Tippetts

103. High Renaissance Art. A more specialized Art History class studying the works of Leonardo Da Vinci, Michelangelo, and Raphael, master painters of the Italian High Renaissance. Taught only on the summer art tour of Europe. (3Su) Tippetts

104. Life drawing. Anatomical and interpretative rendering of the figure in creative composition. Various ages, sexes, body types and races are studied. (3Sp) Elsner, Groutage

105. Advanced Drawing and Composition. Emphasis is given to both imaginative and outdoor sketching, sketching from life, also composition and design. Prerequisites: Art 5, 8, 12. (3Sp) Groutage, Thorpe


110. Modern European Painting. This course will investigate some of the major trends in contemporary European painting. Major attention will be devoted to the "School of Paris" and modern Italian painters. This will be taught only on the summer art tour of Europe. (3Su) Tippetts

111. Watercolor and Related Media. Students may use any aqueous medium or combination. Several lab periods will be spent sketching out-of-doors. Prerequisite: Art 11. (3F, Sp) Lindstrom

112. Portrait Painting. Problems of portrait painting with emphasis on the literal representation of form. Various ages and racial types are studied. Prerequisites: Art 8, 14. (3Sp) Thorpe, Groutage

115. Fabric Design. (applied) Projects in creating original designs and applying them to suitable textiles in techniques of silk screen printing, free-hand painting, block printing, stencil or batik. Desirable prerequisite: Art 5. (3F) Larson

116. Fabric Design. (structural) Projects in creating original designs and reproducing them in hooked rugs, upholstery fabrics, wall hangings, etc., and in various dramatic hangings and covers done in creative embroidery. Desirable prerequisite: Art 5. (3F) Larson

118. Leathercraft. Design and construction of wallets, belts, bags, briefcases, holsters, bridle and related projects. Executed in techniques of modeling, carving, stamping, imposing, etc. (8) Staff

119. Metalsmithing. Continuation of Art 19. Introduction of forging of flatware and sand casting. Emphasis on original design of hollowware, flatware, or other objects of the student's choice. Prerequisite: Art 19. (3Sp) Staff

120. Jewelry Casting. Continuation of Art 20. Introduction of centrifugal investment casting, using wax as the creative medium. Original design of various types of jewelry; techniques necessary for the completion of the metal product. Prerequisite: Art 19. (3F, Sp) Elsner

127. Painting Workshop. Work may be done in representational or non-representational areas in oil or related media. (3W, Sp) Thorpe

128. Photography Workshop. Designed to cover several phases of photography including scenic, textural studies outdoors, closeups and basic portraiture on location. Emphasis on seeing and composing what we see in an artistic manner. Use of student's own equipment encouraged. Completion of a basic course in photography is prerequisite. 3 credits

130. Ceramic Hand Building Techniques. A course devoted to the production of pottery using techniques such as coil, slabs, pinch-
131. Glaze Calculation. Calculation of glaze formulas and operation of the kilns. Prerequisites: Art 5, 6, 7, 30, 31, 130. (3F, W, Sp)
Lindstrom, Elsner

132. Ceramic Workshop. Advanced work in area selected with the aid of the major professor. Prerequisites: Art 5, 6, 7, 30, 31, 130, 131. Credit arranged (F, W, Sp)
Lindstrom, Elsner

135. Color. Color as a design element in stage lighting, painting, and everyday living. Physical, psychological and artistic aspects are correlated. (Sp)

136. Art Photography. Means of producing fine photographs. (3F)
Reynolds

137. Art Photography. Texture, composition, lighting and print quality. (3W)
Reynolds

138. Art Photography. Introduction to color, color film, color harmonies, multiple exposures and other techniques necessary to produce fine color work. (3Sp)
Reynolds

140. Applied Interior Design. Practical application of art elements and principles of design to problems of home decoration and furnishings. Prerequisite: Art 40. (3W, Sp)
Larson

142. Interior Design Workshop. A laboratory course devoted to such activities as the designing and constructing of two and three dimensional models, interiors, elevations and decorative details—traditional and contemporary, public and domestic. To be taken in conjunction with or following Art 140. (3W) Larson

143. Advanced Problems in Interior Design. Experimental projects in home planning and furnishing. Prerequisites: Art 142. (3Sp) Staff

144. Interior Design Apprenticeship. A course designed to acquaint students who are planning to enter interior designing professionally, to actual business procedures as practiced by reputable well-trained interior designers who have been approved by USU Art Staff. Prerequisite: 140. (1-5F, W, Sp, Su) Larson

Reynolds

152. Art Methods for High School. Methods of teaching art in high school. How to motivate work in drawing, painting, design, and crafts. Required of all majors and minors in art on secondary teaching level. (3 or 5W)
Reynolds

153-154. Art Education Workshop. Help will be given on methods of presentation of many materials and techniques of practical value to the elementary and secondary teacher; chart making, posters, murals, dioramas, maps, color theory and harmony, weaving, basketry, gift making, flower and weed arrangements, and many other subjects. The workshop will give art instruction on the grade levels in which the teacher instructs. (3-5 Su)
Reynolds

157. Photography for Publications. Photography for newspaper coverage of news events and sports, and for illustration in other media. Designed to meet specific needs of students who will prepare illustrated articles for publication. Prerequisites: Art 57, 55. (3Sp) Staff

160. Advanced Sculpture. Individual sculptural expression in a variety of plastic media. Emphasizes aesthetic employment of form and the techniques for working in wood, stone, metal, plaster and clay. Prerequisites: Beginning sculpture, Art 60. This course can be repeated six times for credit. (3F, W, Sp) Elsner

162. Sculpture for Landscape Architecture. A study of sculptural expression in various media as related to the landscape and architecture. (3W, Sp) Elsner

164. Photo Illustration. The major uses of photography in commercial advertising are stressed. Typical magazine and newspaper assignments are used on an individual project basis. Imaginative new ideas, novel techniques, and sensitive design layouts are emphasized. This course may be repeated a maximum of three times for credit. Admission only by permission of the instructor. (6W, Sp)
Clark

165. Advanced Photo Portraiture. Intensive studio work and "on-the-job" portrait assignments are used to develop the insight and photo techniques necessary to produce portraits of consistently high quality for commercial studio, advertising, and editorial purposes. Admission only by permission of instructor. (6W)
Clark

166. Advanced Fabric Design in Weaving. Special projects in applying original designs to creative weaving of tapestries, rugs and dramatic textiles. Prerequisites: Art 5 and 66 or equivalent. (3 to 5 F, W, Sp) Larson

167. Color Printing. Students are taught how to make consistently high quality photographic color prints from their own negatives. Project assignments are given to cover a wide range of subjects under various lighting conditions. Prerequisites: Art 53, 57, and 58. (3W) Clark

168. Advanced Publications Photography. Actual story assignments require the preparation of detailed shooting scripts, editorial selection of promising prints, cropping and final presentation of photo stories. Projects

* Taught 1966-67
** Taught 1967-68
vary from single to multiple picture coverage. Admission only by permission of instructor. (5F, W, Sp) **Clark**

169. **Spinning and Dyeing.** Spinning and dyeing of wool, flax and other fibers in the production of special yarns for creative hand-weaving—artistic rather than commercial application emphasized. Prerequisites: Art 66. To be taught simultaneously with Art 166. **Advanced Fabric Design in Weaving.** (3Sp) **Larson**

170. **Photography Laws and Regulations.** A lecture course designed to fit the needs of photography and journalism majors and minors, and other students who may use the camera as a reproductive tool, by dealing with laws, regulations, principles, and practices governing photography. Included are copyright regulations, libel, model release, right of privacy statutes, courtroom regulations, photographic etiquette, and others. (1F) **Hansen**

171 and 271. **Special Studio Courses.** Individual work in any one or more of following, as approved by the instructor concerned: Design Studio, Painting Studio, Printmaking Studio, Photography Studio, Sculpture Studio, Experimental Media Studio, Metalamithing Studio, Ceramics Studio. Credit Arranged (F, W, Sp) **Staff**

181. **Advanced Lettering.** Finished letters for magazine and newspaper advertisements, packaging labels and symbols. Prerequisite: Art 81. (3W) **Anderson**

182. **Advanced Advertising Design.** Theory of designing the cover, page, package, letterhead and poster. The course trains the student in producing professional advertising which would enable him to find employment in this field. Prerequisite: Art 82. (3F, W, Sp) **Anderson**

183. **Advanced Illustration.** A course to prepare the student for the specialized field of illustration that exists today. To have the student experiment in different techniques and media, and learn which to use for different types of reproduction in newspaper or magazines. To learn to research a problem and meet deadlines. Prerequisite: Art 83. (3Sp) **Anderson**

184. **Graphic Design Workshop.** Advanced graphic design problems with emphasis on designing displays, industrial design, packaging, and projects in 2nd and 3rd dimension. Rendering in a variety of media for the portfolio. Prerequisite: Art 7. (3Sp) **Anderson**

185. **Advanced Architectural Rendering.** To perfect architectural renderings in various media to suit the students own style in preparation for commercial work. Prerequisite: Art 85. (3Sp) (By special arrangement) **Anderson**

190. **Survey of Mexican Art.** A survey course of Mexican Art covering colonial and modern architecture and the great Mexican painters, Rivera, Orozco, and Siqueroa. Taught only on the summer art tour of Mexico. (3Su) **Lindstrom**

191. **Woodcut.** The making of prints from designs cut in wood using from one to many colors. (3F) **Groutage**

192. **Serigraphs.** The study of various techniques in silk screen printing including glue, tusche glue, cut paper, and lacquer film etc., for the purpose of making multiple original works of art. (3W) **Groutage**

193. **Lithography.** Producing prints from drawings on limestone. (3F, Sp) **Groutage**

194. **Intaglio.** Production of prints from metal plates using various etching and engraving techniques. (3W, Sp, Su) **Groutage**

195. **Printmaking Workshop.** Individual production in prints - any technique. Prerequisites: Art 191 or 192 or 193 or 194. (3F, Sp, Su) **Groutage**

199. **Exhibit Design.** Required of all art seniors. 1 Credit.

210. **Thesis Photo Problems.** A seminar type course designed to aid graduate students in their photographic problems related to their thesis. Discussions will lend themselves mostly to methods of obtaining necessary photographs to supplement the thesis study. Students will be given information pertaining to the preparation of photos, charts, graphs, etc. for insertion into the final thesis. (1W) **Hansen**

272. **Art Research and Thesis Problems.** Credit arranged. (F, W, Sp) **Staff**

273. **Art Seminar.** Directed individual study in assigned and elected problems later presented and analyzed at group discussions. Required of all graduate students. (F, W, Sp) Credit Arranged. **Staff**
Audiology - Speech Pathology

Head: Associate Professor Samuel G. Fletcher
Office in Mechanic Arts 202

Associate Professors Frederick S. Berg, Jay R. Jensen, Richard D. Taylor; Instructor Ann Foulger.

The Department of Audiology-Speech Pathology offers a broad program leading to a master's degree, with undergraduate support, in communication science and disorders. Graduate specializations are available in Communication Science as well as in the clinical areas of Audiology, Education of the Hard of Hearing/Deaf, and Speech Pathology. The specialization in Education of the Hard of Hearing/Deaf receives cooperative assistance from the Departments of Special Education and Elementary Education.

The demand for specialists in communication science and disorders far exceeds the supply. Numerous opportunities and positions exist in regular and special public schools, rehabilitation centers, hospitals, research laboratories, universities, and many other settings. The student emerging from the graduate program may work primarily with people, with scientific instruments or both. Certification of professional training is available through the American Speech and Hearing Association, the Conference of Executives of American Schools for the Deaf, and the Utah State Department of Public Instruction.

A characteristic feature of clinical training for work with the communicatively handicapped person is supervised clinical practicum in a variety of professional settings. The Utah State University program offers exceptional opportunities for such experience. The following facilities and agencies are available:

University Speech and Hearing Center; Weber Center for Hearing and Speech (University affiliated training center at the Weber Memorial Hospital); University Laboratory School; L.D.S. Primary Children's Hospital; Northern Utah Public Schools; Utah State Department of Health; Five-state cooperative program for Educators of hard of hearing/deaf: Denver, Idaho, Montana, Utah, and Wyoming Schools for the Deaf.

Assistantships, Fellowships, Traineeships, and Grants

University Graduate Assistantship, $1,000; Robert Shaw Scholarship Award, to $700; Vera Gee Scholarship Award, to $500; U.S. Public Health Service (NSDSP) Graduate Traineeships, $250/month plus tuition and dependency allowances.

U.S. Office of Education: Senior Year Traineeships in the Area of the Deaf, $1600 plus tuition; Graduate Fellowships in the Area of the Deaf, $2,000-$2,400 plus tuition and dependency allowance; Graduate Fellowships in the Area of Speech and Hearing, $2,000-$2,400 plus tuition and dependency allowance; Summer Traineeships $75/week plus tuition.

Research Assistantships. Stipends vary with qualifications and responsibilities.
Student Organization

The student speech and hearing association contributes much to the program. Its activities are both social and professional. Each quarter the association sponsors a departmental journal, THRESHOLD, which provides a comprehensive information source concerning activities, progress and subjects of professional interest to students and faculty.

Audiology-Speech Pathology Courses

10. Remedial Speech. For students with communication problems such that speech and/or hearing therapy is needed. Credit arranged (F, W, Sp) Jensen

30. Directed Observation: Speech and Hearing Laboratory. Includes observation of diagnostic procedures and speech and hearing therapy. Selected readings required. Enrollment limited. (Credit arranged) Taylor

50. Fundamentals of Communication Science. An introduction to the basic science of communication. Consideration given to the biological elements of sound production and manipulation, the physics and psycho-physics of sound, and the phonological principles and processes whereby sounds are combined into meaningful patterns. Laboratory demonstrations and applications are included. (5F) Fletcher

70. Language, Hearing, and Speech Development. Studies of normal speech, hearing, and language development. Some consideration given to disorders which may arise in these developmental processes. (3F, W, Su) Staff

90. Phonetics. An analysis of the phonetic and phonatory aspects of speech. (3F, Sp) Jensen

100. Fundamentals in Speech Disorders. Factors conducive to normal and abnormal speech development in the child. Attention given to problems of articulation disorders and stuttering. Recommended for prospective elementary school teachers. (5Su) Staff

105. Speech Improvement in the Elementary Classroom. Designed to provide the teacher with techniques to improve the listening, sound discrimination and production skills of children in the elementary grades. (3Su) Staff

110. Fundamental Anatomy of Speech and Hearing. A study of anatomy and physiology of the organs used in speaking and hearing. Emphasis given to developmental considerations. (5W) Fletcher

120. Speech Pathology I. Articulation and voice. Introduction to articulatory and phonatory problems—examinations, diagnostic and remedial procedures. (5W) Jensen

125. Speech Pathology II. Study of language and speech problems due to lesions of the nervous system including Cerebral Palsy, Aphasia and other dysarthrias. Prerequisites: A-SP 70, A-SP 120 or consent. (5Sp) Jensen

130. Methods of Speech Correction. Instruction given in appropriate and effective methods of speech therapy. Special attention paid to the techniques involved in therapy for articulatory errors. Should be taken concurrently with A-SP 135. (2W) Jensen

135a. Clinical Practicum-Speech Pathology. Supervised diagnostic and remedial casework with speech handicapped individuals. May be taken more than one quarter. Credit arranged. (F, W, Sp) Staff

135b. Clinical Practicum-Audiology. Supervised diagnostic and remedial casework in audiology. May be taken more than one quarter. Credit arranged. (F, W, Sp) Staff

135c. Clinical Practicum-Deaf. May be taken more than one quarter. Credit arranged (F, W, Sp) Staff

145. Stuttering. Theoretical, clinical and experimental approaches to stuttering and other disorders of speech rhythm. (3F) Jensen

150. Audiology I. The process of hearing and hearing disorders, and introduction to the field of clinical audiometry. (5F) Taylor

155. Audiology II. Principles and techniques of audiometric assessment. Prerequisite: A-SP 150. (3W) Taylor

160. Audiology III. Advanced theory and practice of audiological evaluation. Prerequisite: A-SP 155. (3Sp) Taylor

170. Fundamentals for the Hearing Impaired I. Basic principles and current points of view in the development of speech, language and academic skills in hearing impaired children; study and practice related to orthographic systems and speech spectrography. (3W) Berg

175. Fundamentals for the Hearing Impaired II. Specific methodology in the development of speech skills in deaf children, and speech and language skills in "aphasic" children; demonstrations and tutoring experiences—cooperative faculty. (3Sp) Staff

180. Fundamentals for the Hearing Impaired III. Specific methodology in the development of language, reading, social and scientific skills
Audiology—Speech Pathology

with deaf children; demonstrations and tutoring experiences—cooperative faculty. (8F) Staff

190. Problems in Audiology-Speech Pathology. Selected work, individually assigned, handled and directed. Problems of mutual interest to students and the instructor are investigated and reported upon. Prerequisite: Instructor's consent. Credit arranged. (F, W, Sp) Staff

220a. Seminar in Communication Science. Consideration of fundamental science topics pertinent to advanced study in Speech Pathology, Audiology, and Speech and Hearing Science. Prerequisite: Instructor's consent. (2F) Fletcher

220b. Seminar in Speech Pathology. Prerequisite: A-SP 125 or instructor's consent. (2F, W, Sp, Su) Jensen

220c. Seminar in Audiology. Prerequisite: A-SP 160 or instructor's consent. (2Sp) Taylor

225. Diagnostic Methods in Speech Pathology. Diagnosis and appraisal of speech disorders, including principles and techniques used in case study interview. Prerequisite: A-SP 125. (3W) Fletcher, Jensen

230. Medical Background in Speech Pathology and Audiology. Speech and hearing specialists and medical specialists participate jointly in a series of lectures with communications disorders and the multidisciplinary approach to treatment as the common core of concern. Prerequisite: A-SP 120. (4Su) Staff

235a. Clinical Practicum-Speech Pathology. Continuation of A-SP 135a. Emphasis given to supervised laboratory experience in analysis, diagnosis, and habilitation of the more complex communication disorders in a variety of clinical settings. Credit arranged. (F, W, Sp) Staff

235b. Clinical Practicum-Audiology. Continuation of A-SP 135b. Emphasis given to supervised laboratory experience in analysis, diagnosis, and habilitation of the more complex communication disorders in a variety of clinical settings. Credit arranged. (F, W, Sp) Staff

235c. Clinical Practicum-Deaf. Continuation of A-SP 135c. Emphasis given to supervised laboratory experience in analysis, diagnosis, and habilitation of the more complex communication disorders in a variety of clinical settings. Credit arranged. (F, W, Sp) Staff

240. Public School Clinical Practicum. Supervised diagnostic remedial and casework in public school speech correction. Prerequisite: A-SP 125. (4F, W, Sp) Staff

260. Pediatric Audiology. Special tests and procedures for examining hearing of infants and small children. Prerequisites: A-SP 150, 155, 160. (3F) Taylor

270. Speech Reading. Principles and methods pertaining to optimal use of visual perception by persons with impaired auditory acuity. (3F) Berg

275. Auditory Training. Principles and methods pertaining to optimal use of residual hearing by persons with impaired auditory acuity. (3W) Taylor


290. Research Studies. Advanced research in Audiology-Speech Pathology. Credit arranged. (F, W, Su) Staff

295. Thesis. Credit arranged. (F, W, Sp, Su) Staff
English and Journalism
(English, American Studies and Journalism)

Head: Professor King Hendricks
Office in Library

Professors T. Y. Booth, Carlton F. Culmsee, Dean, College of Humanities and Arts, John M. Patrick, Moyle Q. Rice, Hubert W. Smith, J. Golden Taylor; Associate Professors J. Lynn Mortensen, Veneta L. Nielsen, John J Stewart; Assistant Professors William E. Carrigan, Del Rae Christiansen, Zenna Beth Crockett, Kenneth B. Hunsaker, Marian D. Nelson, Don M. Ricks, Dean O. Skabelund, Robert C. Steensma, Reed C. Stock, Delbert E. Wylder; Instructors J. R. Allred, Richard B. Bean, Patricia Gardner, Marilyn J. Healy, Doreen M. Leslie, Thomas L. Lyon, Glenn E. Selander, Ron Smith, Julie Ann Somsen, Roberta S. Sorensen.

English

The English and Journalism program is designed to meet the ever-increasing demand for English-trained personnel in mass communications, in industrial writing and editing, in graduate schools, in public relations work, and in teaching. The need for teachers of English grows more critical each year at all levels.

There are four different majors available in the English and Journalism Department:

1. A Standard English major.
2. An English Teaching major.
3. An American Studies major.

The Standard English Major. The student may complete the Standard English Major and the necessary requirements for certification during the four years. This will qualify him for either graduate work or secondary teaching. The program is to be completed as follows:

I. Completion of general lower division requirements, including Basic Communications.

II. Completion of a minimum of 24 hours in an approved foreign language.

III. Completion of 45 to 50 hours in the field of English, as follows:

A. Lower - division survey courses (15 hours): 40 or 41, 50, 60 or 61.
B. Core Program — Literary Periods (19-21 hours): 166 or 171; 175 or 180; 190 or 191; 155 or 156; 157 or 158.
C. Specialized literary studies and technical courses (10-15 hours). It is suggested that the student and the advisor work out a program involving courses in each of the areas listed below. Prospective teachers should take both 104 and an advanced writing class.

1. Major Figures: 162, 163, 164, 170, 154, 159, 165, 167
2. Types: 132, 137, 138, 139, 150, 151, 152, 153, 168, 169
3. World Literature: 140, 141, 142, 147, 148, 149
4. Technical: 104, 112, 117a,b,c, 134

This four-year course may qualify the student for admission into the School of Graduate Studies.

**English Teaching Major.** Students who do not intend to go beyond the Bachelor's degree in English, but who plan to teach at the secondary level, should complete the Standard English Major except for the language requirement and at the same time meet the requirements for teacher certification. Students who take this major will not qualify for entrance into graduate school.

**The English Teaching Minor.** In addition to the Basic Communications and general humanities requirements, the student should complete a minimum of 25 hours in English, as follows:

I. Lower division (10 hours): 50 and either 60 or 61

II. Upper division (9-10 hours): 132 or 150; one of the novels courses (137, 138, or 139) or 151; 163 or 164; 168 or 169

III. Technical (5-6 hours): 104 and either 112 or 117b

Any deviation from this plan must have the approval of the Head of the English Department.

A prospective English teaching minor should meet with the Head of the English Department to have his course of study approved.

**The American Studies Major.** The American Studies major is designed to cultivate a broad understanding of American culture and its antecedents; and it emphasizes the interrelationships that exist in American literature, history, institutions, philosophy, and arts. In addition to offerings in the College of Humanities and Arts, it combines courses from the College of Business and Social Sciences. The requirements are as follows:

(1) Complete a minimum of 36 hours in English, American, and World Literature from the following or other approved courses: 40, 41, 50, 58, 60, 61, 142, 147, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159.

(2) A minimum of 16 hours in History, including 20 and 155. Additional upper division American History courses may be selected.

(3) A minimum of 11 hours in Political Science, preferably 10, 101, 117, 118, 119.

(4) A minimum of six hours in the following areas: Economics, Sociology, Art, Music, and Education.

(5) A minimum of 24 hours in a foreign language approved by the Chairman of the American Studies Committee.

An American Studies major is not required to complete a minor. He should contact Dr. J. Golden Taylor to have his course of study approved.

**Curriculum for Journalism Major**

A program of study leading to a Bachelor of Arts or Bachelor of Science degree in Journalism is offered in the Department of English and Journalism. The program is designed to equip the student with an adequate set of professional values, to provide a broad background in the humanities and social sciences, and to provide adequate training in skills and techniques that will prepare the student for a career in journalistic work.

A student who majors in Journalism must complete 45 hours in Journalism courses; 37 of these are designated, and 8 are electives.

Requirements for the News-Editorial Journalism Major are as follows:

Journalism 12, 13, 14, 91, 106, 112, 113a, 114, 125, 126, 164, 199.
Art 57 and 157 and Political Science 15 are recommended courses for Journalism majors.

MAjors in Journalism must complete two courses in each of two of the following departments: History, Political Science, Psychology, Sociology.

Two years of a foreign language are suggested for Journalism majors but are not required. Journalism majors should consult Professor Marlan D. Nelson, who has charge of Journalism, at his office in Main 132F.

Journalism Minor. A minor in Journalism consists of 18 hours. Required courses in the minor are Journalism 12, 13 and 199. In addition to these courses, the student should select 8 hours from Journalism 14, 112, 164, 166, 184, 191. Students preparing for high school publications advisement should take Journalism 191.

Graduate Study

Master of Arts Degree. The Department of English offers programs leading to the Master of Arts in English and in American Studies. In each of these fields, two programs are available, although most requirements are identical for all students regardless of program or field. The first program consists of 45 quarter credits of work (of which at least 20 quarter credits, exclusive of thesis, must be in courses numbered above 200, these to include at least three seminars), including a thesis for which either 9 or 10 quarter credits are given. A newer, alternative program also consists of 45 quarter credits, though a thesis is not demanded; instead, the candidate must complete at least 30 quarter credits of work in the courses numbered above 200, these to include at least four seminars, and stand for an oral examination of approximately two hours' duration. In this examination he will be expected to show a comprehensive knowledge of English, American, and world literatures.

The following requirements of the graduate program are presented only in summary. The student should consult the USU Graduate Catalog for further explanations and more detailed regulations.

To complete the degree, the candidate must (1) file an application for admission to graduate study with the School of Graduate Studies, and, upon acceptance, consult with the chairman of the departmental Graduate Committee; (2) take the Graduate Record Examination given by the School of Graduate Studies during the first quarter in residence; (3) take, during the first quarter in residence, a departmental preliminary examination in the field of English or American Studies; (4) select, in consultation with the head of the English Department and the chairman of the departmental Graduate Committee, one of the two programs leading to the degree and be assigned a major professor and a committee; (5) complete English 201 (English majors must also take English 209; American Studies majors must take one of the following: English 162, 205, 209, or 261); (6) complete satisfactorily the additional required course work outlined by his major professor; (7) pass an examination on 15 books recommended by the English Department; (8) file with the departmental Graduate Committee a statement of language proficiency in the language offered for the degree, from the Department of Languages; (9) present an acceptable thesis and pass a final oral examination on the thesis and the related field of the thesis, or, if the alternate program is selected, complete the necessary additional...
credit in courses numbered above 200 and prepare for a comprehensive oral examination to be taken in the last quarter of the period of residence.

Master of Arts in American Studies. Candidates for the Master's degree in American Studies are required to present a Bachelor's degree with American Studies, English, History, or Political Science as a major. The course of study will be arranged in consultation with any member of the American Studies Committee and is subject to approval by the chairman of the committee, Dr. J. Golden Taylor. The emphasis in graduate work will be largely governed by (a) the student's cultural and professional objectives and (b) his undergraduate course work.

Total credit and examination requirements are in general the same as those for the Master's degree in English. However, the departmental qualifying examination will be administered by the American Studies Committee and will cover primarily American Literature, American History, and American Political Institutions.

The student shall be required to demonstrate proficiency in a foreign language, in most cases French or German; and this proficiency is to be determined by the Head of the Languages Department.

A selection of the following courses may be applied toward satisfying requirements for the Master's degree in American Studies: English 142, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 201, 251, 252, and 253; History 142, 143, 144, 145, 146, 147, 155, 171, 203, and 224; Political Science 101, 117, 118, 119, 125, 127, 140, 180, 181, 182, 201, 207, 208, and 209.

As many as ten credits may also be drawn from upper division courses in the following subject matter fields: English and Comparative Literature, English and World History, Philosophy, Art, Music, Sociology, and Economics. All students must take at least one of the following: English 162, 205, 209, 261.

In American Studies (as in the regular English program) the student may elect an alternate plan which requires a minimum of 45 credit hours of which at least 30 must be in courses numbered above 200. All other requirements are the same.

Assistantships. Some assistantships are available for students who qualify as Master's candidates in the English Department. If a student is interested in one of these assistantships, he should make formal application to the Head of the English Department.

English Courses

0. Remedial English. Required of students whose predicted college grade point is below 1.70. Students must obtain a passing grade in this course before they will be admitted to English 1 (Basic Communications). (Non-credit) Staff

1, 2, 3. Basic Communications. Required of all freshmen. Designed to increase the skills of students in writing, reading, speaking, listening. (3 each) Staff

4. Elements of Grammar. For students who wish training in grammar beyond that given in Basic Communications. (3) Staff

5. Vocabulary. A study of word formation and derivation as a means of understanding scientific terms and of increasing vocabulary. (3) Staff

12a, 12b. Practice in Composition. For students who wish practice in composition beyond that given in Basic Communications. (2 each) Staff

14, 15, 16. English for Foreign Students. See Language Department, English 14, 15, 16. (3 each) Staff

24. Introduction to Literature. Introduces the student to an understanding of the methods of the literary artist and the meaning of his work through the study of poetry, prose,
and drama. Provides a foundation both for additional courses in literature and for individual reading. (3)  

33. Readings in Short Story. (3)  

Rice

34. Great Books and Ideas. Man’s ideas about himself, the universe, and the divine. (3)  

Rice, Nielsen, Skabelund

35. Great Books and Ideas. Man’s ideas about social relationships. (3)  

Rice, Nielsen, Skabelund

36. Great Books and Ideas. Man’s ideas about the modern world. (3) Rice, Nielsen, Skabelund  
(Courses 34, 35, 36 are related but they are taught as independent units and need not be taken as a series.)

37. Readings in the Novel. (3)  

Staff

40. World Literature Before 1650. (5)  

Nielsen

41. World Literature from 1660 to the Present. (5)  

Nielsen

42. Readings in Mythology. (3)  

Rice, Nielsen, Skabelund

48. Modern European Literature. (3)  

Staff

50. American Literature Survey. (5)  

Staff

58. Modern American Literature. (3)  

Hunsaker

60. English Literature, Early Period. (5)  

Staff

61. English Literature, Late Period. (5)  

Staff

68. Modern English Literature. (3)  

Staff

104. Grammar. Designed for teachers. (3)  

Mortensen

111. Technical Writing. Effective communication of ideas via the technical report and the scientific article. For junior and senior students of forestry and the natural sciences. Others admitted only with consent of instructor. (Needs of students majoring in arts, letters, education, business, or the social sciences are met by English 112. Students of engineering are directed to English 113.) (3)  

Staff

112. Advanced Expository Writing. Concerned with theory, examples, and practice of general expository writing. Emphasizes organization, paragraph development, diction, and revision. Open to all upper division students, and others by permission of instructor. (3)  

Mortensen, Hunsaker

113. Engineering Reporting. Instruction in style, forms, and techniques of engineering reporting. Open only to students registered in the College of Engineering. (Students majoring in physical sciences may be admitted with consent of instructor. Students in other majors are not admitted.) (3)  

Staff

117. Creative Writing  
(a) Short Stories. (3)  

Rice

(b) Essays. (3)  

Rice, Culmsee

(c) Poetry. (3)  

Nielsen

122. Children’s Literature. Prose and poetry of children to the junior high school age. (3)  

Mortensen

123. Literature for Adolescents. Prose and poetry of the high school age. (3)  

Mortensen

132. Readings in Poetry. An analytical approach to techniques, traditional and modern, and major thought currents of the poetry expressing the twentieth-century in relation to backgrounds both old and new. (3) Nielsen

134. Literary Criticism. An analytical rather than historical approach to criticism, intended to deepen the student’s insight into the nature and purpose of the forms of literature, and to develop literary taste and judgement. (4)  

Patrick

137. English Novel, 18th-Century. A study of the major English novelists of the eighteenth century. (3)  

Steenisma


Christiansen

139. Twentieth-Century Novel. A study of major 20th-century novelists. (3)  

Wylder

140. Greek Literature. Masterpieces of Greek literature, with emphasis upon drama. All readings in English translation. (5)  

Stock

141. Roman Literature. A study of selected major literary contributions of the Romans. All readings in English translation. (3)  

Stock

142. The Bible as Literature. A survey of the major writings from the Hebrew tradition in the King James Version of the Old Testament, the Apocrypha, and the New Testament. (5)  

Taylor

147. Comparative Literature. The Eighteenth Century in France and England. (3)  

Steenisma

148. Comparative Literature. The Romantic Period in England and Germany. (3)  

Patrick

149. Comparative Literature. The Nineteenth Century in England and Europe. (3)  

Hendricks

150. American Poetry. From Philip Freneau to the present. (3)  

Smith, Taylor

151. American Fiction. Nineteenth and early Twentieth century fiction writers. (3)  

Smith, Taylor, Culmsee

152. American Drama. Historical treatment of American drama: extensive reading of representative plays. (3)  

Smith
153. Western American Literature. Literature of the trans-Mississippi West, from the early explorers through the period of settlement. Background material from early journals and official records will be examined. The principal emphasis of the course will be on the novels and short stories depicting the explorers, mountain men, miners, cattlemen, and homesteaders. (5) Taylor

154. Readings in Individual American Authors. Each course in this series involves a comprehensive reading of one author and a high level understanding of his content and style. There is no prerequisite. (a) Thoreau, (b) Whitman, (c) Twain, (d) O'Neill, (e) Faulkner, (f) Hemingway, (g) Jack London. (2) Staff

155. The Colonial Period in American Literature. An introduction to germinal ideas of American thought and institutions as formulated by the Puritans and other writers of the period. (3) Taylor


157. The American Literary Renaissance. The rise of social, political, philosophical, and religious liberalism and idealism as reflected by authors from Irving to Whitman, with special emphasis on the transcendentalist movement. (3) Smith

158. Realism and Modernism in American Literature. The turn late in the nineteenth century to realism and naturalism in the works of Twain, Howells, James, Crane, Norris, Garland, and Dreiser. Twentieth-century literature as a reflection of social, economic, and political issues growing out of America's industrialization and role of world dominance. (3) Smith

159. Critical Studies of Individual American Authors. Each course is an intensive study of the major works of one author with special concern given to matters of text, bibliography, and significant critical writings about the author's work. Open only to upper-division and graduate English majors and to others by consent of the instructor. (a) Emerson, (b) Hawthorne, (c) Melville, (d) James. (2) Staff

160. Chaucer. (5) Hendricks

161. Shakespeare. Comedies and History Plays. (5) Patrick

162. Shakespeare. The Tragedies. (5) Patrick

163. Readings in Individual English Authors. No prerequisite. (a) Wordsworth, (b) Byron, (c) Shelley, (d) Tennyson, (e) Browning, (f) Hardy. (2) Staff

164. Medieval English Literature. A study of English literature from the beginnings to the Renaissance. The earlier work that presents a linguistic difficulty will be studied in translation. (5) Ricks

165. English and European Drama, Medieval to 19th-Century. (5) Booth

166. Modern Drama. Ibsen to the present. (5) Booth


168. Seventeenth-Century Literature. (5) Stock

169. Eighteenth-Century Literature. (5) Steensma

170. The Romantic Period. (5) Patrick

171. The Victorian Period. (5) Booth, Christiansen

172. Readings and Conference. Credit arranged. Any quarter. Students must have the approval of the Head of the department. Staff

173. Thesis. Credit arranged. Staff

174. Bibliography and Methods. Required of all candidates for the Master's degree in English. (3) Staff

175. A, B, C. Problems in Teaching Freshman English. A course designed to help the graduate assistants meet the actual classroom problems in Basic Communications. Required of all teaching assistants. (1F, 1W, 1Sp) Staff

176. History of the English Language. (3) Hendricks

177. Anglo-Saxon. Required of all candidates for the Master's degree. (5) Hendricks


English and Journalism 227
228 College of Humanities and Arts

251. Seminar: Early American Literature. (a) The Puritan Mind, (b) The Impact of Delam, (c) Democracy and Religious Diversity. (3) Staff

252. Seminar: 19th-Century American Literature. (a) The New England Circle, (b) Romanticism and Regionalism: Mid-Atlantic, South, Frontier, (c) The Rise of Realism and Naturalism. (3) Staff

253. Seminar: 20th-Century American Literature. (a) Modern Poetic and Critical Schools, (b) Influences of Modern Science and Philosophy. (3) Staff

261. Reading of Middle English. (3) Hendricks

265. Seminar in English Authors. (a) Bacon, (b) Spenser, (c) Marlowe and Jonson. (3) Staff

271. Seminar in the English Renaissance. (3) Ricks

275. Seminar in Seventeenth-Century Literature. (3) Ricks, Steensma

280. Seminar in Eighteenth-Century Literature. (3) Steensma

293. Seminar in Late English Literature. (a) Romantic Period, (b) Victorian Period, (c) The 20th Century. (3) Staff


299. Independent Study. Independent study with credit arranged. Open only to graduate students in English (1-5) Staff

Journalism Courses

1, 2, 3. College Journalism. For members of Student Life Staff. Discussion of newspapers and responsibilities of journalism. May be repeated once for credit. (1 each) Nelson

10. Critical Analysis of the Newspaper. Study of significant current news practices and their relation to society. Emphasis upon examination of techniques used by editorial writers and columnists; attention given to methods of news analysis and comment. (2) Nelson

12. Introduction to Journalism. Lectures on historical, social, and vocational aspects of the newspaper, magazine, book, radio, television, motion picture, public relations, advertising, journalism teaching; also, the psychology of news. (3) Nelson

13. Reporting. Continuation of 12 with emphasis on newspaper style, social responsibilities, and problems of reporting. Practical experience writing for newspapers. (5) Nelson

14. Editing and Copy Reading. An introduction to news editing and copy reading. Basic elements of newspaper style; newspaper usage, improvement of news presentation. Lecture and laboratory work. (3) Staff

84. Writing for Radio. Taken concurrently with Speech 83. (3) Staff

91. Weekly Newspaper. Problems of editing and publishing weeklies. Efforts are made to provide laboratory experience in a weekly. (3) Nelson

92. Weekly Newspaper Internship. Six or more weeks' work in the summer on a weekly newspaper. Prerequisite: Journalism 91. (Time and credit arranged.) Staff

**106. American Mass Media and Propaganda. Development of American publications and electronic means of disseminating information and propaganda; also, main currents in thought conveyed by these mass media. (5) (Alternate years) Stewart

112. Writing Feature Articles. Lectures and practice in preparing feature articles for newspapers and magazines. Analysis of periodicals is made to determine what editors buy. (3) Stewart

113a. Reporting Public Affairs. Coverage of local, state, federal courts; municipal, state and federal government administration in the local community. Laboratory work included. Prerequisite: Journalism 14. (3) Nelson

113b. Reporting Sports. Techniques and principles of reporting and writing sports; attention also given to sports coverage by other media. (3) Staff

114. Advanced Copyediting. Continuation of Journalism 14. Study of advanced principles of editing, makeup, and editorial policies involved in the editing process. Laboratory work included. (3) Nelson

125. Editorial Writing. Study of the editorial and its place in opinion formation in the mass media. Attention given to the planning, researching, and writing of editorials and editorial campaigns. Lecture and laboratory work. (2) Nelson

126. Law of the Press. Introduction to law of the press: attention given to basic principles of the law of libel, privacy, copyright, press freedom and responsibility as they specifically apply to the news media. (2) Nelson

150. Mechanics of Publishing. Study of planning and business sides of newspaper publishing. Designed to familiarize the student with the equipment of a newspaper plant; expenses of publishing a paper; sources of income; circulation and advertising problems; labor problems. Prerequisite: Journalism 13. (3) Nelson

**Taught 1967-1968.
Landscape Architecture and Environmental Planning

*164. Publicity Methods. Media and methods used to inform the public and conduct public relations work as required by corporations, public institutions, service organizations, and governmental agencies. Prerequisites: Journalism 13, 14 or permission of instructor. (3) 
Aldred

166. Journalism Practices. Laboratory work in publications, radio, or television. (2) Staff

184. TV Writing. Writing and editing news, drama, and other television material. To be studied concurrently with Speech 181. (3) Staff

185, 186, 187. Special Problems in Journalism. (1 to 2) Nelson

191. School Publications. For the prospective teacher. Problems of advising staffs of school newspapers, yearbooks, and magazines. (3) Nelson

199. Senior Seminar. Investigation of current problems in Journalism; introduction to elementary research methods in Journalism: study of selected group of books on journalism taken from the “Essential List of Readings” compiled by Frank Luther Mott. Prerequisite: Senior standing. Required of all Journalism Seniors. (2) Nelson


Department of

Landscape Architecture and Environmental Planning

Head: Professor Burton Taylor
Office in Main 1

Professor Emeritus La Val S. Morris; Assistant Professors Daniel Bazil Young, J. Derle Thorpe (Civil Eng), Jon Anderson (Art); Instructors Donald Ensign, Fred Von Niederhausern, Glen L. Baron; Visiting Critics Burch Beall, AIA, Owen Burnham, AIP, Leon Frehner, ASLA, Karsten Hansen, ASLA, Morris Johnson, ASLA.

Landscape Architecture and Environmental Planning is concerned with the performance of arranging land and the objects upon it for human utilization. The curriculum is arranged so as to provide the student with a broad but well-disciplined background, so that upon graduating, he may perform in numerous capacities including land planning, recreation, industrial, and facilities planning; site selection, as well as in the traditional aspects of landscape architecture. Emphasis is placed on creating for man an environment commensurate with his needs. Class projects range from residential planning problems through institutional and complete community, recreational, and ecological development plans.

Bachelor's Degree. For a major in Landscape Architecture and Environmental Planning, the following courses provide: (1) necessary instructional material directly concerned with Landscape Architecture and Environmental Planning; (2) supporting courses in related fields such as civil engineering, visual arts, physical sciences, and communications; (3) courses required for a liberal education. The student may take a Bachelor of Fine Arts or a Bachelor of Arts degree or a Bachelor of Science degree by adjusting his curriculum to fulfill the specific requirements for each type of degree.

Candidacy. In order to become a candidate for entrance to upper
division and graduation in LAEP, a student must have successfully completed all lower division courses (LA 3, 20, 30, 31, 32, 35, 40, 41, 42, 60, 61, 62).

**Minoring Degree.** Students majoring in other departments can obtain a minor in Landscape Architecture by successfully completing with a B or better LA 35, 60, 61, 62, 140, 141, 142 or in special cases arranging with the department to take LA 190, special problems, which would be adapted to the specific student’s needs.

### FRESHMAN YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
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<tbody>
<tr>
<td>Elem of Land Planning, LA 3</td>
<td>3</td>
</tr>
<tr>
<td>Graphics, LA 20</td>
<td>3</td>
</tr>
<tr>
<td>Theory of Design, LA 35</td>
<td>3</td>
</tr>
<tr>
<td>Interpretive History &amp; Design</td>
<td>9</td>
</tr>
<tr>
<td>Algebra, Math 34, 35</td>
<td>8</td>
</tr>
<tr>
<td>Trigonometry, Math 46</td>
<td>5</td>
</tr>
<tr>
<td>Biology 15, Botany 26</td>
<td>10</td>
</tr>
<tr>
<td>English 1, 2, 3</td>
<td>9</td>
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<tr>
<td>Geology 3</td>
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</table>

### SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
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<tbody>
<tr>
<td>Plant Materials, LA 40, 41, 42</td>
<td>9</td>
</tr>
<tr>
<td>Architectural Design 60, 61, 62</td>
<td>9</td>
</tr>
<tr>
<td>Physical Science 31, 32, 33</td>
<td>9</td>
</tr>
<tr>
<td>Plane Surveying, CE 81, 80</td>
<td>6</td>
</tr>
<tr>
<td>Applied Theory of design &amp; structures LAEP 80, 81, 82</td>
<td>9</td>
</tr>
<tr>
<td>Art 5 or 8 or 10</td>
<td>3</td>
</tr>
<tr>
<td>Sociology 70</td>
<td>5</td>
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<tr>
<td>Soils, Agronomy 55</td>
<td>4</td>
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</table>

### JUNIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
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<tbody>
<tr>
<td>Design LA 140, 141, 142</td>
<td>9</td>
</tr>
<tr>
<td>Planting Design, L A 150, 151, 152</td>
<td>9</td>
</tr>
<tr>
<td>City and Regional Planning 170</td>
<td>3</td>
</tr>
<tr>
<td>Fundamentals of Speech, Sp 1</td>
<td>5</td>
</tr>
<tr>
<td>Art 14, 111, 181</td>
<td>9</td>
</tr>
<tr>
<td>English Composition</td>
<td>4</td>
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<tr>
<td>Economics 51, or Ag Econ 53</td>
<td>5</td>
</tr>
<tr>
<td>Cost Est, CE 130</td>
<td>6</td>
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<tr>
<td>Electives</td>
<td>6</td>
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### SENIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
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<tbody>
<tr>
<td>Constr, LA 160, 161, 162</td>
<td>9</td>
</tr>
<tr>
<td>Advanced Planning and Design, LA 180, 181, 182</td>
<td>12</td>
</tr>
<tr>
<td>Architectural Rendering 185</td>
<td>3</td>
</tr>
<tr>
<td>Rec Planning 130</td>
<td>3</td>
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<tr>
<td>Seminar, LA 195</td>
<td>1</td>
</tr>
<tr>
<td>Writing Feature Articles, Journalism 112</td>
<td>3</td>
</tr>
<tr>
<td>Roads and Pavements, CE 120</td>
<td>4</td>
</tr>
<tr>
<td>Technical Writing, English 111</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>11</td>
</tr>
</tbody>
</table>

Students interested in City Planning may take additional courses in Political Science, Sociology, and Economics. Consult with staff.

### Graduate Study

**Master’s Degree.** A Master’s Degree, MA, MS, MFA, will be given to students who successfully meet the requirements established by the curriculum committee. Special problems in the LAEP 200 series will be assigned to students on an individual basis.

### Landscape Architecture and Environmental Planning Courses

3. **Elements of Land Planning and Design.** Relation of people to land regions and smaller areas. Principles of design and composition applied to various types of land planning. Planning the home environment and its relationship to the community is emphasized. (3F, W, Sp)  

20. **Graphics.** Methods of utilizing various graphic techniques for design presentation. Including perspective, light and shade studies, lettering, and symbolic graphics necessary for professional practice. (3F, W)  

30, 31, 32. **Interpretive History and Design.** The history and analysis of physical plans and their various design elements as related to the community and its components. Design and planning in relation to land utilization during the past 5,000 years is studied. Emphasis on human dynamics with applications for the future. (3F, 3W, 3Sp) Prerequisites: LA 3 and LA 20.  

35. **Theory of Design.** Form and spatial relationships analyzed, defined, and applied in relation to vertical mass and horizontal. Abstract design is studied and the resultant forms transposed into spatial and mass relationships. The chief purpose is to provide the students with an awareness of design as early as possible in his training. (3Sp)
Landscape Architecture and Environmental Planning 231

40, 41, 42. Plant Materials. The ecological, functional, and aesthetic uses of native and cultivated wood and herbaceous plants for use on the land. (3F, 3W, 3Sp) Ensign

60, 61, 62. Architectural Design. The design, construction, and orientation of structures as related to land areas and architectural functions. Prerequisites: LA 20, 35. (3F, 3W, 3Sp) Von Niederhausen

80, 81, 82. Applied Theory of Design and Structures. An introduction to the principles of design relating to structures and land forms. Student design problems related to individual sites as well as overall land planning design problems. Prerequisite for all upper division LAEP courses. Prerequisites: LA 3, LA 20, LA 30, 31, 32, and LA 35. (3F, 3W, 3Sp) Young

100. Professional Experience. Prior to graduation all landscape architectural students must have completed three months experience in landscape architectural or planning position with a government or private organization. Evidence of work done and an oral or written report at the discretion of the department are required. No credit. (Su) Staff

130. Park and Recreational Planning. Analysis and development procedures in national, state and urban parks, forest lands, and private lands in terms of recreational and aesthetic values and uses. (3Sp) Staff

135. Travel Course. A major field trip to examine a variety of projects in planning and design. Students are required to take this course at least once during their training. Credit arranged. (Su) Staff

140, 141, 142. Landscape Design. Introduction to the analysis and writing of design criteria and the design procedure for private and public land planning projects. Theoretical and actual site problems are used. Prerequisites: LA 62 and CE 82. (3F, W, Sp) Young

150, 151, 152. Planting Design. Pictorial compositions and planting plans developed together. Designed to develop ability in visualizing the completed landscape development. (3F, W, Sp) Ensign

160, 161, 162. Landscape Construction. Master construction plans, grading, drainage, structure, cost estimates, and specifications. (3F, W, Sp) Baron

170. 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. The physical design aspects of town and city are analyzed. (3W) Taylor

180, 181, 182. Advanced Planning and Design. Urban design, subdivisions, housing projects, public grounds, parks, cemeteries, building groups, recreational areas, and communities on various types of topography. (4F, W, Sp) Taylor

190. Special Problems. Selected problems to meet individual needs in completing the professional training. Registration by permission only. Credit arranged. (F, W, Sp) Staff

195. Readings and reports on current topics and trends in LAEP. Also covers contracts, specifications, professional ethics, and office practice. (1W, 1Sp) Taylor

210, 211, 212. Advanced Problems in Design and Planning. Problems or program are outlined in a collaborative effort with the staff and candidates for the Master's degree. Credit to be arranged. (F, W, Sp) Taylor

220. Thesis. Subject matter of Thesis will be determined by the student in consultation with the staff. The actual accomplishment of the Thesis will be a matter of making plans and supplementary drawings necessary for the actual accomplishment of a major problem in Land Design and Development. Written material will be required in the form of a statement of the problem; a basis of design consisting of justification, specification and any other supplementary material required. Staff
Courses are offered leading to the Bachelor's degree with a major in French, German or Spanish. Each of these major programs is specialized further to provide either for admission to graduate school or certification for high school teaching.

Language Major

(A) Candidacy. To become a candidate for a major in a modern language the student must have completed two years of lower division work in the language of his choice or the equivalent thereof through high school study or foreign residence. Proficiency tests (see following) will be used as deemed necessary by the Department of Languages to establish this equivalence.

(B) Major. 34 upper division credits in either French, German, or Spanish plus Language 100, distributed as follows:
- Advanced composition, conversation or linguistics. Literature courses. Other upper division courses in the language of the major.

Candidates for a secondary teaching credential must take French 113, German 112 or Spanish 112. They must also take Language 101, Laboratory Practice, for two of the seven credits listed above under “other upper division courses.” They must also complete thirty hours of courses in professional education including the following specific courses: Psychology 100 and 102, Public Health 154 or 155 and Education 127, 129 and 130.

(C) Related Fields (45 Units).

1. One year in a second modern language, Latin or Greek is recommended.
2. Groups:
   - Either 15 units each in two of the three areas listed below or 10 units in each; specific courses to be approved by the candidate’s faculty adviser.
     a. Literature courses in English or in a language other than the major, Philosophy.
     b. History, Sociology, Economics, Political Science or Anthropology.
     c. Fine Arts: speech, theatre arts, art, music, landscape architecture.

(D) The Minor. 1. Students majoring in a modern language will be considered to have completed their minor requirements on completion of C, above. However, under certain conditions to be ascertained by the adviser, waiver of all or part of these requirements may be granted in favor of a minor in another area.

2. For a teaching minor in a foreign language with the recom-
mendation of the Department of Languages a student must complete 15 units of approved upper division work in one language: 24 units in a single language constitute a non-recommended minor for certification in the state of Utah.

Foreign Language Proficiency Tests

In September and in May proficiency tests will be administered to USU students who wish either to continue foreign language study begun in high school or to receive credit by examination for skills acquired through foreign travel or study. All entering students who have one or more years of study of a foreign language in senior high school and who wish to continue the study of that language at USU must take these tests. Tests will be given only in languages which are offered regularly at USU.

Language Laboratory

Laboratory listening sessions are required for all lower division language classes and for some upper division classes: a fee of $2.00 per quarter is charged for this service.

Spring Quarter at The University of the Americas

USU offers properly qualified students the opportunity to spend Spring quarter in residence at the University of the Americas. To qualify, students will normally be enrolled in 2nd-year college Spanish and be recommended for this program by their advisers. It should be particularly attractive to students interested in Spanish, Sociology-Anthropology, Fine Arts, Political Science, International Relations or History.

English Courses for Foreign Students

<table>
<thead>
<tr>
<th>Course Numbers</th>
<th>Course Title</th>
<th>Instructor(s)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>14, 15, 16</td>
<td>English for Foreign Students.</td>
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</tbody>
</table>

Languages 233

drills, for increasing comprehension and ability to write accurately. Required of all foreign students who have failed to make required scores on English proficiency examinations on entering college. It may be used as an elective by others. (3F, W, Sp) Symes

30. English Phonetics for Foreign Students. To train in the sounds of English, and to increase ability to speak with the rhythm and intonation of American English. May be taken in conjunction with Language 14, 15, 16. (3F, W, Sp) Meyer

French Courses

Lower Division

1. 2. 3. Elementary French. (5F, 5W, 5Sp) Staff

4. 5. 6. Intermediate French. Aural-oral approach with knowledge of structure development through pattern drills, conversation and composition. Prerequisite: French 3 or equivalent. (3F, 3W, 3Sp) Fife

4a, 5a, 6a. Intermediate French Readings. Cultural and Literary readings with appropriate conversational drills and composition. Prerequisite: French 3 or equivalent. Recommended to be taken along with Fr 4, 5, 6. (2F, 2W, 2Sp) Kepinski

Upper Division

103. Readings in Prose Fiction. Reading and discussion of significant novels and short stories designed to develop vocabulary and rapid reading skills. Prerequisite: French 6 or 6a. (2F) Robertson

104. Advanced Grammar and Composition. (3F) Fogelberg

111. Readings in the Theatre. Reading and discussion of selected modern plays designed to develop vocabulary and rapid reading skills. Prerequisite: French 6 or 6a. (2W) Robertson


114. Readings in Biography, Criticism, and Poetry. Reading and discussion of modern biographical, critical or poetic works designed to prepare the student for more advanced literature courses. Prerequisite: French 6 or 6a. (2Sp) Robertson

*118. Contemporary French Civilization. Lectures and discussion in French of the culture of France in this century. Social, political, economic and religious life and institutions. Literature, the arts, science and technology. The role of France in the modern world. Prerequisite: French 6 or 6a. (3W) Staff

*Taught 1966-67
*132. French Literature, 1850-1900. Realism, naturalism, the Parnassians and symbolism. Readings, lectures and discussion of representative novelists, dramatists, poets and critics. Prerequisites: French 103, 111 or 114. (3W) Fife

*133. Romanticism in France. Chateaubriand, Hugo, Vigny, Musset, Lamartine. Prerequisites: French 108, 111 or 114. (2Sp) Fife

*134. The 18th Century. Montesquieu, Voltaire, Diderot, Rousseau, Bernardin de Saint-Pierre, Prevost. Prerequisites: French 103, 111 or 114. (2W) Fife

*135. The 18th Century Theatre. Comedies of Beaumarchais and Marivaux. Prerequisites: French 103, 111 or 114. (3F) Robertson

**136. The Comedies of Moliere. Prerequisites: French 103, 111 or 114. (3F) Fife

**140. The Classical Tragedy: Corneille. Prerequisites: French 103, 111 or 114. (2F) Robertson

**141. Philosophers, Moralists and Critics of the Classical Age. Descartes, Pascal, Boileau, La Fontaine. Prerequisites: French 103, 111 or 114. (2Sp) Fife

**142. French Literature of the 16th Century. Humanism and the Reformation. The Pléiade, Rabelais, Montaigne and Ronsard. Prerequisites: French 103 or 111 or 114. (2W) Fife

**143. French Literature in the Middle Ages. Lyric, epic and didactic literature; the theatre and romances; introduction to Old French. Prerequisites: French 103, 111 or 114. (2Sp) Fife

*144. The Classical Tragedy: Racine. Prerequisites: French 103, 111 or 114. (2F) Fife

*150. French Literature of the 20th Century. Readings, lectures and discussion of representative novelists, dramatists, poets and critics. Prerequisites: French 103, 111 or 114. (3Sp) Fife

196, 197, 198. Intensive Basic French. A beginning course designed to give advanced degree candidates minimal reading skills. Prerequisite: Graduate standing or previous mastery of a related second language. (3F, 5W, 3Sp) Staff

199. Readings and Conference. Readings in scientific, technical or literary French. Credit arranged. Not more than 5 units total may be earned by any student. (F, W, Sp) Staff

German Courses

Lower Division

1. 2. 3. Elementary German. Progressive and intensive development of the basic language skills: listening comprehension, speaking, reading and writing. Maximum emphasis on audio-lingual pattern drills and exercises in the classroom and language laboratory. (6F, 5W, 5Sp) Staff

4. 5. 6. Intermediate German. Intensive review of grammar. Cultural and literary readings. Prerequisite: German 3 or two years of high school German. (3F, 3W, 3Sp) Staff

4a. 5a. 6a. Second-Year Conversation. Accompanies German 4, 5, and 6. Required of German majors; recommended for all students in second-year German. Prerequisite: same as for Intermediate German. (2F, 2W, 2Sp) Staff

4s. 5s. 6s. Scientific German. Intensive review of grammar. An introduction to the reading of technical German in various scientific fields. Primarily for science majors. Prerequisite: German 3. (3F, 3W, 3Sp) Staff

Upper Division

100, 101, 102. Introduction to German Literature. Offered mainly for third-year students to bridge the gap between intermediate readings and more advanced upper division literature courses. Extensive reading of selected German authors, using annotated texts. Strongly recommended for German majors. Prerequisite: German 6. (2F, 2W, 2Sp) Beyers

105. Advanced Grammar and Composition. Rapid review of grammar. Application of grammatical rules and principles to the writing of original compositions in German. Prerequisite: German 6. (3F) Degener

112. Applied Linguistics: German. Principles of language learning as applied to German. Theory and development of the concept of pattern drill. Analysis of linguistic problems encountered by teachers and students of German. Required of all teacher candidates. Prerequisite: German 105. (3W) Beyers

115. Introduction to Poetic Forms and Theories. A study of German literary types; elements of versification; theory and practice from 1624 to the present. Reading of illustrative works. Prerequisite: German 6. (2W) Staff

116. Germany Today. Presentation of social, cultural, economic and political aspects of post-war Germany and her position in the world, combined with discussions in German. (3W) Degener

*120. Nineteenth Century Novelle. Reading and discussion of representative stories by Hauff, Storm, Stifter, Keller, Meyer and others. Prerequisite: German 102 or equivalent. (3W) Degener

*121. Lessing, Plays and Biography. Prerequisite: German 115. (3Sp) Degener

*122. Schiller, Plays, Poetry and Biography. Prerequisite: German 115. (3Sp) Beyers, Staff

*Taught 1966-67
**Taught 1967-68
Languages 235

**123. Twentieth Century German Literature.** Exclusive of lyric poetry. Reading and discussion of representative stories by Schnitzler, Mann, Hesse, Kafka, Fallada and others. Prerequisite: German 100. (3Sp) Beyers

**125. The Middle Ages.** A survey of the outstanding literary works and authors of the Middle Ages. Prerequisite: German 100. (3F) Suprunowicz

**126. Survey of German Literature.** The 18th Century. (3W) Degener

**127. The Romantic Movement.** A survey of the chief literary groups, personalities, trends, and ideas of the Romantic Movement and a study of the characteristics of Romantic Literature. Prerequisite: German 115. (3F) Degener, Beyers

**129. Goethe's Dramas.** Goethe's dramas other than Faust I and II. Gotz von Berlichingen, Urfaust, Iphigenie, Tasso, Egmont. The influence of Goethe's life upon these works. Prerequisite: German 115. (3F) Beyers

**130. Goethe's Faust—Part 1.** Prerequisite: German 115 and 129. (3Sp) Degener, Beyers

**131. Goethe's Prose.** Werther, Dichtung and Wahrheit and selections from Wilhelm Meister. Reading of a biography of Goethe. Prerequisite: German 115. (3W) Beyers, Degener

**133. German Drama of the Nineteenth Century.** Rapid reading and discussion of representative plays from Kleist to Hauptmann. Prerequisite: German 102 or equivalent and German 115. (3W) Beyers

**134. German Lyrics and Ballads.** A study of the great German poets of the 19th and 20th centuries including the analysis of individual poems. Goethe, Schiller, Uhland, Eichendorff, Heine, Platen, Lenau, Morike, Hebbel, Lilienzron, Dehmel, Rilke, and others. Prerequisite: German 115. (3F) Suprunowicz

196, 197, 198. German for Advanced Degree Candidates. A beginning course designed to give advanced degree candidates minimal reading skills. Prerequisite: Graduate standing or previous mastery of a related second language. (3F, 3W, 3Sp) Staff

199. Readings and Conference. Readings in technical, scientific, and literary German. Credit arranged. Not more than 5 units total may be earned by any student. (F, W, Sp) Staff

Greek Courses

1, 2, 3. Elementary Greek. (5F, 5W, 5Sp) (Taught only on sufficient demand.) Staff

196, 197, 198 Greek for Advanced Degree Candidates. This course is designed as a beginning class in Classical Greek. Emphasis is placed on mastering the basic grammar, and upon developing skills to read the simpler prose, such as excerpts from Xenophon and Herodotus. No prerequisites. (3F, 3W, 3Sp) (Taught only on sufficient demand) Porter

Latin Courses

1, 2, 3. Elementary Latin. Emphasizes the relation of Latin to English. Study of vocabulary and word-formation as an aid to better comprehension of English. Recommended for English majors and for pre-law and pre-medical students. Includes readings from Caesar. (3F, 5W, 5Sp) (Taught only on sufficient demand.) Staff

4, 5, 6. Intermediate Latin. Readings from the orations of Cicero and Virgil's Aeneid. Miscellaneous readings from other Roman authors. Open to students who have had one year of college Latin or two years of high school Latin. (3F, 3W, 3Sp) (Taught only on sufficient demand.) Staff

Language Courses (Linguistics and Teaching Methods)


101. Language Laboratory Practice. A course designed to give prospective teachers skill in the use of electronic, acoustical and audio-visual devices and systems as tools for learning a modern language. Prerequisite: Completion of 2 years study in any modern, foreign language. (2Sp) Staff

Portuguese Courses

1, 2, 3. Elementary Portuguese. Grammar, dictation, conversation and reading. (5F, 5W, 5Sp) (Taught only on sufficient demand.) Porter


196, 197, 198. Portuguese for Advanced Degree Candidates. A beginning course designed to give advanced degree candidates minimal reading skills. Admission by approval. (3F, 3W, 3Sp) (Taught only on sufficient demand) Porter

199. Readings and Conference. Readings in scientific, technical, or literary Portuguese.


**Taught 1967-68.
Credit arranged. Not more than 5 units total may be earned by any student. (F, W, Sp)

**Russian Courses**

1, 2, 3. Elementary Russian. (5F, 5W, 5Sp)    
Spoerry

4, 5, 6. Intermediate Russian. Two years of Russian. (3F, 3W, 3Sp)    
Suprunowicz

4a, 5a, 6a. Second-Year Conversation. Credit arranged. (2F, 2W, 2Sp)    
Spoerry

196, 197, 198. Russian for Advanced Degree Candidates. Credit arranged. (2F, 2W, 2Sp)    
Spoerry

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**Spanish Courses**

**Lower Division**

1, 2, 3. Elementary Spanish. (5F, 5W, 5Sp)    
Staff

4, 5, 6. Intermediate Spanish. (3F, 3W, 3Sp)    
Staff

4a, 5a, 6a. Second-Year Conversation. (3F, 3W, 3Sp)    
Staff

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**Upper Division**

105. Advanced Grammar. Prerequisite: Spanish 6 or equivalent. (3W)    
Fogelberg

112. Applied Linguistics: Spanish. Prerequisite: Spanish 105. (3W)    
Fogelberg

116. Readings in the Short Story. Prerequisite: Spanish 6 or equivalent. (2F)    
Staff

117. Readings in the Novel. Prerequisite: Spanish 6 or equivalent. (2W)    
Staff

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118. Readings in the Theatre and Poetry. Prerequisite: Spanish 6 or equivalent. (2Sp)    
Staff

**120, *121, *122. Spanish-American Literature.** The major literary periods and major writers of the Spanish-American countries from the earliest times to the present. Prerequisite: Spanish 116, 117 or 118. (3F, 3W, 3Sp)    
Porter, Reese

**125. Survey of Spanish Literature.** From the Siglo de Oro to the later 19th Century. Prerequisite: Spanish 116, 117 or 118. (3F)    
Fogelberg, Reese

**127. Survey of Spanish Literature.** The later 19th Century and the 20th Century. Prerequisite: Spanish 116, 117 or 118. (3Sp)    
Fogelberg, Reese

**128. 19th Century Spanish Poetry.** A study of Spanish poetry of the 19th Century. Prerequisite: Spanish 116 or 125. (3Sp)    
Fogelberg

**129. Cervantes.** Reading and analysis of Don Quixote and other works of Cervantes. Prerequisite: Spanish 117 or 125. (3F)    
Fogelberg

**130. The Literature of the Siglo de Oro.** A study of certain writers of the Siglo de Oro. Prerequisite: Spanish 117 or 125. (3F)    
Reese, Porter

**135. Modern Hispanic Culture.** A study of the present-day social political and economic conditions of Spain, and of the various Latin American countries. Prerequisite: Spanish 116 or equivalent. (3F)    
Porter

**143. Development of the Spanish Novel Since 1843.** A study of the representative writers of the "Regional Novel," and of the writers of "Naturalism." Prerequisite: Spanish 117. (3W)    
Fogelberg, Reese

**145. The Development of the Spanish-American Novel.** Representative novels from various Spanish-American countries and from various literary periods. Prerequisite: Spanish 117. (3W)    
Porter

196, 197, 198. Spanish for Advanced Degree Candidates. (2F, 2W, 2Sp) (Taught only on sufficient demand) Staff

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*Taught 1966-67

**Taught 1967-68
Philosophy

Before registering for upper division Philosophy the student should already have completed ten credits in related subjects in the Humanities, Literature, History, Political Science, or Sociology.

Minor in Philosophy: Subject to approval of their major adviser, students may have a minor in philosophy by successfully completing eighteen credits preferably including Beginning Logic, Ethics, and at least one course in the History of Philosophy.

Philosophy Courses

45. Introduction to Problems of Philosophy. Problems of reality, thought, and value in relation to the modern world. Both for students preparing for more advanced courses in philosophy and for those desiring an introduction to philosophical terminology and to ideas of philosophers ancient, medieval, and modern who have influenced present-day thought. (SF, W, Sp) Hayward, Staff

50. Beginning Logic. Signs, symbols and language in human behavior. Detection of common fallacies, ambiguity, vagueness. Structure of propositions; forms of valid inference; nature of deductive systems; recognition of formal fallacies. Framing and testing hypotheses in everyday life and in science; nature of evidence; right and wrong uses of statistics; probability, discovery of causes. (SF, W, Sp) Staff

56. Beginning Logic. Signs, symbols and language in human behavior. Detection of common fallacies, ambiguity, vagueness. Structure of propositions; forms of valid inference; nature of deductive systems; recognition of formal fallacies. Framing and testing hypotheses in everyday life and in science; nature of evidence; right and wrong uses of statistics; probability, discovery of causes. (SF, W, Sp) Hayward, Staff

*140. History of Ancient Philosophy. The development of philosophical thought in the ancient Greek world. Emphasizes reading from the Pre-Socratics, Plato, Aristotle, the Stoics, and Epicureans. (SF) Richardson

*141. History of Early Modern Philosophy. European thought from the Renaissance through the 16th Century, indicating the relationship of philosophic ideas to science, religion, and society. Readings in the metaphysics, logic, value theory, and theory of knowledge of Descartes, Hobbes, Spinoza, Leibniz, Locke, Berkeley, Hume, and Kant. (3W) Richardson

*142. History of Nineteenth Century Philosophy. European thought from Kant to Nietzsche, indicating the relationship of philosophic ideas to science, religion, and society. Readings in the metaphysics, value philosophy, logic, and theory of knowledge of such thinkers as Bentham, Mill, Comte, Hegel, Schopenhauer, Marx, and Nietzsche. (3Sp) Beyers

*143. 20th Century Philosophy. Readings and discussion of major philosophers of the twentieth century, including philosophers from Bergson to Sartre. (3Sp) Richardson

*144. History of American Philosophy. Treats the main American philosophical levels and systems from Jonathan Edwards to John Dewey. (3F) Richardson

*145. History of Indian Philosophy. Treats the main philosophical systems of India, from Vedic times to 1300 A.D. Such subjects as the basic philosophical ideas in the Vedas and Upanishads, Buddhist and Hindu systems of philosophy, Jainism and Sankhya philosophy. (3W) Richardson

*150. Philosophy of Science. Assumptions and implications of scientific methods and findings: law, convention, determination, causality, truth, and value in the physical, biological and social sciences. (3F) Richardson

*151. Symbolic Logic. Deductive systems, valid and invalid arguments; logical paradoxes; sentential calculus and introduction to predicate calculus. (5Sp) K. Suprunowicz

*152. Ethics. Introductory study of major philosophies on the nature of the good for man, principles of evaluation, and moral knowledge. Special attention is given to appeals to reason, human nature, moral law and happiness as standards in solving moral problems. (3Sp) Richardson

153. Aesthetics. The philosophy of art in the principal systems of aesthetics; interpretations of the creative activity of the artist, the work of art, contemplation and criticism of art objects, and the relationship of art to the social order. (3W) Richardson

155. Metaphysics. Treats systematically the first causes of things. Such questions as what are the most real and the less real things. Causality, space and time, idealism versus realism, universals, matter, essence and existence; the reality of mind, its qualities and role in the cosmos; the role of God. (3Sp) Richardson

Languages 237


**Taught 1967-68.
The Department of Music serves three functions: (1) provides courses which meet lower division and general education requirements in Humanities and Arts; (2) provides courses to increase understanding and appreciation of music and to develop particular skills; (3) offers specific sequences of courses to students desiring professional preparation in music education, applied music, and music theory.

The general purpose of the program in music for the music major is three-fold: (1) to prepare certified music teachers to serve effectively in vocal and instrumental music positions in public school systems; (2) to prepare talented vocalists, pianists, and players of string and wind instruments for careers as professional performers and teachers; (3) to prepare gifted students for graduate study in music theory and composition.

Music Majors

Baccalaureate degrees in music may be earned with a composite major in Music Education, Applied Music, and Music Theory. The curriculum for a major in Music Education leads to the Bachelor of Arts, Bachelor of Science, or the Bachelor of Fine Arts degree. The curriculum for a major in Applied Music or Theory leads to a Bachelor of Arts degree. In order to obtain the Bachelor of Arts degree, the foreign language requirement must be fulfilled.

Degrees offered:

1. Music Education (with instrumental or vocal concentration)
2. Applied Music (performance) piano, voice, strings
3. Theory

It is assumed that each student wishing to major in music will have had training in music prior to his entrance into the University. In order to ascertain his level of achievement in basic musical skills, each freshman and transfer student who wishes to major in music will be given an examination administered by the Music Department during orientation preceding Fall registration. This entrance test will determine whether the Music Theory sequence, typically begun fall quarter of the freshman year, should be preceded by the course in Music Fundamentals and/or Group Piano Instruction. No student will be permitted to continue in music unless he exhibits substantial powers of musical-auditory discrimination fundamental to the competency of both the performer and music educator. A comprehensive examination will be given at the discretion of the Department preceding graduation at the end of the senior year.

All music major are expected to attend concerts, recitals, and lyceums.
Music Minors

Those who wish to minor in Music are required to take Music 2, 4, four hours of ensemble performance, and six hours of electives in Music.

Teaching Minors in Elementary Education and in Secondary Education (for those preparing to teach General Music at the Junior High School level):

Prospective school teachers who wish a teaching minor as indicated above are required to take Music 1, 2, 81, 140, 150, plus two hours to be selected from ensemble performance and three hours of Group Piano (81) or individual piano instruction.

Degree in Music Education with Instrumental Concentrate

<table>
<thead>
<tr>
<th>Music</th>
<th>hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>4, 5, 6 Theory (beginning)</td>
<td>15</td>
</tr>
<tr>
<td>104, 105, 106 Theory (advanced)</td>
<td>9</td>
</tr>
<tr>
<td>101, 102, 103 Music History and Literature</td>
<td>9</td>
</tr>
<tr>
<td>107 Scoring and Arranging</td>
<td>3</td>
</tr>
<tr>
<td>140 Choral Conducting</td>
<td>3</td>
</tr>
<tr>
<td>141 Instrumental Conducting</td>
<td>3</td>
</tr>
<tr>
<td>151 Sec Sch Choral Meth &amp; Mat</td>
<td>3</td>
</tr>
<tr>
<td>153 Sec Sch Instr Meth &amp; Mat</td>
<td>3</td>
</tr>
<tr>
<td>80 Group Piano (or proficiency)</td>
<td>3</td>
</tr>
<tr>
<td>81 Group Voice</td>
<td>1</td>
</tr>
<tr>
<td>82 Group Woodwinds, (flute, clarinet, low single reeds, double reeds)</td>
<td>4</td>
</tr>
<tr>
<td>83 Group Brass (cornet, horn, trombone, baritone-tuba)</td>
<td>4</td>
</tr>
<tr>
<td>84 Group Strings (violin, viola, cello-bass)</td>
<td>3</td>
</tr>
<tr>
<td>85 Group Percussion</td>
<td>1</td>
</tr>
<tr>
<td>Individual Instruction</td>
<td>6</td>
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<tr>
<td>Ensemble Performance</td>
<td>6</td>
</tr>
</tbody>
</table>

4 recital appearances are required, one at the end of each year.

Degree in Music Education with Vocal Concentrate

<table>
<thead>
<tr>
<th>Music</th>
<th>hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>4, 5, 6 Theory (beginning)</td>
<td>15</td>
</tr>
<tr>
<td>104, 105, 106 Theory (advanced)</td>
<td>9</td>
</tr>
<tr>
<td>101, 102, 103 Music History and Literature</td>
<td>9</td>
</tr>
<tr>
<td>107 Scoring and Arranging</td>
<td>3</td>
</tr>
<tr>
<td>140 Choral Conducting</td>
<td>3</td>
</tr>
<tr>
<td>141 Instrumental Conducting</td>
<td>3</td>
</tr>
<tr>
<td>151-150 Sec Sch Choral Meth &amp; Mat</td>
<td>3</td>
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<tr>
<td>89-60, 160 Group Piano, Individual Piano Instruction, or proficiency</td>
<td>6</td>
</tr>
<tr>
<td>35, 135 Opera Workshop</td>
<td>6</td>
</tr>
<tr>
<td>56, 57, 58 Vocal Repertory</td>
<td>3</td>
</tr>
<tr>
<td>Individual Vocal Instruction</td>
<td>6</td>
</tr>
<tr>
<td>Group Instrumental Instruction</td>
<td>3</td>
</tr>
<tr>
<td>Ensemble performance</td>
<td>6</td>
</tr>
</tbody>
</table>

4 recital appearances are required, one at the end of each year.

Degree in Applied Music

Applied music majors should demonstrate outstanding competence vocally or instrumentally during their Freshman and Sophomore years. They must pass a minimum proficiency examination in piano, and should be able to sight read simple piano accompaniments. (All vocal majors are required to develop grade 4 level of piano proficiency.) Students with extensive background in piano performance may choose to pass this requirement by special examination in lieu of taking courses. All applied music majors are required to take weekly one-half hour private lessons during their Freshman and Sophomore years, and one-hour lessons during their Junior and Senior years. Each applied music major shall give an individual graduation recital during his senior year; and each must participate in a perform-

1Required 2 years, or competency plus 1 year on minor instrument Participation in two major performing groups is required. In addition, Utah State Certification requirements must be met. (See College of Education)
ing organization every quarter during each year of study at Utah State University.

Core

Music

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>4, 5, 6 Theory (beginning)</td>
<td>15</td>
</tr>
<tr>
<td>104, 105, 106 Theory (advanced)</td>
<td>9</td>
</tr>
<tr>
<td>107 Scoring and Arranging</td>
<td>3</td>
</tr>
<tr>
<td>101, 102, 103 Music History and Literature</td>
<td>9</td>
</tr>
<tr>
<td>140-141 Choral or Instr Conducting</td>
<td>3</td>
</tr>
<tr>
<td>Foreign Language</td>
<td>24</td>
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Vocal Major

Music

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
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<tbody>
<tr>
<td>Core</td>
<td></td>
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<tr>
<td>56, 156 Vocal Repertory</td>
<td>6-12</td>
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<tr>
<td>35, 135 Opera Workshop</td>
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<td>Individual Instruction</td>
<td>12-18</td>
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<td>Ensemble Performance</td>
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Piano Major

Music

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
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<td>Core</td>
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<tr>
<td>77, 78, 79 Piano Literature</td>
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</tr>
<tr>
<td>42 Piano Ensemble</td>
<td>6</td>
</tr>
<tr>
<td>155 Piano Teaching Methods</td>
<td>2</td>
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<tr>
<td>Individual Instruction</td>
<td>12-18</td>
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<tr>
<td>Ensemble Performance</td>
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String Major

Music

<table>
<thead>
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<th>Course</th>
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<td>43 String Ensemble</td>
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<td>84 Group Strings</td>
<td>3</td>
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<tr>
<td>Individual Instruction</td>
<td>12-18</td>
</tr>
<tr>
<td>Ensemble Performance</td>
<td>6</td>
</tr>
</tbody>
</table>

An information manual, available from the Music Department, gives recommended sequences of courses for all applied music and music education majors for each of the four years.

Degree in Theory

Music

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>4, 5, 6 Theory (beginning)</td>
<td>15</td>
</tr>
<tr>
<td>104, 105, 106 Theory (advanced)</td>
<td>9</td>
</tr>
<tr>
<td>107 Scoring and Arranging</td>
<td>3</td>
</tr>
<tr>
<td>101, 102, 103 Music History and Literature</td>
<td>9</td>
</tr>
<tr>
<td>108, 109, 110 Counterpoint</td>
<td>9</td>
</tr>
<tr>
<td>114, 115, 116 Composition</td>
<td>3</td>
</tr>
<tr>
<td>201 Intro to Musicology</td>
<td>3</td>
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<td>Foreign Language</td>
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<td>Ensemble Performance</td>
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<tr>
<td>Private Instruction</td>
<td>6</td>
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<tr>
<td>(piano and/or organ)</td>
<td></td>
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</tbody>
</table>

It is recommended that each student in Applied Music or Theory complete 25 hours in either German or French, or 15 hours in each.

Graduate Study

Qualified graduates from accredited degree-granting institutions in Music may be admitted as candidates for graduate degrees in Music.

Three different degrees are offered: Master of Science, Master of Arts, and Master of Fine Arts. The Master of Arts degree requires two years of foreign language study; the Master of Fine Arts degree requires specialized background in performance or highly artistic creativity in music. For each degree, the student may select courses of study leading to a) a Major in Music Education, or b) a Major in Applied Music.

Students may elect a thesis project or a lecture-recital. All work is to be completed under supervision of a graduate committee. In addition, each student is required to take the graduate record examination before being admitted to candidacy for the Master's degree.

Degree in Music Education

Required:

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<th>Course</th>
<th>Hours</th>
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<tr>
<td>Music 258 Seminar in Music Education</td>
<td>3</td>
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<tr>
<td>259 Seminar in Music Theory</td>
<td>3</td>
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<tr>
<td>260 Seminar in Music Literature</td>
<td>3</td>
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<tr>
<td>267 Individual Recital or Thesis (Music 285)</td>
<td>9</td>
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<tr>
<td>Educ 260 History and Phil of Educ</td>
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<tr>
<td>230 Secondary School Curriculum</td>
<td>3</td>
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<tr>
<td>Psy 200 Principles of Learning in Tch</td>
<td>3</td>
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</tbody>
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Minor Area

2 3-hour classes in English, history, political science, sociology, or philosophy as recommended by the advisor

Electives:

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
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<tbody>
<tr>
<td>Music 258 20th Century Music</td>
<td>3</td>
</tr>
<tr>
<td>205 Special Problems</td>
<td>6</td>
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<tr>
<td>251 Adv Choral Methods</td>
<td>1</td>
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<tr>
<td>252 Adv Orch Methods</td>
<td>1</td>
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<tr>
<td>255 Band Symposium</td>
<td>3</td>
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</tbody>
</table>
Music Courses

1. **Introduction to Music.** A non-technical course planned to develop understanding and enjoyment of music through hearing and studying selected compositions in all musical forms. (3F, 3W, 3Sp, 3Su) **Staff**

2. **Music Fundamentals.** A study of the rudimentary materials of music: scales, intervals, keys, rhythms, meters, terminology for both visual and aural perception. Designed primarily for non-music majors and elementary school teachers. (5F, 3W, 3Sp, 3Su) **Staff**

4, 5, 6. **Beginning Theory.** Fundamental elements of music. Includes sight singing, ear training, rhythmic reading, melody and harmonic writing and keyboard harmony. Required of music majors. (6F, 5W, 5Sp) **Staff**

25, 125. **University Orchestra.** Experience in performing a wide range of orchestral works, including symphonies and major choral works. May be repeated for credit. Attendance required at all public appearances. Credit arr. (F, W, Sp) **Strawn**

26, 126. **Varsity Band.** A training band for students who wish to qualify for membership in the University Concert Band. A band practicing providing experience for music majors in rehearsal techniques, conducting, and playing minor instruments. Practical study of literature for use in the public schools. May be repeated for credit. (1W, 1Sp) **Wardle**

27, 127. **University Band.** Rehearsals and drills for presentation of shows for football games. Study and preparation of symphonic band literature for concert performance. Attendance required at all public appearances. Prerequisite: ability to play a wind or percussion instrument. (Enrollment in Concert Band winter and spring by audition only.) May be repeated for credit. (2F, 2W, 2Sp) **Dalby**

33, 133. **University Choir.** Rehearsal and public performance of significant choral literature with emphasis on oratorio and larger forms with orchestral accompaniment. Attendance required at all public appearances. May be repeated for credit. (1F, 1W, 1Sp) **Staff**

35. **Opera Workshop.** Musico-dramatic techniques for the beginning singer and coach. Study of easy scenes, one act operas and secondary roles in larger productions. Opportunity to participate in major productions. Admission by audition. (1-3Su) **Puffer**

42, 142. **Piano Ensemble.** The study of works for two pianos and for piano, four-hands. Training in sight reading; developing ensemble playing ability. Admission by audition. Four students per section. May be repeated for credit. (1F, 1W, 1Sp) **Wassermann**

43, 143. **String Ensemble.** Offers opportunities for capable string players and pianists to form trios, quartets, and other small ensembles. May be repeated for credit. (1F, 1W, 1Sp) **Strawn**

44, 144. **Brass Ensemble.** Brass quartets, sextets, and larger groups. Members are selected from applicants. May be repeated for credit. (1F, 1W, 1Sp) **Wardle**

45, 145. **Woodwind Ensemble.** A study of literature for woodwind quintet and other small groups. May be repeated for credit. (1F, 1W, 1Sp) **Dalby, Smith**

56, 57, 58. **Vocal Repertory.** A study of English, Italian, and French vocal literature through performance. Concentration on diction, interpretation, and style. Open to singers and pianists. (2F, 2W, 2Sp) **Puffer**

60, 160. **Individual Piano Instruction.** (1-2F, 1-2W, 1-2Sp, 1-2Su) **Wassermann, Staff**

61, 161. **Individual Viola Instruction.** (1F, 1W, 1Sp, 1Su) **Strawn**

62, 162. **Individual Organ Instruction.** (1F, 1W, 1Sp) **Strawn**

64, 164. **Individual Vocal Instruction.** (1F, 1W, 1Sp, 1Su) **Dittmer, Puffer, Staff**

70, 170. **Individual Woodwind Instruction.** (1F, 1W, 1Sp, 1Su) **Dalby, Smith**

72, 172. **Individual Brass Instruction.** (1F, 1W, 1Sp, 1Su) **Wardle**

73, 173. **Individual Percussion Instruction.** (1F, 1W, 1Sp) **Staff**
74, 174. Individual Violin Instruction. (1F, 1W, 1Sp, 1Su) Strawn

75, 175. Individual Cello Instruction. (1F, 1W, 1Sp, 1Su) Burton, Robertson

77, 78, 79. Piano Literature. A listening course designed to present piano music for the general student as well as the trained musician. These courses are accepted for the Humanities and Arts group requirement. Fall quarter covers the period to and including the Baroque and Rococo; winter quarter covers Classicism and early Romanticism; spring quarter, late Romanticism, 20th Century and American music. (2) Wassermann

80. Group Piano Instruction. (1F, 1W, 1Sp, 1Su) Staff

81. Group Vocal Instruction. (1F, 1W, 1Sp) Staff

82. Group Woodwind Instruction. (1F, 1W, 1Sp, 1Su) Dittmer, Puffer

83. Group Brass Instruction. (1F, 1W, 1Sp, 1Su) Wardle

84. Group String Instruction. (1F, 1W, 1Sp) Strawn

85. Group Percussion. (1F, 1Su) Dalby, Staff

101, 102, 103. Music History and Literature. Basic course for music majors and those desiring a comprehensive background in music. Stresses music in general culture, the place of music in history, and the relationship of music to the other arts. Fall quarter covers the period from antiquity through the Baroque; winter quarter covers Classicism and Romanticism; spring, contemporary music. Required of all music majors. Music 2, required prerequisite. (3F, 3W, 3Sp) Wassermann

104, 105, 106. Advanced Theory. Continuation of Beginning Theory. Includes advanced sight singing, keyboard modulation, and introductory counterpoint. (3F, 3W, 3Sp) Staff

107. Scoring and Arranging. Theoretical and practical study of scoring for wind, string, and percussion instruments in various combinations, ranging from small ensembles to the Concert Band and Symphony Orchestra. (3W) Smith

108, 109, 110. Counterpoint. Strict counterpoint in all species in two, three, and four or more parts. Creative writing. Combined forms; double and triple with free parts. (3F, 3W, 3Sp) Dittmer

112. 20th Century Music. An intensive survey of the significant techniques, forms, and styles in the music of our time. Analysis of a variety of scores and recordings. Works of criticism evaluating recent developments and statements by composers discussing their philosophy and aims are studied. (3Sp, 3Su) Wassermann, Staff


124. Chamber Orchestra. The preparation and performance of music for chamber orchestra and opera. May be repeated for credit. Admission by audition. (1F, 1W, 1Sp, 1Su) Strawn

129. Stage Band Workshop. Practicum for music and music education majors; study of the contemporary idiom of the high school dance band; analysis of harmonic structure and ear training in chordal progressions and improvisation. Prerequisites: Music 104, 105, 106, 107. (3Sp) Smith

135. Opera Staging and Production. Musical and theatrical techniques for the singing actor, pianist-coach, and music-theatre director. Performances of scenes, one act operas, and at least one major production during year. Audition required for singers and pianists. (1-3F, 1-3W, 1-3Sp, 1-3Su) Puffer

136. University Chorale. A select mixed concert chorus performing a wide range of choral literature. Attendance required at all public appearances. Admission by audition. May be repeated for credit. (2F, 2W, 2Sp) Puffer

137. Madrigal Singers. Study and performance of madrigals, motets and distinctive choral literature. Admission by audition. May be repeated for credit. (2F, 2W, 2Sp) Dittmer

140. Choral Conducting. Basic routines in organizing and training choruses. Assigned projects in conducting small and large vocal ensembles. Elements of choral technique and interpretation. (3F) Puffer

141. Instrumental Conducting. Fundamentals of score reading and interpretation of instrumental music. Basic rehearsal procedures and baton technique (3W) Dalby

150. Music for Elementary Schools. Development of the classroom music program. Problems, methods, and materials in singing, rhythms, creative music, reading and listening. (3F, 3W, 3Sp, 3Su) Staff

151. Secondary School Choral Methods and Materials. Teaching and administration of various phases of the choral music program. (3F) Puffer, Staff

153. Secondary School Instrumental Methods and Materials. Teaching and administration of various phases of the instrumental music program (3Sp) Dalby, Staff

155. Piano Teaching Methods. Designed to prepare qualified pianists to teach piano ef-
fectively and to acquaint them with new materials and techniques. Problems common to all piano teaching and teacher-student relationships are analyzed. (1F, 1W, 1Sp)

Wassermann, Staff

156, 157, 158. Vocal Repertory II. A study of German Lied and contemporary song literature. Prerequisites: Music 56, 57, 58. (2F, 2W, 2Sp) Puffer

163. Piano Workshop. An intensive course for advanced piano students and piano teachers. Includes lectures on basic harmony, piano techniques, memorization, building repertoire and teaching materials. (1Su)

Wassermann

201. Introduction to Musicology. A survey of the fields, systematic and historical, of musical knowledge and research. (3Sp)

Dittmer, Staff

202, 203, 204. Music Literature. An advanced course for graduate students designed to study the development of Western Music from Monody to the present through analysis of its form and structure and through an exhaustive investigation of all available literature about music. Fall quarter covers the period and including the Renaissance and Baroque; winter quarter covers Classicism and Romanticism; spring quarter, 20th Century and American music. Prerequisites: 103, 106. (3F, 3W, 3Sp)

205. Special Problems in Music. An advanced course designed to meet specific problems of the music educator and the applied music specialist. (1-3F, 1-3W, 1-3Sp, 1-3Su) Staff

235. Opera Workshop (Advanced). Designed for the advanced singer, conductor-coach, and director. Directors will be assigned scenes and one act operas to direct. Conductor-coaches will prepare and perform scenes and assist with major productions. Advanced singers will perform leading roles in major productions. Admission by audition. (1-3F, 1-3W, 1-3Sp, 1-3Su) Puffer

243. Chamber Music Interpretation. An intensive study of chamber music styles and problems of interpretation. Emphasis will be placed on actual performance. Students will receive training in the coaching of beginning and intermediate ensembles. (1Su) Staff

251. Advanced Choral Methods. Rehearsal techniques and materials for the secondary school choir. The study of phonetics as it relates to choral sound. Teachers registering for this class are expected to sing in clinic chorus. Daily during Summer Music Clinic. (1Su)

252. Advanced Orchestra Methods. Techniques in training the school orchestra. Consideration of special problems relating to the string instruments. Teachers registering for this class are expected to play in the clinic orchestra. Daily during Summer Music Clinic. (1Su)


258. Seminar in Music Education. Basic concepts in Music Education. A study of musical behavior and the scientific bases for human responses to musical stimuli. (3W, 3Su) Staff

259. Seminar in Music Theory. A study of the practical aspects of musical theory as related to analysis, pedagogy and composition. (3F, 3Su) Staff

280. Seminar in Music Literature. A graduate course designed to survey important music literature and significant source material for its study. (3Sp, 3Su)


287. Individual Recital. The preparation and presentation of a graduate recital. Supervision by the major professor. Credit arranged. (F, W, Sp, Su)
Bachelor of Arts and Science Degrees. The Department of Speech offers training in Interpretation, Public Address, and Radio and Television Broadcasting. The requirements of at least 45 credits for a Departmental major or a teaching major in Speech are as follows: Public Speaking, ten credits (Speech 125 and 109 or 113 required of all majors); Interpretation, ten credits (Speech 4 and 124 required of all majors); Theatre Arts, eight credits (Theatre Arts 146, 50, and 24 or 124 required of all majors); Audiology-Speech Pathology, three credits (A-SP 57, or Speech Correction for the Classroom Teacher, if available, required of all majors); Radio and Television, six credits; elective courses in Speech, eight credits. In addition, courses in Dramatic Literature, five credits, and Teaching of Speech, three credits, are recommended in some cases. English 163 and 168 may be used for credit toward the department requirement in Dramatic Literature.

If emphasizing Radio-Television, the speech major is required during his Junior and Senior years to obtain one year's broadcast experience at a commercial or educational television or radio station.

A composite Speech-Theatre Arts major requires the following Speech courses: Speech 1, 5 credits; Speech 125, 5 credits; Speech 4, 5 credits; Speech 124, 5 credits; Audiology-Speech Pathology 57, 3 credits; Speech 83, 3 credits; Speech 181, 3 credits. Those planning to certify for teaching should also take Speech 123, Teaching of Speech, 3 credits, although this may be taken as Education credit if desired. Students taking the Speech-Theatre Arts Composite Major may take as many as 40 hours in Speech if they desire to do so. Suggested electives for such additional hours include Speech 9, 21, 109, 110, and 113, all three-credit courses. For Theatre Arts courses needed for the Speech-Theatre Arts Composite major, see the Theatre Arts Department in this catalog.

Graduate Study
The Department of Speech offers a Master of Science degree and the Master of Arts degree in the following fields: Interpretation, Public Address and Broadcasting.

Graduate students taking speech courses in the 100 series, usually taken by upper division students, will be expected to present additional projects at the option of the instructor.

Speech Courses

1. Fundamentals of Speech. Study and training in voice, body, language, meaning and personal adjustment as applied to speaking, reading, group leadership and broadcasting.

   Thornley, Black, Johnson, Barry, Hales
3. Practice in Speaking. For students whose experience in Basic Communications or previous speech classes indicates deficiencies in such areas as adjustment to the audience situation, bodily action, varied and vigorous use of voice, oral grammar, or other aspects of speech delivery. Prerequisite: consent of instructor. (3F, W, Sp) **Thornley**


9. Voice and Diction Improvement. Improvement of the vocal quality and flexibility of the normal speaking voice, development of more accurate enunciation. Diagnosis of individual problems, theory and practical exercises. Not intended for those with defects in speech cared for by the speech and Hearing Center. (3Sp) **Barry**

10. Individual Problems. Individual attention given in private to needs in an effort to eliminate defects and develop skill in speech. Recommended for anyone needing individual speech instruction and for speech majors. Special fee. May be taken more than one quarter. Credit arranged. (F, W, Sp) **Staff**

18. Dialect. The most prominent dialect works of Burns, Kipling, Drummond, Riley, Dunbar, Harris, Kirk and other writers are studied. (3Sp) **Staff**

21. Intermediate Public Speaking. Work with types of speaking that are the most interesting and useful and determine the length of speeches and times to speak, within the framework of certain minimum requirements. Emphasizes developing skill in speech presentation. Prerequisite: Speech 1 or English 1, 2 and 3. (3F, W, Sp) **Robinson, Black, Johnson, Thornley, Barry**

81. Introduction to Radio and Television. Radio and TV station and network organization, operations, and programming. Attention given to developing an understanding of radio and TV as factors in social organization, and to developing appreciation in selection of programs. (3F) **Hansen**

82. Radio-TV Speech. Analysis and development of speech skills and speech forms used in radio and TV. Development of acceptable standards of voice articulation and pronunciation for broadcasting. (3W) **Hansen**

83. Radio Production. The production of radio commercials, news, musical programs, interviews, discussions and dramas. To be taken concurrently with Journalism 84. (3Sp) **Hansen**

85. Radio-TV Operations. Audio and video control operations for Radio and Television. Includes microphone set-ups, audio console operation, record/playback techniques, and camera operations. Two lectures and three hours laboratory per week. (3F) **Barnes**

101. Parliamentary Procedure. (1F) **Robinson**

105. Technical and Professional Speaking. Meets speech needs of technically trained and professional people. Speaking experiences such as those encountered in career situations. Prerequisite: Speech 1 or English 1, 2 and 3. (3F, W, Sp) **Robinson**


**110. Play Reading. Attention given to cutting and building for public programs. (3Sp) **Johnson**

111. Psychology and Semantics of Speech. Principles of psychology which underlie speech. Personal adjustment through speech. An insight into the process of symbol use. (3F) **Johnson**

112. Private Instruction. Individual attention given in private to needs in an effort to eliminate defects and develop skill in speech. Recommended for anyone needing individual speech instruction and to speech majors. Special fee. May be taken more than one quarter. Credit arranged. (F, W, Sp) **Staff**

113. Argumentation. Information and practice in techniques of analysis, investigation, evidence, reasoning, briefmaking, refutation and construction and delivery of the argumentative speech. (3F) **Robinson**

115. Intercollegiate Debating. Members of debating squads may receive not more than three credits in any one year. (3F, W, Sp) **Robinson**


122. Reading Poetry to Children. The study and application of oral reading principles as applied directly to children's poetry. Also a consideration of choral reading techniques applicable to classroom situations and programming. Designed especially for teachers, prospective teachers, librarians and parents. (3Sp) **Thornley**

123. Teaching of Speech. Methods and problems peculiar to teaching of speech both in secondary schools and in speech areas for Basic Communications work in the University and in basic speech courses at the college level. Organization of courses and lesson plans included. Prerequisite: Instructor's consent. (3Sp) **Thornley**


**Taught 1967-1968.
246 College of Humanities and Arts

124. Advanced Interpretation. The mastering of significant selections from great writers. Reading from manuscript and from memory. (5W) Johnson

125. Speech Composition. Advanced theory and practice of public speaking. Building and delivering several short speeches and reading selected masterpieces from the world's public speaking literature. Prerequisites: Junior standing and Speech 1, or English 1, 2, 3. (5Sp) Robinson

181. Television Production. The production and direction of television programs: developing programs, casting and rehearsal procedures, and coordination of technical aspects. Prerequisite: Speech 83 or instructor's permission. To be taken concurrently with Journalism 184. (3F) Hansen


186. Radio and Television Training. Enrollment limited to students qualified by training and ability for actual broadcasting experience in a station. An apprenticeship under direction of the station staff in executing duties expected of a regular staff employee. Students render three hours' broadcasting service per week, for each hour of credit. Time and credit arranged. (Total limited to 6 credits) (1 to 5F, W, Sp) Johnson

187. Television Film Techniques. Selection and use of lenses, cameras, lighting and meters in the production of news, film, documentary footage and program film for television. Standards and methods in shooting, editing and projecting 8 and 16mm motion picture film, 35mm slides, single system sound film recording, and production of special effects are included. (5Sp) A. Hansen

190. Problems in Speech. Selected work, individually assigned, handled and directed. Speech problems of mutual interest to student and the instructor are investigated and reported upon. Prerequisite: Instructor's consent. Credit arranged. (F, W, Sp) Staff

201. Thesis. (2-5F, W, Sp) Hansen

224. Seminar in Oral Interpretation. (2F) Johnson

225. Seminar in Rhetorical Theory. Classical backgrounds in rhetorical theory with modifications of more recent rhetoricians. (2W) Robinson

230. Seminar in Radio and Television. The literature and research on the uses of radio and television as media of communication and as instruments of social action. (2F, W, Sp) Hansen

290. Research Studies. Advanced research in speech. Credit arranged. (F, W, Sp) Staff

Department of
Theatre Arts

Acting Head: Professor Twain Tippetts
Office in Main 303

Professor Floyd T. Morgan; Assistant Professors LeRoy Brandt, Leon I. Brauner, W. Vosco Call.

The curriculum of the department and Utah State Theatre productions are planned to help students prepare for teaching careers or for advanced study in Theatre Arts.

Bachelor of Arts Degree

Fifty credits are required for the teaching and non-teaching Theatre Arts major, 30 credits in Theatre Arts for the composite Theatre Arts-Speech major, 24 for the teaching minor and 18 for the non-teaching minor.

Course requirements for majors and minors are as follows:

Teaching Major: TH ART 24 or 124 (3 credits), 44, 46 or 144, 50, 100, 102, 104, 120, 146, 194 (27 credits); 6 credits chosen from
Non-Teaching Major: TH ART 24 or 124 (3 credits), 44, 50, 100, 102, 104, 146, 160 (26 credits); 7 credits to be chosen from TH ART 52, 150, 151, 152, 153, 154, 156; Speech 13 or 181, 125 (8 credits); electives in Theatre Arts courses (6 credits).

Composite Theatre Arts-Speech major: TH ART 24 or 124 (2 credits), 44, 50, 100, 102, 104, 146, 194, (22 credits); 6 credits chosen from TH ART 52, 126, 150, 152, 153, 154, 156. For Speech courses required for the Theatre Arts-Speech composite major see Speech Department in this catalog.

Teaching Minor: TH ART 24 or 124 (2 credits), 44, 50, 10 or 100, 102 or 104, 146, 194 (13 credits); 9 credits chosen from TH ART 45 or 144, 52, 150, 152, 154, 156, 160.

Non-Teaching Minor: TH ART 24 or 124, (1 credit), 1 or 10, 44, 50, 146 (10 credits); electives in Theatre Arts courses (7 credits).

Utah State Theatre

Each year the Utah State Theatre produces a number of plays. Theatre Arts majors are required to participate in all and Theatre Arts minors in at least two of these productions per year.

Graduate Study

The Department of Theatre Arts offers advanced work leading to the Master of Arts and Master of Fine Arts degrees. The graduate program prepares the student for work in educational and nonprofessional theatres. It offers training and experience in playwriting, directing, acting, designing and advanced technical practice.

During the first quarter of residence, and before admission to candidacy for either the Master of Arts or the Master of Fine Arts degree, the candidate is required to take the Graduate Record Examination given by the School of Graduate Studies and two diagnostic examinations given by the Theatre Arts staff. The first of these department examinations is a comprehensive written one covering theatre history, literature and criticism, acting, directing, scenery and costume design, lighting, make-up, technical practice, current drama and theatre. The second examination is an oral skills test in which the student demonstrates before a departmental committee his competency in voice and diction, extemporaneous speaking and interpretive reading or acting. The results of these examinations are used to assist the student and his faculty advisor in planning a program of study and in selecting a thesis subject or creative project.

Candidates for the Master of Arts degree are required to present from the Department of Languages a statement of proficiency in reading one foreign language. The language should be one taught regularly at USU.

The candidate for the Master of Arts degree may, with the approval of his supervisory committee, present a thesis or a thesis alternate.

The candidate for the Master of Fine Arts degree presents a creative project in playwriting, directing, acting, scene, costume, lighting, design or advanced technical practice. As part of the creative project and in lieu of a thesis the candidate submits an original long play or its equivalent, a production book or a project portfolio.

Fine Arts Tours

Theatre Arts majors and minors are encouraged to participate in the annual Fine Arts tours. These include a fall tour to San Francisco and summer tours to Europe, Mexico and Hawaii. Art galleries and museums are visited; plays, musicals, ballets and operas attended. The tours are planned to give students learning experiences at minimum cost. Up to nine credits may be earned on the summer tours. Detailed information is available in the Department office.
Theatre Arts Courses

1. Understanding Theatre. A course planned to develop understanding of dramatic art through learning the contributions made to it by playwrights, actors, directors, designers, technicians and theatre builders. (3F, W, Sp) Staff

2. Current Drama. Plays and musical comedies currently being presented in world theatrical centers are studied and new innovations in theatrical productions are appraised. (3W) Morgan

10. Drama Appreciation. For the student who wishes to enhance his enjoyment of plays. Study of the major forms and styles of drama and of some noteworthy productions of selected plays. (3W) Morgan


24. Theatre Practice. Application of basic theatre production practices. Supervised rehearsals, performances, crew and staff work. Registration concurrent with TH ART 50 or with permission of Theatre Arts staff. (1F, W, Sp, Su) Staff

44. Intermediate Acting. A continuation of TH ART 44, with emphasis on characterization and the development of the actor's physical, mental and emotional resources. (3W) Call

50. Stagecraft. Technical organization and planning of the play production. Construction, rigging and shifting of scenery selection and building of properties. (F, W, Sp) Brandt

52. Makeup. Practice of makeup for the stage. Recommended for prospective directors of school, church and community theatres. (1F) Morgan


56. Puppetry. The design, construction, and manipulation of puppets. Recommended particularly for elementary teachers. (3W) Reynolds

72. Dance for Theatre. Body movement designed for the needs of the actor. Emphasis on the creative approach to movement as it is utilized to project character-emotion and mood. (1F) Staff

100, 102, 104. History of Theatre and Drama. A survey course correlating theatrical history and drama from ancient times to the present. Fall: Classic, Oriental, and Medieval; Winter: Early Renaissance through Eighteenth Century; Spring: Nineteenth Century to the present. (4F, 4W 4Sp) Staff

120. Fundamentals of Design for the Theatre. Basic design principles applied to designing for the theatre. Projects in sketching, rendering, drafting, perspective, model making, scene painting techniques. Prerequisite to TH ART 150, 153, 154, 192, 194 and to production thesis projects. (2F) Brauner, Morgan

124. Theatre Practice. Application of basic theatre production practices. Supervised rehearsals, performances, crew and staff work. Registration concurrent with TH ART 150, 152, 153, 154, 156, 166, or with permission of Theatre Arts staff. (1F, W, Sp, Su) Staff

144. Advanced Acting. Emphasis on the creative approach to acting, analysis and creation of the role and ensemble playing. (3Sp) Call

146. Directing. Theory and practice of the principles of stage directing. (3Sp) Call

148. Private Instruction. Individual tutoring to develop competence in voice, acting, directing, scenic and costume design. Special fee. Credit arranged. (F, W, Sp) Staff

150. Scene Design. Application of basic principles of design to the stage setting. Development of scenic designs through color sketches, plans and models. Practice in scene painting techniques. Survey of the history of stage decoration. (3W) Morgan

151. Historic Costume for the Stage. Historical survey of the development of costume from the Egyptians to the 1900's, with a practical approach to the reproduction for stage use of each period, as well as a study of the manners of the period. (3F) Brauner

152. Stage Costuming. Fundamentals of pattern drafting, construction of stage costumes and accessories, organization and care of costume wardrobes. (2W) Brauner

153. Costume Design. Theory and practice in the design and selection of costumes for non-realistic, historical and modern plays. Relationship of costume to character and production. Registration by consent of instructor. (3Sp) Brauner

154. Stage Lighting. Study and application of the principles of stage lighting. Lighting design, mounting of instruments and operation of control boards. Prerequisite: TH ART 50 or consent of instructor. (2W) Brandt

156. Theatre Organization and Management. Study of the managerial aspects (organization, promotion, financing) of the educational and community theatres. (2Sp) Call

158. Creative Dramatics. Guidance of children in the creation of scenes and plays with

1 One credit hour of TH ART 124 to be taken concurrently with TH ART 150, 152, 153, 154, 156, 158.

166. Drama Production. Problems of play selection, casting, acting, directing, scenery construction and painting, lighting, costume and makeup. Recommended to drama teachers, MIA drama directors and recreation leaders. Students who register for this course should also register for 1 credit of TH ART 124. (6Su) Staff

172, 173. Dance for Theatre. Body movement designed for the needs of the actor. Emphasis on the creative approach to movement at it is utilized to project character, emotion and mood. (1W, 1Sp) Staff

190. Problems in Drama. Selected research problems of merit and of mutual interest to students and instructors are investigated. Credit arranged. (F, W, Sp, Su) Staff

192. Projects in Theatre. Advanced work in playwriting, acting, directing, scene design, costume design, makeup, costume construction, lighting, technical practice, and theatre management. Projects may be done in connection with Utah State Theatre productions or they may be independent endeavors. A total of 9 credits may be earned in this course. Credit arranged. (F, W, Sp, Su) Staff

194. Problems of Drama Directors. Play selection, organization of the production, drama club activities, simplification of settings, lighting, costumes, financing, auditorium and stage facilities, central staging, audio-visual aids, and bibliography are studied. Recommended for directors and prospective directors of high school, church, and community theatres. (3Sp) Morgan

196. Advanced Directing. Practice in stage direction. The student selects, casts, directs, and presents short plays and scenes. Prerequisite: TH ART 146. (3W) Staff

200. Seminar in Drama. Intensive study of special problems in drama and theatre. Credit arranged. (F, W, Sp, Su) Staff

201. Dramatic Theory and Criticism. Beginning with Aristotle's Poetics, the course explores the traditional works of critical theory that relate to the theatrical arts. Prerequisites: TH ART 100, 102, 104. (3Sp) Staff


204. Thesis. Credit arranged. (F, W, Sp, Su) Staff

292. Projects in Theatre. Graduate projects in any branch of theatre art. Credit arranged. (F, W, Sp, Su) Staff
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Degrees Offered:
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- Master of Science
- Doctor of Philosophy
Increasing activity in the fields of Forest, Range, Wildlife, Soil Conservation, Watershed Management, and Forest Recreation, and the unquestioned need for their correlation in long-range wild land management, have created excellent opportunities for men who wish to work in these fields. The purpose of this College is to provide training in the use and management of natural resources. Natural resources covers a broad field. In popular usage it connotes renewable land and water resources and their management for food, fiber, and recreation in a relatively natural setting. The forests, rangelands, wildlife resources, watersheds, and forest recreation resources comprise the natural resources in which the College has developed special professional competence. Used in this context, natural resources does not refer to minerals and cultivated land.

The favorable geographical location of this College provides exceptional facilities for field experience and affords excellent opportunities for effective training in managing wild lands and their resources. Forest and range lands in Utah comprise more than 90 percent of the total state area. The Cache National Forest within two miles of the school, the Bear River Migratory Bird Refuge within forty miles, and vast areas of range lands provide forest, range, soil conservation and wildlife problems and offer unlimited study projects and opportunities for demonstration. Herds of elk and deer are studied close to the campus during the winter. Primitive areas, Yellowstone Park, and other national parks are within one day's driving distance.

The curricula of this College prepares a student for positions with federal or state agencies and for private work in (1) Forest Science, (2) Range Science, and (3) Wildlife Resources. A Forest Science student may choose from four options: one designed to train for general Forest Management work as typified by the demand of public land management agencies, one in Forest Recreation, one in Forest-Watershed Management, and one in Forest Research.

As a Range Science student you may specialize in general Range Management, Forest-Range Management, or Watershed Management. A Wildlife Resources student may select a curriculum to train either for Game Management or Fishery Management.

A student will make more satisfactory progress if he has 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 is important. Mere field ability is not sufficient. A prospective student should realize that Forestry and related fields are highly technical professions. They require high aptitude for scholarship and technical development. Success also is correla-
ted with personality and ability to deal with people.

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

Summer Camp. Successful completion of field instruction at the College-operated Summer Camp is required of students who plan to major in any curriculum in the Forest Science Department or the Forest-Range Management option offered by the Range Science Department. Any properly qualified student in the College may attend if he desires and makes suitable arrangements prior to the camp period. The camp opens soon (usually the first Monday) after the end of the spring quarter, and continues for seven weeks, unless the camp is released for fire-fighting, in which instance the camp lasts eight weeks. Nine credits are allowed for the complete program. In addition to the regular Summer Quarter fees, a $5 fee is charged for each of the four courses. Board is provided on a cost basis; lodging is without cost. Before attending camp one should be inoculated against Rocky Mountain spotted fever.

As a transfer to this College from another school a student should note that (a) completion of the camp program is required in the above-named courses of study; (b) it is prerequisite to professional Forest Science course work in the Junior year; and (c) in addition to having completed 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 are planned each year as part of the regular class instruc-

tion. Besides short trips scheduled for individual courses, departments conduct an extensive field-problems trip in the Spring quarter of the Junior year, or the Fall quarter of the Senior year. The trip for Range Science Seniors is taken just before the Fall quarter starts. The trip for Forest Science Juniors is taken during a period of ten days or two weeks just prior to the end of the Spring quarter. A fee of about $50 is charged each student to defray the transportation expenses of the trip.

Loan Funds. Three sources of funds are available on a loan basis to worthy, deserving upper-division students in the College of Natural Resources. These are the W. B. Rice Memorial Loan Fund, the Turner Memorial Fund and the Bureau of Land Management Fund.

Graduation Requirements. The following general requirements must be met for graduation from the College of Natural Resources:
(1) One hundred and ninety-two quarter credits, exclusive of basic Military Science, Physical Education, and Forestry Summer Camp.
(2) All courses prescribed under the study program of one's chosen field.
(3) Fulfillment of the General Education requirement 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) At least one summer of department-approved practical and qualifying work experience. In certain instances Summer Camp attendance may fulfill this requirement.
(6) Beginning with 1967 graduating class, Seniors in the College must have a grade
average in their professional courses of 2.2. 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.

Department of

Forest Science

Head: Professor J. Whitney Floyd
Office in Forestry and Zoology 106

Professors T. W. Daniel, Raymond R. Moore; Associate Professor S. Ross Tocher; Assistant Professors John D. Hunt, Carl M. Johnson, Walter H. Johnson, John D. Schultz, J. Alan Wagar, Ross S. Whaley; Collaborators Norbeet V. De Bylje, Robert D. Doty, Robert S. Johnston, Richard G. Krebill, Roger S. Peterson, Bland Z. Richardson.

Upon completion of any of the following four programs of study, a student is granted the degree of Bachelor of Science in Forest Science. These four programs of study are designed to give comprehensive training in all branches of Forest Science, including growing, protecting, harvesting, and utilization of timber crops. It is desirable that one know by the end of his Sophomore year in which of these four options to enroll:

1) The option in Forest Management provides basic training in forestry for the student who plans to go into administrative work on forest lands or into forestry research.

2) The second option, Forest Recreation, is designed to train a person for employment with the National Park Service, U. S. Bureau of Outdoor Recreation, U. S. Forest Service, State departments of conservation, forestry or park services, or municipal park services. Suitable training in outdoor recreation organization, management, and supervision is provided. In addition, a student is given sufficient forestry training to qualify for the various Federal Civil Service examinations and positions.

A Forest Recreation Research Unit was established in the College of Natural Resources in 1962. This provides additional strength to the teaching and research program in Forest Recreation.

3) The third option, Forest-Watershed Management, provides a basic background in forestry with some selected courses in watershed management, soils, geology, and hydrology. It serves as a base for the student who may undertake graduate work in forest hydrology, and it provides an improved understanding of watershed problems for the student who may enter directly into a career in forest administration.

4) The fourth option, Forest Research, is designed to provide expanded undergraduate training in the basic sciences while still providing a basic forestry background. It serves specifically as a stepping-stone to a graduate program in forestry research. Enrollment is limited to students whose previous records indicate their abilities are sufficiently high to enable them to
carry a more strenuous academic burden.

**Honors.** Any student having an accumulative grade point average of 3.2 or better may be eligible for the honors program. A student in the department honors program may, with the approval of his major professor, substitute certain optional courses for generally required courses.

**Required Basic Courses**

In addition to the 14 Social Science and Humanities units listed below, a student must complete an additional 11 credits in the Social Sciences and Humanities, making a total of 25 credits, with at least 10 units in each field.

### Forest Science

#### Freshman Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Quarters &amp; Cr</th>
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<tbody>
<tr>
<td>English (BC) 1, 2, 3</td>
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</tr>
<tr>
<td>Chemistry 10, 11, 12</td>
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<tr>
<td>Biology 15</td>
<td></td>
</tr>
<tr>
<td>Botany 26, 102</td>
<td></td>
</tr>
<tr>
<td>Forest Science I</td>
<td></td>
</tr>
<tr>
<td>Range Science I</td>
<td></td>
</tr>
<tr>
<td>Wildlife Resources 1</td>
<td></td>
</tr>
<tr>
<td>Gen Ed (Gp Req)</td>
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</tr>
<tr>
<td>Physical Education (Activity of Military Science)</td>
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<tr>
<td></td>
<td>1 1 1</td>
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#### SOPHOMORE YEAR

<table>
<thead>
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<tbody>
<tr>
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<td>Math 35, 44</td>
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<tr>
<td>Physics 6</td>
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<tr>
<td>Geology</td>
<td></td>
</tr>
<tr>
<td>Soils 58</td>
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</tr>
<tr>
<td>Economics 51</td>
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<tr>
<td>Speech 105</td>
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<td>General Education (Gp Req)</td>
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<td></td>
<td>16 19 17</td>
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**Summer Camp**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest Science 96</td>
<td>3</td>
</tr>
<tr>
<td>Forest Science 97</td>
<td>4</td>
</tr>
</tbody>
</table>

1 Students not qualified (Successfully completed 1½ units of High School Algebra) for Math 35 should take necessary prerequisites (Math 30 or 34) which must be taken in the freshman year.

### Options—Forest Management

#### JUNIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Quarters &amp; Cr</th>
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</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>Forest 107</td>
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<tr>
<td>Forest 114</td>
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<td>Forest 118</td>
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<td>Forest 123</td>
<td></td>
</tr>
<tr>
<td>Range 126</td>
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</tr>
<tr>
<td>Range 180</td>
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</tr>
<tr>
<td>Wildlife 150</td>
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<td>Total</td>
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#### SENIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Quarters &amp; Cr</th>
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<tbody>
<tr>
<td>Forest 119</td>
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<td>Forest 123</td>
<td></td>
</tr>
<tr>
<td>Range 126</td>
<td></td>
</tr>
<tr>
<td>Range 180</td>
<td></td>
</tr>
<tr>
<td>Wildlife 150</td>
<td></td>
</tr>
<tr>
<td>Electives</td>
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</tr>
<tr>
<td>General Education</td>
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13 Hours Restricted Electives

<table>
<thead>
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<tr>
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<td>Forest 125</td>
<td></td>
</tr>
<tr>
<td>Forest 129</td>
<td></td>
</tr>
<tr>
<td>Forest 131</td>
<td></td>
</tr>
<tr>
<td>Forest 141</td>
<td></td>
</tr>
<tr>
<td>Forest Recreation</td>
<td></td>
</tr>
<tr>
<td>Bus Admin or Economics</td>
<td></td>
</tr>
<tr>
<td>Statistics 51 or 131</td>
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</table>

#### Forest Recreation

<table>
<thead>
<tr>
<th>Course</th>
<th>Quarters &amp; Cr</th>
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<tbody>
<tr>
<td>Forest 106</td>
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<tr>
<td>Forest 114</td>
<td></td>
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<tr>
<td>Forest 115</td>
<td></td>
</tr>
<tr>
<td>Forest 118</td>
<td></td>
</tr>
</tbody>
</table>

1 Wildlife 160 may be substituted for Wildlife 150.

2 Botany 140 and Entomology 105 may be substituted for Forestry 119.

3 Forest 119 may be substituted for Forestry 118.
### Forest Science 257

<table>
<thead>
<tr>
<th>Course</th>
<th>Quarters &amp; Credits</th>
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<tbody>
<tr>
<td>Forestry 130</td>
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<tr>
<td>Forestry 132</td>
<td>3</td>
</tr>
<tr>
<td>Forestry 137</td>
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</tr>
<tr>
<td>Forestry 138</td>
<td>2</td>
</tr>
<tr>
<td>Forestry 146</td>
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<td>Range 128</td>
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<td>Range 189</td>
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<td>Landscape Arch 130</td>
<td>3</td>
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<td>Wildlife 160</td>
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### SENIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Quarters &amp; Credits</th>
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<tbody>
<tr>
<td>Forestry 119</td>
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<td>Forestry 120</td>
<td>3</td>
</tr>
<tr>
<td>Forestry 121</td>
<td>3</td>
</tr>
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<td>5</td>
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<tr>
<td>Forestry 132</td>
<td>3</td>
</tr>
<tr>
<td>Forestry 133</td>
<td>3</td>
</tr>
<tr>
<td>Forestry 134</td>
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<tr>
<td>Range 162</td>
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<tr>
<td>English 24</td>
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<td>Total</td>
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</table>

**15 Hours Restricted Electives**

- Botany 121          (3) W
- Soils 105           (3) F
- Soils 114           (5) Sp
- Geology 115         (5) F
- Geology 117         (4) W
- Math 97             (5) F,W,Sp
- Ap Stat 131         (4) F,W
- CE 173              (4) W
- A & I Eng 149       (3) F
- Forestry 202        (1) W

### Forest Research

#### Freshman Year

<table>
<thead>
<tr>
<th>Course</th>
<th>Quarters &amp; Credits</th>
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<tbody>
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<td>Chemistry 3, 4, 12</td>
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</tr>
<tr>
<td>English 1, 2, 3</td>
<td>3</td>
</tr>
<tr>
<td>Biology 15</td>
<td>5</td>
</tr>
<tr>
<td>Botany 26, 102</td>
<td>3</td>
</tr>
<tr>
<td>Math 35, 96, 97</td>
<td>5</td>
</tr>
<tr>
<td>PE, MS, or AS</td>
<td>1-2 1-2 1-2</td>
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### Sophomore Year

<table>
<thead>
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<th>Course</th>
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<tbody>
<tr>
<td>Botany 120</td>
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<tr>
<td>Math 28</td>
<td>5</td>
</tr>
<tr>
<td>Forestry 112, 113</td>
<td>3</td>
</tr>
<tr>
<td>Physics 20, 21, 22</td>
<td>5</td>
</tr>
<tr>
<td>Geology 3</td>
<td>5</td>
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<tr>
<td>Econ 51</td>
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</table>

*Wildlife 150 may be substituted for Wildlife 160.*
College of Natural Resources

Soils 58 ............................................. 5
1Electives ....................................... 6-9 2

18 16-19 19

Summer Camp

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
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<tbody>
<tr>
<td>Forest Science 96</td>
<td>3</td>
</tr>
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<td>Forest Science 97</td>
<td>4</td>
</tr>
<tr>
<td>Range Science 98</td>
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<tr>
<td>Wildlife Resources 99</td>
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Junior Year

<table>
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<th>Qua taught &amp; Cr</th>
<th>F</th>
<th>W</th>
<th>Sp</th>
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<tbody>
<tr>
<td>Forestry 106</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Forestry 114, 115</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Forestry 126 or 130</td>
<td>3</td>
<td>or 3</td>
<td></td>
</tr>
<tr>
<td>Range 126</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Statistics 131, 132</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Speech 105</td>
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<td>1Electives</td>
<td>4-7</td>
<td>2-8</td>
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Senior Year

<table>
<thead>
<tr>
<th>Qua taught &amp; Cr</th>
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<th>W</th>
<th>Sp</th>
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</thead>
<tbody>
<tr>
<td>Forestry 119</td>
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<tr>
<td>Forestry 121, 122, 123</td>
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<td>5</td>
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<tr>
<td>Electives</td>
<td>12-15</td>
<td>9-12</td>
<td>11-14</td>
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</tbody>
</table>

Graduate Study

The Department offers the Master of Science and Doctor of Philosophy degrees as professional degrees. The Master of Forestry degree is offered for those students who lack prior academic training in forestry. The Master's degree is granted in the following eight subject areas: forest management, silviculture, forest ecology, forest recreation, forest hydrology, forest economics, forest protection, and wood science and technology. A thesis is required for the MS and PhD degrees, but the MF may be granted without a thesis.

The degree of Master of Science in Forest Science may be earned by a student who has an undergraduate degree in Forestry, with acceptable scholarship, upon completion of a prescribed course of study and fulfillment of other requirements listed by the School of Graduate Studies.

The Master of Forestry degree is available to students possessing a non-Forestry Bachelor's degree with acceptable scholarship. The requirements include completion of the required basic lower division program, the required upper division Forest Science curriculum, and ten units of graduate (200 series) course work.

Doctor of Philosophy degree. A program of instruction and research leading to the degree of Doctor of Philosophy is offered to a selected number of students.

An applicant for graduate work should submit an official transcript of college courses and an official application for admittance to the Dean of the School of Graduate Studies. Application forms may be obtained at his office.

Graduate Assistantships are available to graduate students in Forest Science. Application for assistantships should be made to the head of the Forest Science Department.

Forest Science Courses

1. Survey and Orientation. Survey of the profession of Forest Management, and the relation of conservation and multiple uses of wildland resources to the welfare of the state and nation. (2F) Floyd


96. Forest Surveying. Practical field problems in surveying methods commonly employed in Forest, Range, and Wildlife Management. Lab Fee $5. (Summer camp 3 credits) Moore

97. Forest Practice. Field studies in inventories, successional stages, and growth of
stands of trees. Study of forest soils and related land use. Lab fee $5. (Summer camp 4 credits.)

C. Johnson, Moore

103. Silviculture and Dendrology. Basic Silvics: Silvicultural systems; western conifers and western regional silviculture; elements of eastern hardwoods and types. Not open to Forest Science majors. Prerequisites: Range 126 and Summer Camp. (4W) C. Johnson

104. Forest Management and Economics. Organization of a forest for production: surveys, normal and actual growing stock, determination of allowable harvest, management plans; economics influencing management. Not open to Forest Science majors. Prerequisite: Forest 103. (3Sp) Moore

106. Forest Measurements I. Measurements of timber in log, tree, and stand; log rules and sealing; statistical methods useful in analyzing forest data; timber cruising practices. Prerequisite: Summer Camp. (4W) Moore

107. Forest Measurements II. Volume and yield table compilation; growth of even-aged, all-aged and residual cutover stands. Prerequisite: Forest 106. (3Sp) Moore

110. Principles of Conservation. An introduction to conservation problems designed to acquaint one with the nature and extent of the renewable resources of the United States and the methods of conservatively using them. Open to all students except those registered in the College of Natural Resources. (3F, Sp) C. Johnson

112. Dendrology I. Hardwoods. Identification, distribution and silvics of the more important forest trees in the United States. (3F) C. Johnson

113. Dendrology II. Conifers. Identification, distribution, and silvics of the more important forest trees of the United States. (3Sp) C. Johnson

114. Silviculture I. Characteristics of the tree species which influence silvicultural practice in the United States. Prerequisites: Summer Camp, Range 126, Forestry 112, Botany 120. (3W) Daniel

115. Silviculture II. Silvicultural systems used in securing natural reproduction of forests and their applications to the important species and forest types in the United States. Prerequisite: Forestry 114. (3Sp) Daniel

116. Seeding and Planting. Seed collection, extraction and cleaning methods; germination testing; storage of forest tree seeds; practical experience in field planting and nursery work. Prerequisite: Forestry 115. (2Sp) Daniel

118. Forest Protection I. Prevention, suppression and suppression of forest and range fires, including economic and physical effect; fire behavior. Field trips. (3W) C. Johnson

119. Forest Protection II. Problems of administration and economies in protecting forests from biological enemies. Prerequisites: Forestry 115, 121. (3W) Schultz

120. Silviculture III. Regional silviculture of the United States. Prerequisite: Forestry 115. (3W) Daniel

121. Forest Management. Physical factors influencing the regulation of a forest for sustained yield; site, growing stock and rotation; compilation of data for management plans. Prerequisite: Forestry 107, 115. (4F) Moore


123. Forest Economics. Economic problems involved in the utilization of forest land and timber, distribution of forest products, and the management for multiple uses. (3Sp) Whaley

125. Logging. Principles and methods of harvesting wood products, with emphasis on cost, values, and the application of forestry to the harvesting process. Prerequisite: Forestry 97. (3F) Moore


129. Mechanical Properties. Factors affecting the strength of wood. (2W) W. Johnson

130. Milling and Products. Manufacturing, grading, seasoning and preserving lumber, including study of the wood-using industries and their products. (3Sp) W. Johnson

131. Forest Products Marketing. Principles of marketing applied to lumber and other forest products. (3Sp) W. Johnson

132. Forest Administration and Policy. A study of forest administration, organization, policy formation and personnel management. The development of forest and conservation policy and its effects on current forestry practices. (3F) Whaley

134. Aerial Photo Interpretation. Elements of photogrammetry; use of aerial photographs in mapping vegetation types and estimating timber volumes, construction of planimetric maps from aerial photographs. (3F, W) Toccher

137. Recreational Use of Wildland. Consideration of the factors responsible for rec-
College of Natural Resources

Recreational use, legislative programs, philosophical concepts, and descriptions of recreational agencies involved in wildland recreation management. (3F) Hunt

138. Recreational Land Classification. Land classification and economics of various forms of forest recreational use. (2Sp) Whaley

139. Interpretive Planning. The analysis and development of interpretive programs for recreational areas. Techniques of natural history interpretation. Evaluation and planning of visitor information programs. (3W) Tocher

140. Forest Recreation Management. Factors influencing the management of forest recreation sites. Consideration of land management objectives, alternative methods of development, regulations, and user satisfaction. (3Sp) Floyd

141. Forest & Range Hydrology. The role of forest and range vegetation in determining the hydrologic function of a watershed; natural storage phenomena of the forest land surface and methods of modifying this. Prerequisites: Range 126, 180, For 115. (4Sp) Schultz

145. Forest Problems. Individual study and research upon a selected forestry problem approved by the instructor. (1-3F, W, Sp) Staff

146. Junior Field Problems. Study of forest operations. Junior year. Fee $50. (1Sp) Staff

201. Forest Management Seminar. Review and discussion of current literature and developments in Forest Management. (1F) Moore


203. Forest Recreation Seminar. Review and discussion of current literature and developments in Forest Recreation. (1Sp) Tocher

204. Forest Ecology. Study of past and present distribution of forest species and forest types and the physical-biological basis of distribution and growth performance. (3W) Staff

205. Silviculture. Intensive study of a particular region by individual students. Group work consists of advanced treatment of silvics and silviculture, with emphasis on physiological aspects of both subjects. (3F, W, Sp) Daniel

206. Forest Management. Individual study projects within the fields of forest measurements, valuation, regulation, organization, and development of forest properties. (2F, W, Sp) Moore

207. Forest Protection. Advanced study in specialized fields of forest protection. (2W) Staff

208. Forest Watershed Management. Individual study projects within the field of forest watershed management. (2F, W, Sp) Schultz

209. Forest Economics. Advanced work in forest economics. Particular attention is given to the application of economic theory to solving present-day problems in the multiple use of forest lands and in the production and distribution of forest products. (2F, W, Sp) Whaley

210. Forest Recreation. Individual study projects within the field of forest recreation. (2F, W, Sp) Staff


212. Forest Utilization. Individual study projects within the field of forest utilization. (2F, W, Sp) W. Johnson


*220. Advanced Forest Autecology. Advanced treatment of the effects of various environmental factors on tree development, and consideration of the consequent reverse action of the tree itself on the environment. (3W) Staff

*221. Advanced Forest Synecology. Advanced treatment of the community relations of forest stands, their internal structure, and their effect on the surrounding environment. (3W) Staff

222. Forest Ecosystem Analysis. Detailed investigation of the autecology and synecology of selected forest ecosystems; interpretation of the dynamics of the ecosystem. (3Sp) Staff

*Taught 1966-67
Department of

Range Science

Head: Professor L. A. Stoddart
Office in Forestry and Zoology 161

Professors C. Wayne Cook, Karl G. Parker, Extension Specialist, Arthur D. Smith; Assistant Professors Jame E. Bowns, George B. Coltharp, J. B. Grumbles, Neil E. West; Collaborators Alvin T. Bleak, Raymond W. Brown, Paul W. Conrad, Dean Doell, William A. Laycock, P. E. Packer.

A four-year program leading to the degree of Bachelor of Science in Range Science is available. Opportunity is given under this program to specialize in General Range Science, Forest-Range Science, or Watershed Science.

Graduates are qualified for such positions as Forest Ranger, Soil Conservationist, Range Manager or Range Conservationist under the United States Civil Service Commission, with such federal agencies as the Forest Service, Soil Conservation Service, Bureau of Indian Affairs and Bureau of Land Management. At present a shortage exists in qualified men for such positions, and employment opportunities are excellent. State land management and both federal and state research opportunities are also available.

Range Science graduates also may enter private work, such as operating a livestock ranch, technical foreman for livestock companies, adviser to land management companies, and range land appraiser.

Required Courses

All students in the Department of Range Science must complete the coursework listed below during the Freshman and Sophomore years. In addition, University group requirements and coursework under one of the three options must be completed. These three fields of specialization include:

1. **General Range Science** under which the student is trained for management of range lands including public range administration and private ranch operation.

2. **Forest-Range Science** which trains the student for work in the U.S. Forest Service.

3. **Watershed Science** which involves training in wild-land hydrology, soil conservation, and administration of watersheds.

In consultation with his major professor, the student is advised to secure approval of a complete study plan for his college career, including electives to meet his personal objectives. Certain substitutions may be made in required coursework to meet special education objectives upon approval of the department.

### FRESHMAN YEAR

<table>
<thead>
<tr>
<th>Dept Course No—Course Name</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
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<tbody>
<tr>
<td>Biology 15—general biology</td>
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<tr>
<td>Botany 26, 102—Botany, Taxonomy</td>
<td>5 5</td>
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<td>English 1, 2, 3—Basic</td>
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<td>Communications</td>
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<tr>
<td>Mathematics 34, 35, 44—Algebra, Trigonometry</td>
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<tr>
<td>Forest Science 1—Survey and Orientation</td>
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</tbody>
</table>

*Students presenting 1½ units of high school algebra or otherwise qualified to take college algebra (Math 35) are not required to take Math 34. High school geometry is prerequisite to Math 34, 35, 44.*
### Required for Graduation in General Range Science Option

**JUNIOR YEAR**

<table>
<thead>
<tr>
<th>Dept Course No</th>
<th>Course Name</th>
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<tbody>
<tr>
<td>Physics 6</td>
<td>General Physics</td>
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</tr>
<tr>
<td>Range Sci 160</td>
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<tr>
<td>Range Sci 161</td>
<td>-Range</td>
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<tr>
<td>Range Sci 126</td>
<td>-Plant Ecology</td>
<td>5</td>
<td></td>
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</tr>
<tr>
<td>Botany 120</td>
<td>-Plant Physiology</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range Sci 131</td>
<td>-Range</td>
<td>5</td>
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<tr>
<td>Range Sci 132</td>
<td>-Range</td>
<td>5</td>
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</tr>
<tr>
<td>Range Sci 163</td>
<td>-Range</td>
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<tr>
<td>Animal Sci 150</td>
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<td>Animal Sci 151</td>
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<td>Animal Sci 152</td>
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**SENIOR YEAR**

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<tr>
<td>Wildlife 160</td>
<td>-Animal Ecology</td>
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<tr>
<td>Range Sci 180</td>
<td>-Watershed</td>
<td>5</td>
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</tr>
<tr>
<td>Range Sci 193</td>
<td>-Range Problems</td>
<td>3</td>
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<td>Range Sci 194</td>
<td>-Range Problems</td>
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<tr>
<td>Animal Sci 110</td>
<td>-Beef</td>
<td>3</td>
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<tr>
<td>Animal Sci 125</td>
<td>-Sheep Production</td>
<td>3</td>
<td></td>
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<tr>
<td>Range Sci 181</td>
<td>-Range Economics</td>
<td>3</td>
<td></td>
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<tr>
<td>Range Sci 164</td>
<td>-Technical Prob</td>
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### Required for Graduation in Forest-Range Option

**JUNIOR YEAR**

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<tr>
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<tbody>
<tr>
<td>Physics 6</td>
<td>General Physics</td>
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<tr>
<td>Range Sci 160</td>
<td>-Applied Range Science</td>
<td>5</td>
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<tr>
<td>Range Sci 126</td>
<td>-Plant Ecology</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Botany 120</td>
<td>-Plant Physiology</td>
<td>5</td>
<td></td>
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<tr>
<td>Range Sci 131</td>
<td>-Range</td>
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<tr>
<td>Range Sci 130</td>
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<tr>
<td>Range Sci 132</td>
<td>-Range</td>
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<tr>
<td>English 112</td>
<td>-Advanced Expository Writing</td>
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<tr>
<td>Forest Sci 118</td>
<td>-Forest Protection</td>
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<tr>
<td>Forest Sci 130</td>
<td>-Milling and Products</td>
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**SENIOR YEAR**

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<tr>
<td>Wildlife 160</td>
<td>-Animal Ecology</td>
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<tr>
<td>Range Sci 180</td>
<td>-Watershed</td>
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<tr>
<td>Range Sci 193</td>
<td>-Range Problems</td>
<td>3</td>
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<tr>
<td>Forest Sci 106</td>
<td>-Forest</td>
<td>3</td>
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<tr>
<td>Forest Sci 134</td>
<td>-Aerial Photo Interpretation</td>
<td>3</td>
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<tr>
<td>Forest Sci 103</td>
<td>-Silviculture and Dendrology</td>
<td>4</td>
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<tr>
<td>Forest Sci 104</td>
<td>-Forest Mgt and Economics</td>
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### Required for Graduation in Watershed-Management Option

**JUNIOR YEAR**

<table>
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<tr>
<th>Dept Course No</th>
<th>Course Name</th>
<th>F</th>
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</thead>
<tbody>
<tr>
<td>Physics 6</td>
<td>General Physics</td>
<td>5</td>
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<td></td>
</tr>
<tr>
<td>Range Sci 160</td>
<td>-Applied Range Science</td>
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<tr>
<td>Forest Sci 106</td>
<td>-Forest</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forest Sci 134</td>
<td>-Aerial Photo Interpretation</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forest Sci 103</td>
<td>-Silviculture and Dendrology</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forest Sci 104</td>
<td>-Forest Mgt and Economics</td>
<td>3</td>
<td></td>
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<tr>
<td>Total</td>
<td></td>
<td>11</td>
<td>17</td>
<td>5</td>
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</tbody>
</table>

*Not required of students with experience in livestock judging.

*Not required for those having served with the Armed Forces. Military Science or Air Science courses may be substituted. See Physical Education Department write-up regarding specific course work required.

*Required for Watershed Science option only.

*General Range Science and Forest-Range Science options only.
A Bachelor's degree in Range Science or a related subject is prerequisite to advanced study.

To a selected few students, a program of instruction and research leading to the degree of Doctor of Philosophy is also offered. Students having the Bachelor's or Master's degree should contact the department head for information concerning eligibility for study toward this degree.

Assistantships. There are available to graduate students a number of assistantships which will defray most of the costs of attending school, including exemption from non-resident tuition fees. Such assistantships involve part-time work for the department. Interested students should apply to the department head for further details.

Range Science Courses

1. Elements of Range Science. Introduction to problems and methods in range science. (1W)

26. Range Analysis. Field identification of summer range plants. Methods and techniques of vegetation analysis. Practice in range allotment analysis. (1 Summer Camp)

126. Plant Ecology. Role of heredity and environment in plant behavior; plant succession, competition and indicators; analysis of habitat factors influencing plant growth and distribution. Prerequisites: Plant taxonomy and general soils. Lab fee $1. (5F, Sp)

130. Grassland Communities. Composition, distribution, successional patterns, and management of grassland ranges. Prerequisite: Plant taxonomy and Range 131. Two lectures, one lab. (3W)

131. Forest Range Communities. Composition, distribution, successional patterns, and management of forested ranges. Prerequisite: Plant taxonomy. Two lectures, two labs. (4F)

132. Desert Plant Communities. Composition, distribution, successional patterns and management of desert ranges. Prerequisite: Plant taxonomy and Range 131. Lab fee $10. Two lectures, one lab. Saturday field trips may be scheduled. (5Sp)

Graduate Study

The degree of Master of Science in Range Science is granted upon completion of an arranged course of study. Adequate facilities are available to allow emphasis upon such related fields as Forestry, Soil Conservation, Animal Science, Botany, Wildlife, Economics, or Soils.

Range Science 263

3Taught alternate years

161. Range Analysis Techniques. Theory, application and limitations of vegetation analysis methods and techniques. Field practice in vegetation sampling and range analysis. Credit not allowed those with credit in Range 98. Lab fee $3. Field trips to be arranged. (1F) Grumbles

162. Range Management. A terminal course for non-range majors dealing with management of native range lands; maintenance of production; utilization of range forage; and range livestock management. Prerequisite: summer camp or permission from instructor. (5Sp)

163. Range Improvement. Methods and problems involved in seeding range lands, removing brush, improving stock watering facilities, and fencing ranges. Terracing, water spreading and use of dams on range lands. Prerequisite: Range 160 or 162. (3W) Grumbles

164. Technical Problems in Range Management. Specialized problems in range administration and science encountered by the technician. Prerequisite: Range 160 or 162. (3W) Stoddart

165. Range Problems. Individual study and research upon a selected range problem. Prerequisite: Faculty approval. (1-3F,W, Sp, Su) Staff

166. 197. Range Field Problems. Field study of range management operations and research. Courses 196 and 197 are given alternate years. Lab fee $50. Prerequisite: Plant Ecology and Plant Communities. (3F) Coltharp


204. Land Use Seminar. Current problems and practices in land resource allocations and administration with special emphasis on the western range. (2F) Smith

205. Seminar in Range Nutrition. Problems in research in the field of plant and animal nutrition on rangeland. Prerequisite: Animal Nutrition. (3W) Cook


207. Graduate Seminar. Review of current research in range science by graduate students and faculty. (1Sp) Coltharp


281. Advanced Range Economics. Advanced study of economic factors affecting land management practices with special consideration to range lands and range operations. Prerequisite: Range Economics. (2Sp) Smith

*Taught 1966-67
**Taught 1967-68
Department of  
Wildlife Resources

Head: Professor William F. Sigler  
Office in Forestry and Zoology 163

Professors George H. Kelker, Jessop B. Low, Allen W. Stokes; Associate Professors Donald R. Franklin, John M. Neuhold, Frederick H. Wagner; Assistant Professors David F. Balph, William T. Helm, Robert H. Kramer, Gar W. Workman; Research Chemist Susan S. Martin; Teaching Assistant Francis W. Clark

Students with a major in this department may choose either of two options: Game Management or Fisheries. Each leads to the degree of Bachelor of Science in Wildlife Resources.

The Game option prepares students particularly for management of wildlife; the Fisheries option for positions in fishery management, both freshwater and marine.

The Department participates in a Cooperative Wildlife Research Unit, a Cooperative Fishery Unit, and a program in wildlife extension.

The department operates or has access to the following research facilities: a large new aquarium facility operated as an aquatic toxicology and physiology laboratory, the Bear Lake Biological Laboratory, a new experimental fish hatchery, a river studies laboratory area, and a radioecology and behavior laboratory.

Program of Studies

The first two years include courses designed to give the student a sound scientific background. By the beginning of the Junior year one should decide with his adviser upon a course of studies for the final two years. Besides choosing an option a student will want to select courses to meet his particular professional goal.

During the Freshman and Sophomore years a student should complete the following:

<table>
<thead>
<tr>
<th>Course Description</th>
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<tbody>
<tr>
<td>English 1, 2, 3</td>
<td>9</td>
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<tr>
<td>College algebra and trigonometry</td>
<td>8</td>
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<tr>
<td>Chemistry, including organic</td>
<td>15</td>
</tr>
<tr>
<td>Botany, including taxonomy</td>
<td>15</td>
</tr>
<tr>
<td>Zoology: invertebrate, vertebrate and entomology</td>
<td>15</td>
</tr>
<tr>
<td>Physics</td>
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<tr>
<td>Economics</td>
<td>5</td>
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<tr>
<td>Soils</td>
<td>6</td>
</tr>
<tr>
<td>Survey courses in forest, range, and wildlife management</td>
<td>4</td>
</tr>
<tr>
<td>MS, AS, or PE</td>
<td>3</td>
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</tbody>
</table>

Electives from associated departments are chosen with approval of the major professor. Recommended electives include: all courses in Wildlife, Range, or Forestry; Applied Statistics 131, 132, 141; Botany 112; Chemistry: organic, physical, or biochemistry; Civil Engineering 81, 173; Animal Husbandry 150; Geology 3; Photography 51; Physical Education 36; Physiology 4, 121, 122, 131; Zoology 101, 112, 116, 118, 119, 121, 122, 128, 129.

Required for Graduation of All Wildlife Students

Wildlife 145, Principles of Wildlife Management ........................................... 3
Wildlife 157, 158, 159, Seminar (Senior Year) .................................................. 3
Wildlife 160, Animal Ecology ............................................................................... 5
Range 126, Plant Ecology .................................................................................... 5
Applied Statistics 51 or 131, Statistical Methods ............................................... 4
Advanced Writing, English 111, 112, 117. 
Journalism 112 .................................... 6
Speech 105, Technical Speaking ................. 3
Social Sciences and Humanities (including above required courses), 25 hours with at least 10 in each group. In addition to these courses, one of the following options may be chosen.

Option A. Game Management
Any two of the following three
Wildlife 146, Management of Upland Game ....3
Wildlife 147, Management of Waterfowl and Furbearers .......... 4
Wildlife 153, Management of Big Game .. .... 4
Zoology (two courses in 100 series) .......... 8
Any two of the following four
Wildlife 161, Limnology .. .................. 4
Wildlife 166, Aquatic Ecology .......... 3
Wildlife 172, Problem Orientation .............. 3
Wildlife 175, Wildlife Law Enforcement .... 3
Total including related courses (see above): 33 credits

Option B. Fishery Management
Wildlife 161, Limnology ...................... 4
Wildlife 165, Fishery Principles .............. 4
Wildlife 169, Fishery Techniques ............. 4
Zoology 155, Ichthyology .................. 5
Any two of the following four
Wildlife 162, Fishery Biology ................. 4
Wildlife 166, Aquatic Ecology .......... 3
Wildlife 172, Problem Orientation .............. 3
Wildlife 175, Wildlife Law Enforcement .... 3
Total including related courses (see above): 33 credits

Graduate Study
The advanced degrees, Master of Science and Doctor of Philosophy in Fishery Biology or Wildlife Biology, are granted upon completion of a prescribed course and fulfillment of the Graduate School requirements.

Assistantships. The Utah Cooperative Wildlife Research Unit and the Utah Cooperative Fishery Unit provide research assistantships for graduate students in the department. The Wildlife Resources Department has one teaching assistantship. In addition there are several grants from outside agencies available to support graduate students. A prospective student should submit formal application with a transcript of college credits and references to the Dean of the School of Graduate Studies. Inquiry as to admission should be directed to the Head of the Department of Wildlife Resources. Applications for assistantships should be directed to the Head of the Department.

Wildlife Resources Courses


99. Wildlife Practice. Integrated studies of wildlife populations in relation to land uses. Lab fee $5. (1 Summer Camp) Kelker


146. Management of Upland Game. Taxonomy, life histories, distribution, environmental needs, and plans for management of game birds and small mammals. Two lectures, one lab. Prerequisite: Wildlife 145. (3F) Stokes

147. Waterfowl and Furbearer Management. Taxonomy, life histories, habitat requirements, economic importance, and plans for management of waterfowl and furbearers, especially muskrat and beaver. Prerequisite: Wildlife 145. Three lectures, field trips. (4Sp) Stokes

148. Animal Behavior. Maintenance and social activity of a variety of animals stressing behavioral adaptation and behavioral regulation of animal numbers. Three lectures, one lab. (4F) Stokes

150. General Wildlife Management. Principles of animal ecology and wildlife management: life histories, economics, and management phases of important species of big game, upland game, waterfowl, and fish. No credit allowed wildlife management majors. Five lectures; field trips arranged. (5F, Sp) Kelker

153. Management of Big Game. Life histories, distribution, numerical variation, enemies, and management activities for big game animals. Prerequisite: Wildlife 145 or 150. Three lectures, two labs, including field trips. (4W) Wagner

155. Economic Wildlife. General importance of wildlife resources; natural history, economic values and control methods for rodena...
and predators; identification of skulls and skins; brief evaluation of hawks and reptiles. Two lectures, one lab. (3W) Kelker

Ichthyology (Zoology 155) Ecology, classification, and life histories of native and introduced fishes. Two lectures, two labs. (5W) Sigler


157, 158, 159. Wildlife Seminar. Discussion of current developments in wildlife management. Two recitation periods per week. (1F, 1W, 1Sp) Staff

160. Animal Ecology. Distribution and behavior of animals as affected by various environmental factors. Special attention to inter-relationships of biotic communities. Three lectures, two labs, including field problems. (6F, Su) Wagner, Balph

161. Limnology. A study of the physical, chemical and biological interactions in lakes and other fresh waters. Prerequisite: Entomology 13. Three lectures, one lab. (4F) Neuhold

162. Fishery Biology. Anatomy, development, respiration, and excretion of fresh water teleosts. Two lectures, two labs. (4W) Neuhold

163. Instrumental Ecology. Theory of instrumental methods used to study environmental factors and their effects on wildlife. Three lectures. (3Sp) Martin

164. Fish Populations. General population characteristics, methods of enumeration, and determination of mortalities. Prerequisite: permission of instructor. Two lectures. (2W) Staff

165. Fishery Principles. Principles of fish management in lakes and streams. Fish population structure and fish life history parameters. Prerequisite: Zoology 155. Three lectures, one lab. (4W) Sigler, Franklin, Helm

166. Aquatic Ecology. Relationships between water and various animals, particularly fishes. Special attention to effects of topography, geography, rainfall, water quality, and various aspects of civilization on aquatic resources. Three lectures. (3Sp) Helm

167. Principles of Fish Culture. The principles of Fish culture, fish hatchery management, diseases and nutrition of hatchery-reared fish. Three lectures. (3F) Workman

168. World Fishery Resources. Development, economic significance, problems and application of research to management of selected commercial fisheries of the world. Three lectures. (3Sp) Kramer

169. Fishery Techniques. Techniques of life history study, fish sampling, habitat management and fish stocking. Prerequisite: Wildlife 165. Three lectures, one lab. (4Sp) Helm, Neuhold, Sigler, Workman

170. Wildlife Problems. Individual study and research upon a selected wildlife problem. Three lectures. (1 to 5F, W, Sp, Su) Staff

172. Problem Orientation. A discussion of the needs of an approach to wildlife investigations, presenting data, analyzing the problem, and drawing conclusions relative to research in wildlife management. (Three lectures. (3W) Kelker


210. Advanced Field Problems. Field training in techniques not covered in undergraduate courses. (1 to 5F, W, Sp) Staff

248. Animal Behavior II. Cause, function and development of behavior among animals. Prerequisite: Wildlife 148. Three lectures, one lab. (4W) Balph

253. Advanced Big Game Management. Population dynamics, census methods, hunting regulations, and management plans. Prerequisite: Wildlife 153 or equivalent. Two lectures, one lab. (3W) Wagner

257. Graduate Seminar. Discussion of current investigation and management programs by class and staff members and by representatives of state and federal agencies. (2F, W, Sp) Helm, Low, Neuhold


261. Advanced Limnology. Advanced study of factors affecting productivity of fresh water. Prerequisite: Wildlife 161 or equivalent. Two lectures, two labs. (4F) Sigler

262. Fish Population Theory. Study and discussion of the mathematical models which are in use in the field of fisheries. Four lectures, one discussion period. (5W) Franklin

270. Research and Thesis. Credit for field or laboratory research, library work, and thesis writing. (1 to 15F, W, Sp, Su) Staff

*Taught 1966-67
College of

Science

Department of Applied Statistics, Computer Science, 272
  Applied Statistics, 272
  Computer Science, 273

Department of Bacteriology and Public Health, 276
  Bacteriology and Public Health, 276
  Medical Technology, 279

Department of Botany, 280

Department of Chemistry, 283

Department of Geology, 287

Department of Mathematics, 288
  Mathematics, 288
  Mathematical Statistics, 290

Department of Physics, 290

Department of Zoology, 294
  Zoology, 294
  Entomology, 296
  Physiology, 298
  Pre-Dentistry, 299
  Pre-Medicine, 299
  Nursing, 299

Degrees Offered:
  Bachelor of Arts
  Bachelor of Science
  Master of Science
  Doctor of Philosophy
Utah State University has always given high place to the sciences. The organization of a College of Science in 1962 was in keeping with the trend in our nation and in the world. Our twentieth century civilization is based on science, and every facet of this great area is fundamental in a Land-Grant University such as this one.

The College of Science comprises the eight departments of Applied Statistics and Computer Science, Bacteriology and Public Health, Botany, Chemistry, Geology, Mathematics, Physics, and Zoology.

The curricula of the science departments are designed to achieve four purposes:

First, they serve all students, because no college graduate today can be considered educated without a firm grasp of scientific principles. The sciences are truly liberal. They contribute to the general education as surely and as importantly as the humanities and the arts and the social sciences.

The second purpose of the College is to train teachers of science. This is an increasingly significant responsibility. America cannot move forward unless it has competent, well trained teachers of science on every level of education.

Third, the health professions are properly grounded on science. The University has an excellent record in providing pre-dental and pre-medical training. Students in these programs move directly into the professional dental and medical schools of other universities. The basic training of these people will continue to be an important part of the program in the College of Science.

Finally, the College of Science trains research scholars in the various areas of science. To become a competent chemist, physicist, geologist, or scientist in any other area, the student must have a sound undergraduate major in the subject, followed by years of graduate specialization in his field. All of the departments mentioned above offer the Bachelor's and Master's degrees and the majority of them offer the PhD degree. The production of able research scientists is of prime importance and is a major function of the departments in the college.

The opportunities for competent and conscientious students in the various science fields is unlimited. Demands for teachers and researchers are far greater than the supply. Monetary rewards are substantial and the spiritual and intellectual rewards satisfying. Science is challenging. It demands the best from students, but for those who succeed it offers a rich return.

Students planning to enter the sciences are urged to discuss their plans and goals early with their advisors, department heads, and dean. Basic course work in mathematics, chemistry, and physics is essential to most areas of science. Several scholarships are available to science students. Teaching and research assistantships are available through the science departments. General requirements for graduation are the same as those outlined for the entire University.
Applied Statistics, Computer Science

Head: Professor Rex L. Hurst
Office in Main 14

Associate Professors Lynn Davis, Donald V. Sisson; Assistant Professors David R. Harris, Bartell C. Jensen, Eugene C. Kartchner, Wendell L. Pope, Lee Stenquist, David White.

The Department offers the degree of Bachelor of Science in Applied Statistics and in Computer Science, and the degree of Master of Science in Applied Statistics.

Applied Statistics

Statistics is that 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.

The experimental scientists of many fields of endeavor make extensive use of statistics as a research tool. Statistics provides the methodology for summarizing data, estimation of parameters, testing of hypotheses and formulating mathematical models to simulate physical and biological situations.

Applied Statistics majors are prepared for further graduate study or for accepting a wide choice of well paid positions. Statisticians find employment as members of research teams in business, industrial concerns, the federal government, state governments, and private research groups. All of these provide outstanding possibilities for professional advancement.

Bachelor of Science Degree. For a major in Applied Statistics students are expected to complete Applied Statistics 131, 132, 133, 134, 141, 176, 177, 178, and 199. Some credit should be taken in Special Problems 198. They are also expected to take extensive work in Mathematics and Computer Science.

Undergraduate minor. An undergraduate minor in Applied Statistics is expected to complete at least 18 credit hours from the following courses: Applied Statistics 131, 132, 133, 134, 141, 171, 172; Computer Science 145, 146, 167, 175.

Suggested Four-Year Curriculum

<table>
<thead>
<tr>
<th>Freshman and Sophomore:</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Communications</td>
<td>9</td>
</tr>
<tr>
<td>Physical Education</td>
<td>3</td>
</tr>
<tr>
<td>Mathematics 46, 96, 97, 98, 99</td>
<td>25</td>
</tr>
<tr>
<td>Philosophy 50</td>
<td>5</td>
</tr>
<tr>
<td>Economics 51, 52</td>
<td>10</td>
</tr>
<tr>
<td>Applied Statistics 51</td>
<td>4</td>
</tr>
<tr>
<td>Physics (20, 21, 22) (17, 18, 19) or Chemistry (10, 11, 12) (3, 4, 5)</td>
<td>15</td>
</tr>
<tr>
<td>Electives (including group requirements)</td>
<td>29</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Junior and Senior:</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applied Statistics 131, 132, 133, 134, 141, 176, 177, 178 or equivalent 198, 199</td>
<td>32</td>
</tr>
<tr>
<td>Computer Science 11, 167, 175</td>
<td>11</td>
</tr>
<tr>
<td>Mathematics 126</td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td>54</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>
Graduate Study

Master of Science Degree. The Department offers Master of Science degree in Statistics. The area of research includes (a) development of new tools of statistical inference, (b) refinement of old techniques, (c) improvement and development of the design of experiments. Students will be encouraged to take a strong minor in Computer Science.

A student seeking an MS degree in Statistics should have either a BS degree in Statistics or a BS degree in Mathematics. Majors in fields of application with a strong background in Mathematics may also be considered.

Financial assistance is available in the form of Graduate Assistantships for outstanding candidates. USU also offers a limited number of Research Fellowships which are open to all majors.

Computer Science

Computer Science deals with the organization and usage of data processing systems. Data processing systems consist of digital or analog computers and the associated data transmission networks.

One phase of Computer Science deals with the development of data processing systems as a part of business or research organization. It treats such problems as data collection, forms design, modernization of accounting and paper work procedures, modernization of reports, selection of computer and data transmission components to build complete systems.

A second phase of Computer Science deals with the methods and theory of programming computers and data transmission equipment to handle all types of numerical and logical information. Programming a computer or data transmission system consists of providing step by step instructions that will produce the desired result.

The Computer Science area is one of the fastest growing parts of our society. Areas such as industrial automation involving numerical and process control, business automation and a wide variety of scientific computations offer a wide range of employment opportunities.

Bachelor of Science Degree. The Department offers a degree program with emphasis in mathematics and another with emphasis in management science. For either program the student must have:

1. At least 26 credit hours of computer science.
2. At least 6 credit hours of statistics.
3. Mathematics through calculus.
4. At least 15 credit hours of physics or chemistry.
5. At least 10 credit hours of economics.
6. At least 5 credit hours of logic.
7. All university requirements for graduation.

The following is a suggested curriculum:

<table>
<thead>
<tr>
<th>Freshman and Sophomore:</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Communication</td>
<td>9</td>
</tr>
<tr>
<td>Physical Education</td>
<td>3</td>
</tr>
<tr>
<td>Mathematics 46, 96, 97, 98, 99</td>
<td>25</td>
</tr>
<tr>
<td>Philosophy 50 (logic)</td>
<td>5</td>
</tr>
<tr>
<td>Economics 51, 52</td>
<td>10</td>
</tr>
<tr>
<td>Computer Science 11</td>
<td>3</td>
</tr>
<tr>
<td>Physics 20, 21 22 or 17, 18, 19 or Chemistry 3, 4, 5, or 10, 11, 12</td>
<td>15</td>
</tr>
<tr>
<td>Electives (including lower division requirements)</td>
<td>28</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>98</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Junior and Senior:</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics option</td>
<td></td>
</tr>
<tr>
<td>Computer Science 145, 146, 167, 168, 175, 181, 182, 196, 197</td>
<td>27</td>
</tr>
<tr>
<td>Applied Statistics 131, 132</td>
<td>8</td>
</tr>
</tbody>
</table>
Mathematics 110, 126, 127, 128 20
Philosophy 161 (Symbolic logic) 5
Electives (A selection from Math 116, 117, 118, 123, 124, and 160 is recommended) 40

Junior and Senior
Management Science option

Credit Hours
Computer Science 145, 146, 157, 168, 175, 181, 182, 196, 197 27
Applied Statistics 131, 132, 141 (Business Statistics may be substituted on approval) 11
Business Administration 118, 133, 134, 151, 171, 181, 209, 210 32
Mathematics 126 3
Electives 27 100

Applied Statistics Courses

Undergraduate Courses

51. Elementary Statistics. An introduction to the nature of statistical reasoning. The nature of observations. The condensation and presentation of data. Elements of sampling. The use of statistics in making estimates and drawing conclusions. Prerequisite: Math 35 or equivalent. Three lectures, one lab. (4F) Staff

131. Statistical Methods. Sample-based inferences about populations. Individual and group comparisons. Tests of significance. Linear regression and correlation. Prerequisite: Math 35 or equivalent. Three lectures, one lab. (4F) Staff


133. Statistical Methods. Multiple regression, curvilinear regression, multiple and curvilinear covariance, least squares analysis of basic designs. Prerequisite: Applied Statistics 132. Three lectures, one lab. (4W) Hurst

134. Design of Experiments. Fundamental principles of experimental design; completely randomized; randomized blocks, latin squares, components of variance; factorial arrangements; confounding; split plot; incomplete block designs; and fractional replication. Prerequisite: Applied Statistics 132 or equivalent. Three lectures, one lab. (4Sp) Sisson


171. Statistical Theory for Research Workers. An introduction to the theory of statistical inference; probability; discrete and continuous probability density functions and their properties; expected values; variances, moments, cumulants and their generating functions; orthogonal linear functions; sampling distributions; central limit theorem. Prerequisite: Calculus. (3W) Sisson

172. Statistical Theory for Research Workers. Optimum properties of estimators: theory of point estimation; principle of maximum likelihood; theory of confidence interval estimation and test of hypothesis; likelihood ratio test; goodness-of-fit test; theory of least squares general linear hypotheses and their application to regression and experimental design. Prerequisite: 171. (3Sp) Sisson

176. Introductory Theory of Statistics. Set operations combinatorial methods, probability, discrete frequency distributions, expectations, moments and moment generating functions. Prerequisite: Calculus and a knowledge of statistical methods. (3F) Sisson

177. Introductory Theory of Statistics. Continuous frequency distributions, expectations, moments and moment generating functions, linear combinations of variables, sampling and sampling distributions, point and interval estimation. Prerequisite: 176. (3W) Sisson

178. Introductory Theory of Statistics. The testing of hypotheses, Type I and Type II errors, power of the test, application of theory to the testing of means and to testing of relationships among variables. Prerequisite: 177. (3Sp) Sisson

198. Special Problems. Conferences, reading, and laboratory investigations. (Arranged F, W, Sp) Staff

199. Seminar Review of current literature and developments in the field of statistics. (1-3, F, W, Sp) Staff

Graduate Courses

221. Industrial Statistics—Sampling Inspection. Control of quality of manufactured products; attribute and variable inspection; single, double, and sequential plans; sampling plans for continuous production; cost functions and elementary decision functions. Prerequisite: 172, 263. (3Su) (Taught on demand) Staff

233. Biological Statistics. Biological assays; quantitative and quantal responses; dosage response relationships; parallel line and slope-
241 Stochastic Processes. An introduction to stochastic processes and their properties. The probability law of a stochastic process. Conditional probability and conditional expectation. Fundamental properties of specific stochastic processes; the Normal process, the Wiener process, the Poison process and its generalizations. Counting and renewal counting processes. Markov chains. Specific applications to physics, communication theory, biology, economics, etc. Prerequisite: Probability Theory. (Taught on Demand) Sisson

261. Intermediate Theory of Statistics. Probability theory; basic notion of sets, sample description space, events, algebra of events, probability of an event, probability theorems, combinational analysis, conditional probability, Bayes' Theorem, independent events, independence of several events, random variable, probability functions, distribution functions, discrete distributions; Bernoulli trials, Binomial, Multinomial, Hypergeometric, Poison, negative binomial distributions, limiting theorems, continuous distributions, probability functions for continuous variate, multivariate distributions, transformations, expectation of a random variable, expectation, moment, moment generating functions, moments of multivariate distributions. Prerequisite or corequisite: Mathematics 99, 160. (5W) White

262. Intermediate Theory of Statistics. Important continuous distribution, uniform, normal, gamma, beta distribution and others, inductive inference; populations and samples, Chebyshev's inequality; law of large numbers; the central limit theorem; point estimation: optimum properties of estimators; principle of maximum likelihood; multivariate normal distribution; bivariate normal, multivariate normal marginal and conditional distributions; the moment generating functions; derived distributions; distributions of functions of random variables, chi-square, student's F distributions; large sample theory; asymptotic distributions of maximum likelihood estimators. Prerequisite: 261. (5W) White

263. Intermediate Theory of Statistics. Interval estimation, confidence limits, fiducial limits, confidence interval and regions for parameters of well-known distributions, test of hypotheses; regression and linear hypotheses; analysis of variance; sequential tests of hypotheses and distribution-free methods. Prerequisite: 262. (5Sp) White

281. Sampling Design. Principle steps in sample surveys; simple random sampling; properties of the estimators; sampling for proportions and percentages; estimation of sample size; two stage sampling; stratified random sampling for percentages. Prerequisite: 172 or 263. (3F) (Taught on Demand) Sisson

291. Applied Experimental Design I. A course dealing with analysis of variance techniques commonly encountered in many fields of research. Variance components, nested and crossed relationships between factors; generalized methods of obtaining expected mean-squares in analysis of variance; analysis of covariance; data with unequal numbers of observations in subclassifications; utilization of appropriate computer programs. Prerequisite: 134 and 173 or 178. (3F) White

292. Applied Experimental Design II. General least-squares theory for experimental designs; confounding for symmetrical factorial designs, number of levels a prime power; fractional replications; double confounding; latin squares; partial confounding; balanced incomplete block designs. Prerequisite: Applied Statistics 291, Math 160. (3W) White

293. Applied Experimental Design III. General formulas for pn factorials; confounding plans for prime-power factorials; confounding plans and fractional replications for mixed factorials; sequential analysis. Prerequisite: Applied Statistics 292. (3Sp) White


288. Special Problems. Individual study and report preparation in areas of special interests. Training in professional consulting. (F, W, Sp) Staff

Computer Science Courses

Undergraduate Courses


145. Computer Programming. The characteristics and instruction repertoire of a modern digital computer; the organization of problems for solution using a computer; the use of machine language programming in problem solving. Two lectures, one lab. Prerequisite: CS 11 or permission of instructor. (3W) Staff

146. Computer Programming. Continuation of CS 145. Assembly level languages for programming digital computers. Students are expected to gain programming proficiency sufficient to be able to solve problems from
their own fields using a computer. Two lectures, one lab. Prerequisite: CS 145. (3Sp)  

157. Programming Business Problems. Discussion of program-oriented programming languages; the use of such a language to write programs for a computer; students are expected to learn a programming language (such as COBOL) and to solve business and data processing problems using a computer. Two lectures, one lab. Prerequisite: CS 11 or permission of instructor. (3Sp)  

157. Programming Scientific Problems. Discussion of problem-oriented programming languages (compilers); the use of a compiler language to write programs for a computer. Students are expected to learn a programming language (such as FORTRAN) and to solve problems in their own fields using a computer. Two lectures, one lab. Prerequisite: CS 11 or permission of instructor. (3Sp)  

168. Advanced Programming. Discussion of the problems involved in implementing higher level languages; the algorithmic language ALGOL for describing algorithms; special programming problems. Prerequisite: CS 146 and CS 167. (3F)  

175. Operations Research: Methods and Problems. A study of the problems and methods in operations research. Problem areas to be included for analysis are: inventory, replacement, waiting lines, competitive strategies, allocation, sequencing and dynamic programming. Prerequisite: Economics 52 and Mathematics 99. (5F)  


182. Monitors and Systems Design. The organization and construction of a monitor; the organization of supporting systems, including utility programs, input/output programs, report generators, simulator systems, and sort systems. Prerequisite: CS 181. (3Sp)  

196. Special Problems. This course is designed to give the student an opportunity to apply the knowledge that he has gained in the preceding courses in computer science to the solution of problems that are of particular interest either for the staff member or for the student involved. (Arr credit)  

197. Seminar. Review of current literature and developments in the field of computer science. (1Sp)  


deptartment of

Bacteriology and Public Health

(Bacteriology, Public Health, Medical Technology)

Head: Professor W. Whitney Smith  
Office in Plant Industry 310  

Professor Lewis W. Jones; Professor Emeritus Kenneth R. Stevens;  
Associate Professors Paul B. Carter, Frederick J. Post; Lecturers Newell G. Daines, Ray N. Malouf, K. F. Brough.  

Bacteriology and Public Health

Bachelor of Science Degree. A Bacteriology major requires: Bacteriology 70 & 72 or 10; 160, 168, 180, 201, 291; and two of the following Bacteriology courses: 104-5, 110, 120-21, 192. Chemistry 3, 4, 5, 115, 121, 122, 180; Mathematics 35,
46; Physics 17, 18, 19; Public Health 150; Botany 26; Zoology 16, 112, 116.

Students meeting requirements for the Bachelor of Science degree in Bacteriology plus Zoology 118 are eligible to apply for admission to dental or medical schools.

Graduate Study

The Department of Bacteriology & Public Health has good facilities for research and advanced studies. It occupies the third and part of the fourth floor of the Plant Industry Building. The usual technical instruments are available. During 1966 ground will be broken for a new and enlarged Bacteriology Building. The Department also has access to an electron microscope, ultracentrifuge, electrophoresis apparatus, spectograph, flame spectrophotometer, and other major research instruments.

**Master of Science in Bacteriology.** (See also “Master of Science Degree” in School of Graduate Studies in this Catalog.) The Master's degree in Bacteriology combines a substantial research effort with a rounding out of course work in bacteriology and related subjects. At the conclusion of the Master's degree candidates are expected to have completed the bacteriology courses offered in the department, plus chemistry through some advanced biochemistry courses, mycology and protozoology.

**Doctor of Philosophy in Bacteriology.** (See also “Doctor of Philosophy Degree” in School of Graduate Studies). The Doctorate in Bacteriology is primarily a research degree. A doctoral thesis comprising an intensive and definitive contribution to knowledge is the most basic requirement.

In previous training or in the Doctoral program candidates are expected to complete course work in Bacterial Physiology, Immunology, Systematic Bacteriology, Soil, Dairy Food, Pathogenic, and Aquatic Microbiology as well as Mycology, Protozoology and Virology.

Appropriate supporting courses are expected in Biochemistry, Physical Chemistry, Genetics, Pathology, Entomology, Plant Physiology, Cellular Physiology and other science specialties.

Candidates are expected to offer certain research tools: Applied Statistics, and a reading knowledge of German, Russian, or French; or a reading knowledge of two foreign languages of scientific significance; or suitable substitutes justified by the nature of the Doctoral program.

**Biology Courses**

**1. Principles of Biology.** A study of the basic principles of life as illustrated by both plant and animal forms, including microbes. Four lectures, one recitation, one lab. (5F, W, Sp) Staff

**15. General Biology.** A study of the structures and functions common to living things. Cellular and molecular processes are emphasized. A knowledge of high school chemistry is assumed. This course or consent of the instructor is prerequisite to all bacteriology courses except Bacteriology 10. Five lectures, one lab. (5F, W, Sp) Staff

**Bacteriology Courses**

**10. Elementary Bacteriology.** Basic concepts, practical applications. (Not open to students who have had Baet 70.) (Four lectures, one lab.) (5F, W, Sp, Su) Jones, Smith

**70. General Bacteriology.** The fundamental principles of bacteriology and their application to food, water, soil, dairy and disease. For Science majors or students who have had a basic biology course. (Not open to students who have had Bacteriology 10). (4F, W, Sp) Jones, Post

**71. General Bacteriology Laboratory.** Pre-requisite: Previous or concurrent registration in Bacteriology 10 or 70. Two 3-hour labs. (2F, W, Sp) Jones, Stevens, Post

**72. General Bacteriology Laboratory.** Pre-requisite: Previous or concurrent registration in Bacteriology 10 or 70. (1F, W, Sp) Stevens, Jones, Post

**Taught 1967-68**
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*104. Dairy Bacteriology. Micro-organisms of milk and its products. Prerequisite: Bacteriology 10 or 70. (3F) Jones

*105. Dairy Bacteriology Laboratory. Two 3-hour labs. Prerequisite: Bact 10 or 72 and previous or concurrent registration in Bacteriology 104. (2F) Jones

**110. Soil Microbiology. Relationships of micro-organisms to soil fertility. Prerequisite: Bacteriology 10 or 70. (2Sp) Jones

*120. Food Microbiology. Relationships of micro-organisms to food preservation, spoilage, and poisoning. Prerequisite: Bacteriology 10 or 70. (2W) Post

121. Food Microbiology Laboratory. Prerequisite: Bact 10 or 72. (2W) Post

160. Pathogenic Bacteriology. Properties of pathogens and relationships to infectious diseases. Prerequisite: Bact 72 or equivalent and Organic Chemistry. Three lectures, two labs. (5F) Carter

*161. Advanced Pathogenic Microbiology. Common pathogenic molds, yeasts, and viruses. Prerequisite: Bacteriology 160. Four lectures, one lab. (5Sp) Staff

165. Immunology. Prerequisites: Bact 160 and Biochemistry. Three lectures, two labs. (5W) Carter

**172. 173. Bacteriology Laboratory Methods. (2W, 2Sp) Staff

*180. Physiology of Bacteria. Cellular chemistry and physiology. Prerequisites: Bact 10 or 70, Organic Chemistry. (4W) Jones

192. Aquatic Microbiology. Principles of microbiology (limited to the Kingdom Protista) relevant to the aquatic environment. Emphasis is placed on fresh water and wastewater with some discussion of estuarine and marine microbiology. Prerequisites: Bacteriology 70 and 71; or CE 194 and WLR 161. Three lectures, one lab. (4Sp) Post

**201. Systematic Bacteriology. Classification relationships. Prerequisite: Bacteriology 10 or 70. (2F) Smith

291. Seminar. (1F, W, Sp) Staff

294. Special Problems in Bacteriology. Special assignments, reports, and discussions. Preparation of a comprehensive and critical review. Credit arranged. Prerequisite: consent of instructor. (F W, Sp) Staff

299. Thesis Research. Credit arranged. (F, W, Sp) Staff

A Public Health major requires:
Public Health 15, 50, 150, 155, 254; Bacteriology 10 or 70 and 72, 160; Physiology 4, Physics 6, Zoology 16, 112; Physical Education 55, 135, 145; Psychology 100 or Family and Child Development 100; Psychology 145 or Sociology 162; Principles of Nutrition 22 or 140; Chemistry 10, 11, 12.

Students planning a career in Public Health Laboratory work can satisfy the Public Health major with Public Health 15, 50, 150; Bacteriology 10, or 70 and 72, 104, 105, 120, 121, 160, 168, 192; Medical Technology 131; Physics 6; Chemistry 10, 11, 12, 180; Mathematics 35; Zoology 3, 4, 112, 116.

For a minor in Health Education take: Public Health 15, 50, 150; Physical Education 135; Principles of Nutrition 22 or 140; and Psychology 145.

Public Health Courses

15. Personal Health. Health problems of University students; especially for freshmen and sophomores. (2F, W, Sp) Malouf, Staff

And Members of Cache Valley Medical and Dental Associations

50. Fundamentals of Public Health. A basic course in the principles of public health with major emphasis on health education, control of communicable diseases, community sanitation problems, radiological health. (3Sp) Smith

149. Current Problems in Community Health. The Current emerging problems: air and water pollution, effects of urbanization and the population explosion, proliferation of agricultural poisons, low incidence of communicable disease, radiation hazards, etc. (3Su) Brough

150. Environmental Sanitation. Consideration of regular public health sanitation programs such as waste disposal, water treatment, refuse disposal, insect and rodent control, food and milk, industrial hygiene and radiological sanitation. (4Sp) Post

**151. Public and School Health Administration. Organization, administration and functions of health agencies. Prerequisite: PH 50. (3W) Smith

*Taught 1966-1967
**Taught 1967-1968
152. **Family Health.** A broad course on the fundamentals of healthful living. Open to all upper division students; especially for juniors who are required for state of Utah certification to take a course in family health. Does not meet the school health requirement for state of Utah certification. (3F) Daines

153. **World Health Problems.** Designed to meet the health needs of persons who plan to work or travel in foreign lands. Personal and environmental health problems in specific regions of the world. (1Su) Staff

154. **School Health Program.** The program for health in elementary and secondary schools. A healthful environment, healthful living, and health instructions. (4 Home study, Summer) Smith


156. **School Health Methods.** Objectives, methods, curricula, and materials. Prerequisite: P H 155. (3F) Staff

159. **Public Health Laboratory Methods.** Experience in the practice of the Public Health Laboratory. (3 to 15F, W, Sp) Fraser

254. **Special Problems in Public Health.** Assignments, reports, discussions. Preparation of a comprehensive and critical review. Credit arranged. (F, W, Sp) Staff

**Medical Technology**

The College of Science offers courses which satisfy entrance requirements for Medical Technology internships in the United States and Canada. The University provides a three-year program which, combined with the internship, qualifies the student for the BS degree.

A Medical Technology major should take during the first three years: Bacteriology 10 or 70-71, or 70-72, 160, 168; Med Tech 131; Biology 15; Chemistry 3, 4, 5, 121, 115, 180; Physiology 4; Physics 6; Zoology 16, 116. A hospital internship for twelve months is completed during the fourth year. This includes instruction in Medical Technology 133, 134, 135, 136, 137. This internship is available in the LDS hospitals of Salt Lake City, Ogden and Idaho Falls, and at St. Benedict's hospital in Ogden. During this fourth year students register for three quarters (45 upper division credits in Medical Technology). When this program is satisfactorily completed, a student is eligible for the Bachelor of Science degree in Medical Technology. A student may then also apply for certification by the Registry of Medical Technologists, after completion of a qualifying examination given by the American Society of Clinical Pathologists. Consult Professor P. B. Carter for further details.

**Medical Technology Courses**

131. **Clinical Laboratory Methods.** Prerequisite: Bacteriology 10 or 71 or 72. (4Sp) Carter

133, 134, 135. **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. (13F, W, Sp) Carter

136. **General Pathology Discussions.** (2F) Carter

137. **Clinical Laboratory Methods Discussion.** (2W) Carter

138. **Blood Bank and Blood Serology Techniques.** (1Sp) Carter

139. **Pathological Conference.** (1Sp) Carter

*Taught 1966-67*
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Department of

Botany

(Cytogenetics, Plant Pathology, Plant Physiology, Taxonomy, Virology)

Head: Professor Orson S. Cannon
Office in Plant Industry 204


Education for future professional work in Botany is the primary objective of the Botany curriculum. Students should have thorough undergraduate training in botany, supported by chemistry, mathematics, physics, and related biological sciences. If graduate study beyond the Master of Science degree is planned, a reading knowledge of at least one foreign language should be acquired. Employment is found in universities and colleges, the U.S. Department of Agriculture, State Agricultural Experiment Stations, and in industry. This curriculum also provides excellent training for students who desire to become teachers of biological sciences in high schools and colleges.

In addition to the general University group requirements for the BS degree, students should take Biology 15; Botany 26, 102, 116, 117, 120, 130, 240; Chemistry 3, 4, 5, 121, 122; Math 35, 46; Zoology 112. Under exceptional circumstances some upper division Botany classes may be substituted for one of the classes above, and Chemistry 10 and 11 may be substituted for Chemistry 3, 4, 5.

To supplement the foregoing courses, students with their adviser should select additional courses from the following recommended courses for fields of specialization.

Cytogenetics: Botany 104, 118, 150, 212; Chemistry 121, 122, 190; Physics 143; Zoology 16, 132, 112.

Plant Pathology and Virology: Botany 125, 150; Appl stat 51, 131, 132; Bacteriology 70, 71; Chemistry 121, 122, 190; Entomology 108; Horticulture 131; Math 96, 97, 98, 99; Physics 17, 18, 19; Zoology 16.

Plant Physiology: Botany 224, 225; Chemistry 101, 115, 121, 122, 190; Math 96, 97, 98, 99, 110; Physics 17, 18, 19; Physiology 127, 130; Zoology 16, (Range 126; Bacteriology 70; Soils 105).

Taxonomy: Agronomy 56; Botany 104, 108, 112, 118, 125, 150; German 1, 2, 3; Range Science 126; Zoology 107, 131.

Graduate Study

Master of Science Degree. The Department of Botany offers the Master of Science degree in the following specialized fields: Cyto-
genetics, Plant Pathology, Plant Physiology, Taxonomy, Virology. Graduate studies are also offered in the Interdepartmental Curriculum in Plant Nutrition and Biochemistry. The opportunities and facilities for research in these fields are greatly augmented through the cooperation of the USU Agricultural Experiment Station, United States Department of Agriculture, and the Intermountain Herbarium.

A candidate must submit a thesis on a topic within the field of his major subject. The thesis alternate, "Plan B" is not acceptable for the Master's Degree.

Doctor of Philosophy Degree. The Department of Botany, in cooperation with related departments, offers the degree of Doctor of Philosophy in the specialized fields of Plant Physiology, Taxonomy, Virology, Cytogenetics, and the Interdepartmental Curriculum in Plant Nutrition and Biochemistry. Detailed information may be obtained from the Department.

Herbarium

Graduate study in plant taxonomy offered in the Department of Botany utilizes the extensive facilities of the Intermountain Herbarium. Most plant species that grow in Utah and the Intermountain region are represented in the herbarium.

Biology Courses

1. Principles of Biology. Study of the basic principles of life as illustrated in both plants and animals, including microbes. Four lectures, one recitation, one lab. (5F, W) Staff

15. General Biology. A study of the structures and functions that are common to living things. Cellular and molecular processes are emphasized. A knowledge of high school chemistry is assumed. This course is a prerequisite to all other botany courses in the Botany Department except Biology 1. Five lectures, one lab. (5F, W, Sp) Shaw

Botany Courses


102. Taxonomy of Vascular Plants. The kinds, relationships, and classifications of vascular plants, chiefly of this region. Assumes a knowledge of fundamental principles of botany. Three lectures, two labs. (5Sp, Su) Holmgren, Shaw

*104. Evolution of Cultivated Plants. Origin, evolution and distribution of certain selected plants which are of economic importance to man. Prerequisites: Botany 26, 102, Zoology 112 or equivalent. Lectures, readings and student reports. (3Sp) Shaw

108. Agrostology. A taxonomic study of native and imported grasses of western ranges. Special attention is given to species important in grazing and soil binding. Assumes a knowledge of fundamental principles of botany. Two lectures, two labs. (4F) Holmgren

112. Aquatic and Marsh Plants. A taxonomic and ecological study of aquatic and marsh plants. Emphasizes important food and cover plants for wildlife. Assumes a knowledge of the fundamental principles of botany. Two lectures, two labs. (4F) Holmgren

**116. Microtechnique. Principles and methods in preparation of plant materials for microscopic study; efficient use of the microscope. Assumes a knowledge of fundamental principles of botany. (4W) Boyle

*117. Anatomy. Structure and development of major cell types and tissues comparative anatomy of the stem, root, and leaf of seedbearing plants. Assumes a knowledge of fundamental principles of botany. Two lectures, two labs. (4W) Boyle

118. Cytogenetics. The structure, functions and modifications of chromosomes and their relationships to genetic phenomena. The laboratory emphasizes plant materials. Prerequisite: Zoology 112. Three lectures, two labs. (5Sp) Boyle

120. Elementary Plant Physiology. The principal physiological processes of plants, including water relations, synthesis and use of foods, and growth phenomena. Prerequisites: Biology 15, and Chemistry 12. (Chemistry 12 may be taken concurrently.) Four lectures, one lab. (5W, Sp) Wiebe

*Taught 1966-67
**Taught 1967-68
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*121. Water Relations of Plants. Factors affecting the availability of water, its absorption and use in plants, and the effects of water deficits on plant processes. Prerequisite: Botany 120. (3W)

**125. Morphology of Vascular Plants. Structure, development, reproduction, and evolution of the classes and orders of vascular plants. Prerequisites: Biology 15, Botany 26, and 102. Three lectures, two labs. (5Sp) Shaw

130. Principles of Plant Pathology. Fundamental principles underlying disease in plants. The types of disease and methods of study give the student a comprehensive view of plant pathology. Assumes a knowledge of botany fundamentals. Three lectures, two labs. (5F)

*140. Forest Pathology. Nature, cause and control of disease affecting forest trees. Factors inducing loss in forest products are emphasized. Prerequisites: Biology 15, and Botany 26. Three lectures, one lab. (4W)

*150. Mycology. Comparative morphology and nuclear behavior of the fungi. A summary of the field with special attention given forms important in agriculture, medicine, and industry. Prerequisite: Botany 26. Three lectures, two labs. (5Sp)

212. Advanced Plant Taxonomy. A course designed to consider traditional and recent techniques of collecting and synthesizing taxonomic data. Emphasis will be placed on evolution of taxa. Prerequisite: Botany 102. Three lectures, one lab. (4Sp)

**224. Plant Growth and Development. Growth processes, with emphasis on hormones, photoperiod, dormancy. Prerequisite: Botany 120. (3W)

225. Mineral Nutrition of Plants. Physiological and biochemical processes involved in the mineral nutrition of higher plants. Consideration will be given to specific roles of each nutrient in plant growth and metabolism. Prerequisite: Botany 120. Three lectures, one lab. (4F)

226. Plant Virology. Physical and chemical properties of viruses and their biological relationships. Prerequisite: Botany 120 (3W)

**227. Plant Respiration and Metabolism. A study of the oxidative breakdown of certain organic substances normally present in plant cells. The mechanisms by which sugars are respired to CO₂ and H₂O and the interrelationships between this process and various others. Prerequisite: Plant Physiology 120. 3 lectures and 1 lab. (4Sp)

**228. Photosynthesis in Higher Plants. Elucidation of the chloroplast structure and the various mechanisms of photosynthesis: photosynthesis electron transfer, chlorophyll excitation, photosynthetic phosphorylation, carbon dioxide fixation, and the influence of environmental factors on photosynthesis. Prerequisite: See Instructor. Three lectures, one lab. (4Sp)

234. Special Problems. Individual instruction. Credit arranged. (F, W, Sp, Su) Staff

240. Seminar. (1F, W) Staff

241. Plant Physiology Seminar. (1Sp) Staff

250. Research. Conduct special research in plant cytology, pathology, physiology, or taxonomy. Individual instruction. Credit arranged. (F, W, Sp, Su) Staff

*Taught 1966-67
**Taught 1967-68
Department of
Chemistry

Head: Professor Melvin C. Cannon
Office in Widtsoe Hall 112

Professors Delbert A. Greenwood, Garth L. Lee, Grant Gill Smith, Harris O. Van Orden; Professor Emeritus Sherwin Maeser; Associate Professors Richard H. Boyd, William M. Moore, Jack T. Spence, Frank R. Stermitz; Assistant Professors Richard C. Anderson, Brice G. Hobrock, H. M. Nielsen, Richard L. Redington, Anthony T. Tu

Major. The degree of Bachelor of Science in Chemistry is a professional degree. Graduates who meet the requirements of the American Chemical Society, by which the Department is approved, and who fill the requirements of the University as given in this catalog, will be certified by the Society. The degree of Bachelor of Arts in Chemistry is offered for those desiring more flexibility in the academic program. Graduates with the Bachelor of Arts degree will not be certified by the American Chemical Society. Each major must attain at least a 2.25 grade point average in Chemistry, Physics, and Mathematics to qualify for graduation.

A reading knowledge of German is required for the BS degree. This requirement is normally satisfied by the completion of German 1, 2, and 3. Two years of a foreign language are required for the BA degree. It is in the student’s interest to fulfill this requirement as soon as possible.

A minimum of 60 credit hours in Chemistry is required for the BS degree and the following courses must be included: Chemistry 3, 4, 5, 121, 122, 123, 123A, 104, 105, 106, 109, 110, 111, 115, 150, 153, 160, 198, and 199. Also six credit hours of advanced courses are required which may be taken from the following courses: Chemistry 134, 190, 191, 192, 201, 202, 203, 204, 225, 226, 227, 250, 251, 272, 287, 295; Physics 122, 130; Mathematics 140, 141, 142. Prerequisites necessary during the program are Physics 20, 21, 22, and Math 96, 97, 98, 99, 110.

A minimum of 45 credit hours in Chemistry is required for the BA degree and the following courses must be included: Chemistry 3, 4, 5, 121, 122, 123, 123A, 104, 105, 106, 109, 110, 111, 115. Prerequisites necessary during the program are: Physics 20, 21, 22; Math 97, 98, 99, 110.

Minor: A minimum of eight credits of upper division Chemistry courses is required for a Chemistry Department approved minor. Suggested courses which will meet these requirements are: Chemistry 115, 121, 122, 180 or 190.

Teaching Major: A teaching major in Chemistry requires the completion of the following minimum program: Chemistry 3, 4, 5, 101, 115, 121, 122 and 180. Supporting courses to be taken are Physics 17, 18, 19 and Math 35, 44, 96, 97, 98, 99. For a composite teaching major in Physical Science, the following minimum schedule is recommended: Chemistry 3, 4, 5, 12, or 121, 101 or 180; Physics 17, 18, 19, 122, 130, 131 or 140; Mathematics 46, 97, 98, 120 or 150; Philosophy 50 or 160. Required professional education courses for the teaching certificate are listed by the College.
Doctor of Philosophy Degree. The Chemistry Department offers advanced study and research leading to a degree of Doctor of Philosophy in Chemistry. Before admission to candidacy the student must fulfill the following requirements: (a) Demonstrate a reading comprehension of German and of Russian or French; (b) Pass a comprehensive examination in a field of specialization, and in two minor fields of chemistry, not later than one academic year before the final examination on the thesis; (c) Present an acceptable statement of a thesis problem. The student should consult the School of Graduate Studies or the Head of the Department concerning other requirements.

A Graduate Program in Nutrition and Biochemistry leading to a Master of Science or Doctor of Philosophy degree is available in cooperation with departments giving courses in these areas. Detailed information may be found in this catalog under the School of Graduate Studies.

Chemistry Courses

3, 4, 5. Chemical Principles and Qualitative Analysis. Introduction to chemical theory and principles of chemistry, including introductory qualitative analysis. For science majors, pre-medical and pre-dental students and those who will take additional chemistry courses. Prerequisite: two of the following high school courses: advanced algebra, chemistry, physics or equivalent. Three lectures, two labs. (6F, 5W, 5Sp) Lee

10, 11. General Chemistry. Principles of inorganic chemistry. Prerequisite: One unit of high school or college algebra. Four lectures, one lab. (5F, 5W or 5W, 5Sp) Staff

12. Elementary Organic Chemistry. An introduction to organic chemistry. Designed to follow Chemistry 11 and completes a one-year terminal course in chemistry. (5Sp) Staff

31. Physical Science. Principles of chemistry essential to understanding the physical universe integrated for use in interpreting human experience. Intended to help meet the physical science group requirements. Three lectures. (3F, 3Sp) Maeser

Graduate Study

Graduate Study. All new graduate students must take entrance examinations in inorganic, organic, physical and analytical chemistry. These will be administered three days before registration day in the Fall quarter and by special arrangement at other times.

Master of Science Degree. The Chemistry Department offers the Master of Science degree with research in any one of the following fields: Analytical, Biological, Inorganic, Organic, and Physical Chemistry.

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of Education. A better preparation for the teaching of chemistry is possible with a combined BA degree and teaching certificate.

Suggested curricula for BA and BS degrees in Chemistry:

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<tr>
<th>FRESHMAN</th>
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\(^1\)Not required for BA degree.
101. Elementary Physical Chemistry for Biologists. A lecture survey of basic quantitative laws governing chemical processes, applied to examples of biological interest. Mathematical derivations are kept to a minimum. Recommended as a prerequisite for those interested in biological or medical research. Prerequisites: Chemistry 5; Math 35, or equivalent. Three lectures. (3Sp) Staff

104, 105, 106. Physical Chemistry. Quantitative methods for solving problems in chemical thermodynamics, phase change, electrochemistry, reaction kinetics, quantum theory, and molecular structure. Prerequisites: Chemistry 5, Physics 22, Math 110. Three lectures. (SF, 3W, 3Sp) Boyd, Moore, Redington

109, 110, 111. Experimental Physical Chemistry. Laboratory work correlated with Chemistry 104, 105, 106. (1F, 1W, 1Sp) Boyd, Moore, Redington

115. Quantitative Analysis. Basic theory and laboratory practice in gravimetric and volumetric analysis. Prerequisites: Chemistry 5, Math 35. Two lectures, two labs. (4Sp) Cannon

116. Inorganic Preparations. A laboratory course in practical methods of synthetic inorganic chemistry. Prerequisite: Chemistry 5, 111. (Credit arranged) Hobrock

121, 122. Organic Chemistry. Fundamentals of the chemistry of carbon compounds. Prerequisite: Chem 5. Three lectures, one lab. (4F, 4W) Smith

123. Organic Chemistry A continuation of Chemistry 121 and 122 for chemistry majors and others desiring an intensive lecture course in organic chemistry. Prerequisite: Chem 122. Three lectures. (3Sp) Smith

123A. Organic Chemistry Laboratory. Laboratory to accompany Chem 123. (25p) Smith

134. Qualitative Organic Analysis. The classification, reactions and laboratory work involved in the identification of unknown organic compounds. Prerequisites: Chem 123, 106. (4Sp) Anderson

150. Inorganic Chemistry. Study of the elements, compounds and bonding theories based upon the atomic structure. Prerequisite: Chemistry 104. Three lectures. (3F) Hobrock

153. Instrumental Analysis. Theory and application of physico-chemical methods of analysis. Selected electrochemical and optical methods. Prerequisites: Chemistry 106, 115. Two lectures, one lab. (3W) Spence

160. Undergraduate Seminar. (1W) Staff

180. Elementary Biochemistry. A brief survey of the chemistry of biologically important compounds such as carbohydrates, lipids, proteins, nucleic acids and enzymes including their role in animal and plant metabolism. Qualitative and semi-quantitative experiments with important compounds are performed. This is a terminal course normally not intended to meet requirements for more advanced work in biochemistry. Prerequisites: Chemistry 5, 121. Four lectures, one lab. (5F) Tu, Van Orden

190. Principles of Biochemistry. A study of the chemical and physical behavior of biologically important compounds including the chemistry of carbohydrates, lipids, proteins and hormones with an introduction to enzymatic processes, bioenergetics and metabolism. Prerequisites: Chem 106, 122 (or special permission). Four lectures, one lab. (5F) Tu, Van Orden

191, 192. Principles of Biochemistry. Chemistry of life processes including acid-base phenomena, enzyme catalyzed reactions, bioenergetics, oxidation-reduction, biosynthetic phenomena and the metabolism of biologically important compounds. Prerequisites: Chem 100. Students completing Chem 180 may register with special permission. Three lectures. (3W, 3Sp) Tu, Van Orden

193, 194. Biochemistry Laboratory. Laboratory experiments illustrating general principles in studying biological materials. To accompany Chem 191 and 192. Prerequisite: Chem 190 (or special permission). Chem 115 advisable. Two labs. (2W, 2Sp) Tu, Van Orden

195. General Pharmacology. Lectures and laboratory work dealing with principles, clinical application and research methods. Prerequisites: Chem 190, 122. Three lectures, two labs. (5W) Greenwood

198. Undergraduate Research Problems. Credit arranged. (F, W, Sp) Staff

199. Undergraduate Thesis. (1F, 1W, 1Sp) Staff

201. Quantum Chemistry. Quantum chemistry with emphasis on valence bond and molecular orbital calculations. Prerequisites: Chem 106, Math 110. Three lectures. (3F) Boyd, Moore, Redington


203. Chemical Kinetics. Theory of reaction rates with application to current research problems. Prerequisite: Chem 201. Three lectures. (3Sp) Boyd, Moore, Redington

*Taught 1966-67
**Taught 1967-68
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204. Chemical Thermodynamics and Statistical Mechanics. Advanced chemical thermodynamics from the standpoint of Gibbs. Prerequisites: Chem 106, Math 110. Three lectures. (3F) Boyd

205. Chemical Thermodynamics and Statistical Mechanics. Introduction to statistical mechanics. Prerequisites: Chem 201, 204. Three lectures. (3F) Boyd

206. Chemical Thermodynamics and Statistical Mechanics. Applications of thermodynamics and statistical mechanics to chemical problems. Prerequisite: Chem 205. (3Sp) Boyd

209. Special Topics in Physical Chemistry. Prerequisites: Chem 203, Math 110. (3) Staff


229. Theoretical Organic Chemistry. Application of kinetics, thermodynamics and simple quantum mechanics to problems of organic chemistry. Prerequisite: Chem 228. Three lectures. (3Sp) Smith


234. Chemistry of Natural Products. Alkaloids, steroids and terpenes with emphasis on biosynthesis. Prerequisite: Chem 227. Three lectures. (3F) Stemitz

250. Advanced Inorganic Chemistry. Modern topics and theories in inorganic chemistry. Prerequisites: Chem 106, 150. Three lectures. (3W) Hobrock

251. Coordination Chemistry. Theory of the coordinated bond and inorganic reaction mechanism. Prerequisite: Chem 250. Three lectures. (3Sp) Hobrock

260. Graduate Seminar. (1F, 1W, 1Sp) Staff


289. Animal Metabolism. Feeding experiments involving development of amino acid, vitamin, mineral, and other nutritional deficiencies in blood, urine and other secretions and excretions when indicated. Credit arranged. (F, W, Sp) Greenwood

295. Enzymes. Enzymes and their functions in plants and animals. Prerequisites: Chem 106, 192. Three lectures. (3W) Tu, Van Orden

296. Enzyme Chemistry Laboratory. The experimental methods of enzyme chemistry including the purification, assay, and isolation of enzymes followed by a study of their kinetics, activity and other properties. Prerequisites: Chem 106, 194. Alternate years. Two labs. (2Sp) Tu, Van Orden

298. Graduate Research. Credit arranged (F, W, Sp) Staff

Nutrition and Biochemistry Seminar. (See An Hus 270).

*204. Taught 1966-67
**206. Taught 1967-68
Department of 
Geology

Head: Professor J. Stewart Williams
Office in Main 258

Associate Professors Clyde T. Hardy, Donald R. Olsen.

Bachelor of Science Degree. For a major in Geology the following courses are required: Chemistry 10, 11; Civil Engineering 81; Mechanical Engineering 21, 22; English 111; Geology 3, 4, 5, 101, 102, 106, 108, 110, 111, 113, 114, 115, 118; Mathematics 35, 46; Physics 17, 18, 19; and Biology 15; Recommended are Mathematics 96, 97, 98, 99; Civil Engineering 84, 181; German 1, 2, 3; Photography 51; Chemistry 5, 12; and Physics 20, 21, 22.

Geology Club. The Geology Club, under general supervision of the department, is an organization for all Geology majors.

Graduate Study

Master of Science Degree. The Department of Geology offers advanced study and research leading to the Master of Science degree. Graduate students of other departments may take any course in the 100 series for credit.

Geology Courses

1. Introductory Geology. For students in non-science areas. (5F, W, Sp) 

2. Physical Geology. For majors in Geology, Forest and Range Management, Engineering, Agronomy, and other sciences. (5F, W, Sp) 

3. Historical Geology. Physical history of the earth and the development of life as indicated by the geologic record. (5F, W, Sp) 

4. Minerals and Rocks. Identification of common minerals and rocks. Prerequisite: Geology 1 or 3. (3W) 

5. Physical Science. Elements of geology integrated with astronomy, chemistry, mathematics, and physics for use in interpreting human experience. Designed to help fill the exact science group requirements. (SF, W) 

6. Invertebrate Paleontology. Introduction to the study of invertebrate fossils. Methods of preparation. Prerequisites: Geology 4 and Zoology 3. (5F) 

7. Stratigraphy and Sedimentation. Prerequisite: Geology 3. (5F) 

8. Structural Geology. Prerequisite: Geology 3. (SF) 


12. Surficial Geology. Processes active on surface of earth, unconsolidated deposits, and geomorphology. Recent geologic events. For majors in Forest and Range Management, Engineering, and Agronomy. Prerequisite: Elementary geology. (SF)
Department of Mathematics

Head: Professor Neville C. Hunsaker
Office in Engineering C-325


Two majors are offered by the Mathematics Department for the Bachelor of Science degree. Students intending to enter graduate study in Mathematics, those intending to teach Mathematics in a junior college or a university, and those expecting industrial employment as mathematicians take the regular major. Those intending to teach Mathematics in the secondary schools must satisfy the State requirements for secondary certification and must fill department requirements in one of two ways: (1) Regular mathematics major, (2) A department approved teaching major.

Regular majors are required to complete Mathematics 110, 130, 131, 132 and fifteen additional credits of upper division Mathematics selected from courses other than 140, 141, 142, 150, 151 and 152. Physics 20, 21 and 22 are required and nine credits of upper division Physics are recommended. Those expecting to obtain a degree higher than a BS degree in Mathematics should have a reading knowledge of French, German, or Russian.

A department-approved teaching major must include Mathematics 99, 120, 150, 151, 152, 175 and an additional nine credit hours of upper division Mathematics selected from other courses meeting departmental approval.

A department-approved teaching minor must include Mathematics 98 and 150, and should include Mathematics 120, 124, 175.

All students majoring in Mathematics must have had Plane and Solid Geometry. Plane Geometry is a prerequisite for all university mathematics except Mathematics 21, 22, 23, 30, 34, 35 and 60.

If a student completes both Mathematics 30 and 34, credit will be
allowed for only one of these courses.

All courses to be used as prerequisites must be completed with a grade of "C" or better.

Mathematics Courses

0. Remedial Mathematics. A no credit course for those students whose performance on the mathematics entrance examination is below the acceptable minimum. (F, W) Staff

21, 22, 23. Mathematics For Elementary Teachers. Basic mathematics for prospective teachers in the elementary schools, including an introduction to algebra and geometry. (3F, 3W, 3Sp) Staff

30. Elements of Mathematics. A survey course designed to help fill the science group requirements for students who are not planning to study more mathematics. Prerequisite: One year of high school algebra. (5F, W, Sp) Staff

34. Introduction To College Algebra. Beginning algebra course 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 34. (3F, W, Sp) Staff

35. College Algebra. The elementary algebra needed as prerequisite for Math 96. Prerequisite: Math 34. (5F, W, Sp) Staff

40. Introduction To Probability Theory and Statistics. A pre-calculus course in elementary probability theory and a brief introduction to statistics. Prerequisite: Math 35. (3F, W) Staff

44. Plane Trigonometry. For students who need trigonometry for applications but who will probably not study calculus. Prerequisite: Math 35. (5F, W, Sp) Staff

46. Plane Trigonometry. For students who need trigonometry as a prerequisite for Math 96. Prerequisite: Math 35. (5F, W, Sp) Staff

60. Mathematics of Finance. Prerequisite: Math 35. (3Sp) Staff

66. Introduction to Mathematical Analysis. Calculus and an introduction to linear analysis. Primarily for students of College of Business. Prerequisite: Math 35. (5W, Sp) Staff

96, 97, 98, 99. Analytic Geometry and Calculus. Analytic geometry in 2 and 3 dimensions together with elementary calculus including partial derivatives, multiple integrals and infinite series. Prerequisite: Math 46. (5 credits each F, W, Sp) Staff

110, 111. Ordinary Differential Equations. Study of elementary techniques used in finding solutions to ordinary differential equations. Prerequisite: Math 99. (3 credits each F, W, Sp) Staff


120. Modern Geometry. An axiomatic development of Euclidean and Non-Euclidean geometries. Prerequisite: Math 97. (3F) Staff

123. Number Theory. Elementary properties of integers, some arithmetical functions, congruences, and simple Diophantine equations. Prerequisite: Math 97. (3W) Staff

124. Foundations of Mathematics. Introduction to elementary set theory and a study of axiomatic systems in general. Prerequisite: Math 97. (3Sp) Staff

126. Numerical Methods. Survey of numerical methods used in finding zeros of functions, solutions of systems of equations, and curve fitting. Prerequisite: Math 99. (3F) Staff

127, 128. Introduction To Numerical Analysis. Extension of Math 126 with emphasis on numerical differentiation, integration, and solutions of ordinary differential equations. Prerequisite: Math 126. (3W, 3Sp) Staff

130, 131, 132. Advanced Calculus. Elementary theory of functions of real variables. Prerequisite: Math 110. (3F, 3W, 3Sp) Staff

134, 135, 136. Introduction To Topology. Study of elementary point set topology. Prerequisite: Math 99. (3F, 3W, 3Sp) Staff


145. Vector Analysis. The algebra and calculus of vectors. Prerequisite: Math 99. (3F) Staff

147, 148. Introduction To Complex Variables. A first course in complex variables designed for physics and engineering students, and as a prerequisite for Math 254. Prerequisite: Math 130 or 140. (3W, 3Sp) Staff

150, 151, 152. Mathematics for Secondary School Teachers. Basic concepts of mathematics for prospective secondary school teachers with emphasis on mathematical systems and the system of real numbers. Prerequisite: Math 97. (3F, 3W, 3Sp) Staff

153. Mathematical Readings. Prerequisite: Math 99. (3F) Staff
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160. Determinant and Matrix Theory. An introduction to matrix analysis with emphasis on applications. Prerequisite: Math 99. (3F)

175. Teaching of Mathematics in the Secondary Schools. A methods course required of all prospective secondary school teachers. Prerequisite: Math 150. (3Sp)

216, 217, 218. Topics in Abstract Algebra. Prerequisite: 118. (3F, W, Sp)

220, 221, 222. Advanced Topics in Algebra. Prerequisite: 216, 217, 218. (3F, W, Sp)


234, 235, 236. Topology. Prerequisite: 132. (3F, W, Sp)

246. Tensor Analysis. Prerequisite: 145. (3W)

250. Graduate Seminar. Credit arranged. (F, W, Sp)

251, 252, 253. Real Variables. Prerequisite: 132. (3F, W, Sp)


260. Graduate Thesis. Credit arranged (F, W, Sp)

Mathematical Statistics

Students can get a Bachelor of Science in Mathematical Statistics. The work in Mathematical Statistics has a three-fold purpose: (a) To train professional statisticians. (b) To instruct students who wish to broaden their mathematical studies in Economics, Sociology, Genetics, Biometry, Psychology and Education. (c) To conduct research in statistics and train competent consultants on statistical problems.

Mathematics 99 or its equivalent is required of all students taking statistics.

If students wish to major or minor in Statistics, they take courses 160 to 167 inclusive in Statistics, plus Mathematics 110, 130, 131, and 132.

Statistics Courses

161. Calculus of Probability. Prerequisite: Math 99. (5F)

162, 163. Mathematics of Statistics. Including Math 161, a year sequence in mathematical theory of probability, random variables on both discrete and continuous sample spaces, elementary sampling theory and hypothesis testing. Prerequisite: Math 160, 161. (5W, 5Sp)

166. Sequential Analysis and Control of Quality of Output in Manufacturing. (3Sp)

167. Statistical Reading and Reports. (3Sp)

Department of Physics

Head: Associate Professor W. Farrell Edwards
Office in Engineering 154

Professor John K. Wood1; Visiting Professor J. W. DuMond; Associate Professors Jack E. Chatelain, John J. Merrill, Akeley Miller; Assistant Professors Jay O. Jensen, Richard L. Knight, V. Gordon Lind, Robert E. McAdams

Bachelor of Science Degree. Requirements for a Physics major: Fifty credits, of which thirty-five credits must be upper division courses. Certain approved courses

1On Leave
in upper division Engineering, not to exceed ten credits, may be counted. A Physics major must complete a senior project approved by the Department. The following sequence of courses is recommended for students wishing to continue in graduate study in Physics:

**Freshman Year:** Mathematics 96, 97, 98; Chemistry 3, 4, 5; English 1, 2, 3; Physics 20.

**Sophomore Year:** Physics 21, 22, 23; Mathematics 99, 110, 111; German, Russian or other group electives.

**Junior Year:** Physics 153, 154, 155, 181, 182, 183; Mathematics 130, 131, 132, or 140, 141, 142; Physics 166, 167, 168 or electives.

**Senior Year:** Physics 125, 126, 127, 156, 157, 158, 175, 176, 177, 188, or electives.

A minor in Physics will be approved on completion of Physics 153, 154, 155 or Physics 175, 176, 177. Nine credits of upper division Physics courses including 122 and 130 may be substituted on departmental approval.

**Teaching Major:** For a teaching major in Physics, a student should complete the following program: Physics 153, 154, 155, 181, 182 or 175, 176, 177, 181, 182 with prerequisites; Math through 110. Required professional education courses for the teaching certificate are listed in the College of Education.

**Biophysics**

Students planning to pursue biophysics should write to either the Physics or Zoology department for advisement since this is a graduate program requiring a strong undergraduate program in mathematics, physics, and biology.

**Graduate Study**

**Master of Science Degree.** A candidate for the degree of Master of Science in Physics must take an entrance examination administered by the Department and present General Physics, General Chemistry, Calculus, one additional year of Mathematics and upper division courses in five of the following areas: Mechanics, Heat and Thermodynamics, Geometrical and Physical Optics, Electricity and Magnetism, Modern and Nuclear Physics, Meteorology, Physical Chemistry, Electronics, Sound. A student having earned fewer than six credits in certain of these five fields may be requested to take additional work in those areas as part of the work for the Master's degree.

**Doctor of Philosophy Degree.** The Physics Department in cooperation with related departments offers the Doctor of Philosophy degree. The examination schedule for this degree is as follows: Entrance examination; qualifying examination at the start of the second year of study; language examinations in German, Russian and "others"; comprehensive examination any time prior to one year before the final examination on the thesis. Detailed information may be obtained from the Department or from the Dean of the School of Graduate Studies.

**Physics Courses**

6. **General Physics.** A survey course in physics, with a laboratory. Covers fundamental physical principles with emphasis on how a problem is approached and solved in physics. (5F, W, Sp) Staff

10. **Astronomy.** An introduction to the solar and stellar systems in terms of modern methods and theories. No prerequisites. (3F, W, Sp)

17, 18, 19. **General Physics.** Mechanics, electricity, magnetism, heat, light, sound, atomic and nuclear physics for non-science majors. Prerequisite: Math 35 or Math 44 or 46. Recommended: Math 97. Should be taken in
sequence except with permission of instructor. Two lectures, three recitations and one lab per week. (5F, 5W, 5Sp)  

20. 21, 22. General Physics-Science. Mechanics, electricity, magnetism, heat, light, sound, atomic and nuclear physics for science majors and engineers. Prerequisite: Math 97. Recommended: concurrent registration in Math 98. To be taken in sequence except with permission of instructor. Two lectures, three recitations and one lab per week. (5F, 5W, 5Sp)  

23. Quantum and Statistical Physics. Further development of physical phenomena due to the quantum and/or statistical nature of matter. Prerequisite: Physics 22. (3Sp)  

40. Introductory Mechanics I. Introduction to Newtonian Mechanics with brief development of elementary calculus and vector algebra. Prerequisite: Permission of the instructor. (3F)  

41. Introductory Mechanics II. Development of concepts of energy and momentum, both linear and rotational, and the introduction of conservation laws. Further development of vector and calculus notations. Prerequisite: Physics 40. (3W)  

42. Energy Transfer. Wave motion, sound, and heat. Prerequisite: Physics 41. (3Sp)  

50. Mechanics Laboratory. Experiments on conservation of momentum and energy oscillatory motion, heat transfer, and gas laws. Prerequisite: Student must be concurrently registered in Physics 42. (1Sp)  

117. General Meteorology. Physics of the Air. Atmosphere physics and weather phenomena, using both dynamic and synoptic procedures. Brief study of meteorological apparatus, observations, map reading, forecasting, and basic principles of aeronautical meteorology. Prerequisites: Physics 19 or 22 and Calculus. Four lectures, one lab. (2Sp)  

122. Survey of Modern Physics I. For engineering, science, and teaching majors. (3W)  

125, 126, 127. Modern Physics. Application of special relativity and quantum mechanics to atomic structure, molecular physics, solid state physics, X-rays and nuclear physics. Prerequisite: Physics 155 or 177. Three lectures, one recitation. (4F, W, Sp)  

130. Nuclear Physics. A survey of methods and results of recent investigations of nuclear processes. To follow Physics 122. (3Sp)  

131. Nuclear Detection Methods. Designed to familiarize the student with the instruments, techniques of measurement, and elements of health safeguards used in nuclear physics. (2F, W, Sp)  

140. Biophysics I. Foundations of physical measurements in biology with emphasis on optical methods: microscopy including phase and interference, spectroscope, X-ray techniques, crystal analysis. Prerequisite: Physics 19 or 20. (3F)  

141. Biophysics II. Introduction to quantitative biology. The underlying physical principles involved in biophysical phenomena are discussed. Prerequisite: Physics 19 or 22. (3W)  

142. Radiobiology. Designed to acquaint students in Medical Technology, Botany, Zoology, Pre-medicine, Pre-veterinary and Agriculture with a foundation of techniques in health physics, radiation monitoring and measuring and isotope handling. Prerequisite: One quarter of general physics. (3)  


156, 157, 158. Introduction to the Theory of Relativity. An introduction to the foundations, formulation, and predictions of the special theory of relativity and applications to modern physics. This course is designed for seniors majoring in physics with calculus and an introduction to differential equations as prerequisites. Advanced courses in mechanics and electricity and magnetism are considered helpful but not necessary. (2F, 2W, 2Sp)  

160, 161, 162. Thermal Physics. A study of theoretical models devised to correspond with the observed behavior of matter in bulk in terms of heat and energy. (3F, 3W, 3Sp)  

166, 167, 168. Wave Theory and Optics. Three-quarter sequence covering optics and related topics. Emphasis on wave motion and diffraction phenomena; also geometrical optics, aberrations, interference, polarization, X-ray optics, and atomic spectra. Three lectures. (3F, 3W, 3Sp)  

175, 176, 177. Electricity and Magnetism. Electrostatics, magnetostatics, DC and AC circuits, electromagnetism, and electromagnetic theory. Use of the calculus and differential equations. (3F, 3W, 3Sp)  

181. Mechanics Laboratory. A one quarter course including experiments on linear and non-linear oscillatory motion with and without coupling and experiments on elastic behavior of bodies. Makes use of calculus and some differential equations. Prerequisite: concurrent or previous registration in Physics 153. (1Sp)  

* Taught 1966-67  
** Taught 1967-68
182. Electricity and Magnetism Laboratory. A one quarter course including experiments with direct and alternating current bridges, experiments to examine the mechanical and electrical details of galvanometer and other meter behavior, and experiments concerning feedback and filter and other transfer properties. Makes use of calculus and some differential equations. Prerequisite: concurrent or previous registration in Physics 175. (1W) Staff

183. Atomic Physics Laboratory. A one quarter course including experiments in Atomic Physics such as the measurement of electronic charge by the Millikan oil drop experiment and the Franck and Hertz experiment. Makes use of calculus and some differential equations. Prerequisite: concurrent or previous registration in Physics 153. (1Sp) Staff

184. Optics Laboratory. A one quarter course including advanced experimental work in optics such as refraction in inhomogeneous media, diffraction, polarization, photometry, spectra, information retrieval. Prerequisite: concurrent or previous registration in Physics 166. (1W) Staff

188. Special Problems in Physics. A laboratory course to give the advanced student experience with precision instruments and their use in physics, 1 to 3 per quarter (F, W, Sp) Staff

193, 194, 195. Seminar in Physics. A weekly meeting of staff and physics majors consisting of reports on recent developments in physics. Students receive credit for course by making reports. (1F, 1W, 1Sp) Staff

196, 197, 198. Selected Reading in Physics. (1F, 1W, 1Sp) Staff

Courses numbered above 200 may be taken by undergraduates only with the approval of the instructor and the head of the department.


214. Soil Physics. (See Agronomy 214.)

219, 221, 222. Atomic Spectra, Molecular Spectra, and Spectrographic Measurements. (3F, 3W, 3Sp) Staff

230, 231, 232. Nuclear Physics. (3F, 3W, 3Sp) Staff

250. Research in Physics. Credit arranged. (F, W, Sp) Staff

260, 261, 262. Thermodynamics, Kinetic Theory, Statistical Thermodynamics. (3F, 3W, 3Sp) Chatelain

270, 271, 272. Quantum Field Theory. (3F, 3W, 3Sp) Chatelain

275. Relativity and Cosmology. A special theory of relativity developed from the Einstein postulates. The historical and experimental basis for the theory will be discussed, and necessary mathematical techniques will be developed with applications to relativistic mechanics. (3F) Staff

276. Relativity and Cosmology. The general theory of relativity developed from the principle of equivalence. The Reimann-Christoffel curvature tensor, the field equations, and the known rigorous solutions will be discussed. (3W) Staff

277. Relativity and Cosmology. Equations of motion in the general theory, experimental tests of the theory, possible unified field theories, and applications to cosmology. (3Sp) Staff

285, 286, 287. Introductory Quantum Mechanics. Prerequisite: Advanced Calculus. (3F 3W, 3Sp) Staff

288. Introductory Quantum Mechanics. Continuation of 287. (3F) Staff


293, 294, 295. Graduate Seminar in Physics. Credit Arranged. (F, W, Sp) Staff

296, 297, 298. Theoretical Electricity and Magnetism. (3F, 3W, 3Sp) Staff
Bachelor of Science Degree. For a major in Zoology the following courses must be taken: Biology 15; Zoology 16, 107, 112, 118, and 132; Physiology 121 and 122, or 130 and 151; Wildlife Resources 160, or any additional upper division course in Zoology; Botany 26; Mathematics 35 and 46; Physics 17, 18, and 19; Chemistry 3, 4, 5, 121, 122, and 123; and 15 hours of modern language. The following courses are recommended; Entomology 13 and 101, Bacteriology 10 or 70 and 71, a second year of a modern language, Philosophy 50 (Logic), Philosophy 160 (Philosophy of Science), English 34, 35, 36 or any upper division literature course; additional courses in history, political science, and fine arts. Students interested in experimental aspects of zoology should elect more mathematics (96, 97, 98, 99, and 110), more chemistry (115 and 190) and applied statistics (131 and 132).

For a pre-medical or pre-dental major in Zoology, the listed pre-medical or pre-dental requirements must be completed, and in addition the following courses must be taken: Zoology 107, 127 or 128, 132, and any one of the following courses: Ent 115, Physiol 130, Zool 116 or 212.

For a major in Biophysics. Students planning to pursue biophysics should write to either the Physics or Zoology department for advisement since this is a graduate program requiring a strong undergraduate program in mathematics, physics and biology.

Graduate Study

Master of Science Degree. The Zoology Department offers a Master of Science degree in various phases of Agricultural Entomology, Genetics, Medical Entomology, Systematic Entomology, Physiology, Parasitology, Mammalogy, Ornithology, and Herpetology.

Doctor of Philosophy Degree. Cooperatively with related departments, advanced study and research is offered for the attainment of the degree of Doctor of Philosophy in specialized fields of Zoology, Entomology and Physiology.
Further information may be obtained from the Department or from the Dean of the School of Graduate Studies.

Biology Courses

11. Principles of Biology. A study of basic life principles as illustrated in both animals and plants, including microbes. Four lectures, one recitation, and one 2-hour lab. (5F, W, Sp, Su) Gunnell, Linford

15. General Biology. A study of the structures and functions that are common to living things. Cellular and molecular processes are emphasized. A knowledge of high school chemistry is assumed. This course is a prerequisite to all other courses in the Zoology Department except Biology 1 and Physiology 4. Five lectures, one lab. (5F, 5W, 5Sp) Staff

Zoology Courses

4. General Vertebrate Zoology. Detailed study of the chordates, with emphasis on structure, function, evolutionary relationships and natural history. Prerequisite: Zoology 3 or equivalent. Three lectures, two labs. (5F) Gunnell

16. General Zoology. Study of the animal kingdom, with emphasis on comparative structure and function of the organ systems and on evolutionary relationships. Prerequisite: Biology 15. Three lectures, two labs. (5W, 5Sp) Staff

31. Evolution. A general consideration of the biological principles of evolution as it applies to plants, animals and man. Prerequisite: Biology 1, or a good high school course in biology. Three lectures. (3W) Gunnell

101. Invertebrate Zoology. The more important phyla of invertebrates, with some consideration of the local fauna. Prerequisites: Zoology 16 or equivalent. Three lectures, two labs. (5Sp) Staff

102. Human Genetics. A beginning course covering the basic principles of genetics. Similar to 112 but less technical. Human genetics is emphasized. Not open to students with credit in 112. Prerequisite: At least one course in biological science. Five lectures. (6Sp) Staff

107. History and Literature of Biology. The more important men and ideas in the historical development of biology. (4F) Gardner

112. Principles of Genetics. A beginning course dealing with the basic principles of genetics. Illustrative material is taken from animals, plants and man. Prerequisite: Zoology 16 or equivalent or Botany 26. Four lectures, one lab. (5F, W) Staff

114. Population Genetics. A study of the flow of genes in undisturbed populations, the outcome of selective forces in populations, and the role of migration, mutation, and chance in altering the genetic makeup of populations. Prerequisites: Zoology 112 and Applied Statistics 131, 132. Three lectures, one lab. (4Sp) Staff

116. Parasitology. Protozoa and worms parasitic in man, domestic animals and wild animals, and relationships between parasites and their hosts. Prerequisite: Zoology 16 or equivalent. Three lectures, two labs. (5Sp) Bahler, Hammond

118. Vertebrate Embryology. An introduction to the principles of development of the vertebrates. Prerequisite: Zoology 16 or equivalent. Three lectures, two labs. (5Sp) Dixon

119. Comparative Anatomy. Fundamentals of structure of the main types of vertebrates are studied comparatively. Prerequisite: Zoology 16 or equivalent. Three lectures, two labs. (5W) Dixon

121. Ornithology. Structure, classification, distribution and annual cycles of birds, with emphasis on study of the local fauna in the field. Prerequisite: Zoology 16 or equivalent. Two lectures, two labs. (4Sp) Dixon

122. Mammalogy. Structure, classification, life histories and distribution of mammals; introduction to methods of field investigation. Prerequisite: Zoology 16 or equivalent. Two lectures, two labs. (4F) Dixon

123. Field Zoology. Study of the most common Utah animals, including identification, natural history, distribution, ecology, etc. Also methods of study in the field, and collection and preparation of specimens for study, display and storage are considered. Some laboratory time is spent in making observations and collections in the field. Prerequisite: Zoology 16 or equivalent. Two lectures, two labs. (4F) Linford

127. Cytology. Study of cells, both plant and animal, including techniques of study, intracellular morphology and subcellular organization. Prerequisite: Organic Chemistry. Two lectures, two labs. (5F) Sanders

128. Elements of Histology. Study of tissues, including characteristics of different kinds of tissues and the main organs. Prerequisite: Zoology 16 or equivalent. Three lectures, two labs. (5F) Bahler

129. Histological Technique. Techniques employed in making preparations of animal tissues for microscopic study. Three labs. (3W) Staff

132. Mechanics of Evolution. Critical study of the facts and theories pertaining to the
biological principles of evolution, with emphasis on how it occurs. Prerequisites: Zoology 112 and Zoology 16 or Botany 26 or equivalents. Three lectures. (3W) Bowman

150. Herpetology. Classification, distribution, life habits, and identification of amphibians and reptiles, with emphasis on the local forms. Prerequisite: Zoology 16 or equivalent. Two lectures, two labs. (4F) Gunnell


201. Special Problems. Individual study of a problem under the guidance of a staff member. Credit arranged. (F, W, Sp) Staff

205. Orientation for Graduate Students. Introduction to procedures in graduate study; qualifying examinations, scientific method, selection of problem, becoming acquainted with literature, organization and writing of thesis and final examination. Required of all graduate students in Zoology, Entomology, Physiology. (1F) Staff

207. Theoretical Biology. A critical study of modern biological thought. (3W) Sanders

211. Genetics of Lower Organisms. Concepts of genetic structure, function, and recombination in lower organisms with emphasis on current literature. Prerequisite: Zoology 112. Three lectures. (3Sp) Simmons

212. Biochemical Genetics. Concepts of genetic function at the chemical and molecular level, with emphasis on current literature. Prerequisites: Zoology 112, Chemistry 122; recommended, Chemistry 190. Three lectures. (3Sp) Simmons

213. Biochemical Genetics Laboratory. Experimental methods used in research in biochemical genetics. Must accompany or follow Zoology 212. Two labs. (2Sp) Simmons

214. Advanced Genetics. Intensive study of heredity and variation with emphasis on current research. Prerequisite: Zoology 112. (3Sp) Staff

**215. Genetics of Drosophila and Maize. Concepts of genetic structure, function, and recombination in higher organisms, with emphasis on current literature. Prerequisite: Zoology 112. Three lectures. (3W) Bowman

233. Zoogeography. Principles governing the distribution of animals, with emphasis on terrestrial vertebrates, and the history of the biota of western North America from the beginning of the Cenozoic era. (3W) Dixon

235. Protozoology. The protozoa, with emphasis on parasitic forms, and on the methods of studying the protozoa. Consideration is also given to free-living protozoa and to classification, morphology, physiology, and reproduction of the protozoa in general. Two lectures, two labs. (4W) Hammond

236. Advanced Parasitology. Detailed study of certain parasitic protozoa and helminths, with emphasis on current research. Prerequisite: Zoology 116. (2Sp) Hammond

240. Research and Thesis. Research connected with problem undertaken for partial fulfillment of requirement for Master of Science or PhD degree. Credit arranged. (F, W, Sp) Staff

251, 252. Seminar. Attendance required of all graduate students in residence in department each Fall quarter. Fundamental problems relating to current researches in zoological science are discussed by faculty, graduate students. (1F, 1Sp) Staff

262, 263. Seminar in Vertebrate Zoology. Required of all graduate students in Vertebrate Zoology each winter and spring quarter while in residence. Seniors and others interested may participate with the permission of the instructor. (1W, 1Sp) Dixon

272, 273. Seminar in Genetics. Required of all graduate students in Genetics each winter and spring quarter while in residence. Seniors and others interested may participate with the permission of the instructor. (1W, 1Sp) Gardiner, Simmons, Bowman

282, 283. Seminar in Parasitology. Required of all graduate students in Parasitology each winter and spring quarter while in residence. Seniors and others interested may participate with permission of instructor. (1W, 1Sp) Hammond

Entomology

Bachelor of Science Degree. For a major in Entomology, the following courses are required: Biology 15; Zoology 16, 107, 112, 132; Entomology 13, 100, 101, 102, 111, 112, 108 or 115; Botany 102, 130 (Botany 140 or Zoology 116 may be substituted with permission); Chemistry 3, 4, 5, (10, 11, 12 allowed only in some specialities) 121, 122 and 123; Physiology 4; Mathematics 35; Wildlife Resources 160. The following are recommended: Entomology 21, 120, 230; Plant Science 119; Applied Statistics 131, 132; English 111, Plant Science 131; Physics 6. Students

*Taught 1966-67
**Taught 1967-68
planning graduate work are advised to study a foreign language and take Chemistry series 3, 4, 5, 121, 122.

Entomology Courses

13. General Entomology. Fundamental knowledge about insects—where they live, what they do, how they develop and behave; also structure, function, relationship to the environment and principles of insect control are considered. Students learn how to collect and preserve insects and to identify the major groups of these. This course is intended to serve as a foundation for other courses in Entomology and provide an introduction to the subject for those preparing to teach biology and for students in Agriculture and Wildlife Resources. (SSp) Staff

**21. Social Life of Insects.** Factors in social development and communication among bees and other social insects are considered; the elements of the biology of bees, and of the management of honey bees are also included. (2Sp) Nye

100. Systematic Entomology. Classification of insects. Insect collection required. Prerequisite: Entomology 13. One lecture, one lab and field collecting. (3F) Hanson

101. Principles of Animal Taxonomy. A study of the principles of classification of animals and the rules of zoological nomenclature. Prerequisite: Entomology 100 or Zoology 16, or equivalents. One lecture. (3W) Hanson

102. Advanced Systematic Entomology Laboratory. Advanced study of the classification of insects, including practice in the preparation of keys description of species, and scientific illustration. Prerequisite: Entomology 100. This course must be taken simultaneously with Entomology 101. Two labs. (2W) Hanson

*105. Forest Entomology.** Ecology, life history, identification and economic importance of major forest insect species. Beneficial and harmful insects, and general problems of forest insect control are discussed. Two lectures, two labs. (4F) Davis

106. Insect Ecology. Ecological principles as applied to insects, including fundamental concepts of ecology, ecological relationships, and measurement of ecological factors of importance in Entomology. The impact of changes in environmental conditions on insect populations also are considered. Prerequisites: Zoology 16 or equivalent and Entomology 13. (3F) Staff

108. Agricultural Entomology. Insect pests of major economic importance to agriculture, including their recognition, type of damage done, distribution, life history, and methods of control. Three lectures, two labs. (5F) Davis

111. Insect Morphology. Structure of insects, including external and internal anatomy. Prerequisite: Entomology 13. Three lectures. Two labs. (5F) Staff

112. Insect Physiology. Function of the organ systems of insects. Prerequisite: Entomology 111. Three lectures, two labs. (5W) Brindley

113. Insect Toxicology. An introduction to the principles of toxicology as applied to the control of insects, including molecular structure of insecticides as related to toxicity, mode of action of insecticides, resistance of insects to insecticides, and problems of residues. Prerequisite: Ent 112 or Physiol 151, and organic chemistry or biochemistry, or equivalents. Three lectures, two labs. (5Sp) Brindley

115. Medical and Veterinary Entomology. A study of Arthropods that annoy and transmit agents of disease to man and domesticated and wild animals. Vectors of plague, spotted fever, tularemia, malaria and other Arthropods carrying disease receive major attention. Prerequisite: Zoology 16 or equivalent. Two lectures, two labs. (4W) Hanson

*129. Insect Pollination in Relation to Agriculture.** Pollinating insects in agriculture, including beekeeping as related to crop pollination, utilization of native pollinating insects, and special problems in the pollination of many commercial crops. (2W) Bohart

130. Nematology. Recognition, distribution, host and environmental relations, and control of nematodes with emphasis on plant parasitic forms. Prerequisite: Zool 16 or equivalent. (3W) Staff

138. Aquatic Entomology. Identification, distribution, life histories and adaptations of aquatic insects, with particular reference to local streams and lakes. Two lectures, one lab. (3Sp) Hanson

210. Special Problems. Individual study under staff guidance. Prerequisite: Entomology 13, 100, 108. Credit arranged. (F, W, Sp)

*230. Insects in Relation to Plant Diseases.** A study of the insect vectors of plant diseases, including modes of transmission, nature of the pathogens and interrelationships of the pathogen, insect and host plant. Prerequisite: Entomology 108 or Botany 130. Two lectures, one lab. (3W) Davis

**231. Biological Control of Insect Pests.** Study of invertebrate parasites and predators

*Taught 1966-67

**Taught 1967-68
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of insects. Consideration is also given to diseases of insects, vertebrate predators, and destruction of undesirable plants by insects. Prerequisite: Entomology 13 or 108. Two lectures, one lab. (3W) Davis

233. Aphidology. Morphology, biology and taxonomy of aphids. Prerequisite: Entomology 103. (2W) Knowlton

250. Research and Thesis. For research connected with problem undertaken for partial fulfillment of requirements for Master of Science or PhD degree. Credit arranged. (F, W, Sp) Staff

262, 263. Seminar in Entomology. Required of all graduate students in Entomology each winter and spring quarter while in residence. Seniors in Entomology and others interested may participate with the permission of the instructor. (1W, 1Sp) Staff

Physiology

A major in Physiology must satisfy the Zoology requirements, and in addition complete Mathematics 110.

A minor in Physiology must complete eighteen hours of courses approved by the division of Physiology.

Physiology Courses

4. Human Physiology. For the student who desires a survey of physiology but who is not planning advanced intensive study. It deals with the functioning of the human body, with emphasis upon broad general biological principles. Five lectures, one lab. (5F, W, Sp) Bahler

20. Human Anatomy. Structure of the main human body systems with emphasis on the muscular, skeletal and nervous systems. For students desiring a more thorough study of human anatomy than is given in Physiology 4. Prerequisite: Physiology 4. Two lectures, one lab. (3F, 3W) Linford

104. Advanced Human Physiology. A survey of the systems of man with emphasis on the functions of the circulatory, nervous and muscular systems. Designed primarily for students with teaching majors in the biological sciences. Prerequisites: Physiology 4, Zoology 16 or equivalent, Chemistry 12. Three lectures, two labs. (5Sp) Ellis

121. 122. Mammalian Physiology. An intensive and detailed two-quarter course in physiology in which the functions of each of the organ systems of man and animals is studied. Students may not register for 122 without having had 121. As preparation, Zoology 16 or equivalent, Chemistry 3, 4, 5, 121, 122, 123 or equivalent and a course in physics are required. Three lectures, two labs. (5F, 5W) Ellis

130. Cellular Physiology. A study of physiological functions at the cellular level. Prerequisites: Chemistry 121 and 122, and Physics 17, 18 and 19 or equivalent. Three lectures, two labs. (5W) Sanders

141. Endocrinology. A study of the ductless glands and their secretions. Emphasis is placed on the action of these hormones on growth, metabolism, and adaptation of animals to changes in their internal and external environments. Prerequisites: Zoology 16 or equivalent, Physiology 4, and Chem 121, 122. Three lectures, one lab (4Sp) Sanders

142. Physiology of Reproduction. A study of the physiology of reproduction in mammals. Prerequisites: Zoology 16 or equivalent, Physiology 4 or Veterinary Science 20, and a course in organic chemistry; Physiology 141 recommended. Two lectures, one lab. (3W) Foote

151. Comparative Physiology. A comparative study of organ function in the animal kingdom. Prerequisite: Physiology 121, 122 or 130. Three lectures, two labs. (5Sp) Sanders

261. Physiology of Response. Nerve-muscle. A detailed physiological study of neuro-muscular mechanisms of response in the animal kingdom. Prerequisites: Physiology 122 or 130, Chemistry 190, Physics 19 or equivalents. Two lectures, one lab. (3F) Sanders

271, 272, 273. Readings in Physiology. Reading and reporting of classical and current literature in Physiology. Required of all Physiology graduate students each quarter while in residence. Seniors in Physiology and others may enroll with the permission of the instructor. (1F, 1W, 1Sp) Staff

282, 283. Seminar in Physiology. Required of all Physiology graduate students each Winter and Spring quarter while in residence. Seniors in Physiology and others may enroll with the permission of the instructor. (1W, 1Sp) Staff

291. Research and Thesis. Research connected with problem undertaken for partial fulfillment of requirements for Master of Science or PhD degree. Credit arranged. (F, W, Sp) Staff

*Taught 1966-67
Pre-Dentistry

Students planning to enter dentistry may take the necessary courses in the College of Science to satisfy requirements for admission to any school of dentistry in the United States.

Suggested pre-dental schedule:

**FRESHMAN**

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<th>Subject</th>
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<td>Mathematics 34, 35, 44 or 46</td>
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<td>English 1, 2, 3</td>
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**SOPHOMORE**

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<td>Physics 17, 18, 19</td>
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<td>Electives (Optional)</td>
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**JUNIOR**

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<tr>
<td>Zoology 118 or 119</td>
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<tr>
<td><strong>Total</strong></td>
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</tr>
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</table>

Recommended electives are Psychology, History, Political Science, Sociology, Economics, Scientific Vocabulary, and other English courses.

Students planning to receive a BS degree in a combined curriculum (three years here and one year in a dental school) must complete a minimum of 141 credits of pre-professional work, including the USU graduation requirements.

Pre-Medicine

The college of Science offers the courses to provide a pre-medical training that satisfies entrance requirements of medical schools in the United States and Canada.

Suggested pre-medical schedule:

**FRESHMAN**

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**SOPHOMORE**

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<td>Physics 17, 18, 19</td>
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**JUNIOR**

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<td>Zoology 112</td>
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<td>Zoology 118</td>
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<tr>
<td>Chem 115</td>
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<td></td>
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<tr>
<td>Electives</td>
<td>13</td>
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</tr>
<tr>
<td><strong>Total</strong></td>
<td>17</td>
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</table>

Electives should be chosen from the Humanities, Arts and Social Sciences. Some medical schools require or recommend Comparative Anatomy.

Students interested in graduation from USU before attending medical school may major in any subject.

If interested in a pre-osteopathic program students should consult the pre-medical adviser.

If planning to receive a BS degree in a combined curriculum (three years here and one year in a medical school) students must fulfill requirements of USU and must complete a minimum of 141 credits of pre-professional work.

Nursing

If students have Registered Nurse credentials they may pursue studies toward a Bachelor of

1Military Science or Aerospace Studies would be two credits each quarter.

2Students with unusually good records are sometimes accepted after two years of pre-dental work. In this case the required courses included in the three-year program listed above must be completed in two years.

3Foreign Language strongly recommended.
Science degree in Nursing. Credits earned toward the RN are applied toward the BS, as evaluated by the Registrar. A student may be graduated with a major in Nursing or may complete studies for a degree in a field such as Public Health or Bacteriology.
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Graduate Studies

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School of Graduate Studies

J. Stewart Williams, Dean
Office in Library 239 (South Entrance)

Graduate study is supervised by the Dean of the School of Graduate Studies, assisted by the Graduate Council. This Council consists of one representative from each of the eight resident colleges of the University. The librarian is an ex-officio member. Members of the Council are nominated by the Faculty Senate and appointed by the President to serve four-year terms, two to be appointed each year.

The present Graduate Council is listed below with the year in which each member's term of office expires: College of Agriculture, R. L. Smith, 1969; College of Business and Social Sciences, Therel R. Black, 1967; College of Education, Terrance E. Hatch, 1968; College of Engineering, Bruce O. Watkins, 1968; College of Natural Resources, John N. Neuhold; College of Family Life, Norma H. Compton, 1967; College of Humanities and Arts, Hubert W. Smith, 1966; College of Science, W. S. Boyle, 1966.

There are 12 graduate degrees offered at Utah State University: Civil Engineer, Irrigation Engineer, Master of Education, Master of Forestry, Master of Music, Master of Science, Master of Business Administration, Master of Industrial Education, Master of Arts, Master of Fine Arts, Doctor of Education and Doctor of Philosophy.

A graduate with a Bachelor's degree from USU or from any other accredited college or university may be admitted to the School of Graduate Studies. A "B" average is necessary for admission to a degree program. Seniors at USU who have an average of "B" or better in their courses in the Junior and Senior years, and who at the beginning of any quarter lack not more than five credits to complete all requirements for the Bachelor's degree, may be allowed to register in the School of Graduate Studies.

An application for admission, accompanied by transcripts of all previously earned credits, and by letters of recommendation, should be presented as far in advance of the day of registration as possible. Students must be approved by the department in which they propose to work.

If the student cannot qualify for the degree program in a particular field, he may be admitted to the School of Graduate Studies as a non-candidate student. Admission to this school does not imply admission to candidacy for a higher degree.

General Policies on Graduate Work

Qualifying Examinations. A qualifying examination is required by the School of Graduate Studies and may be taken prior to registration. If not taken then, this examination and any qualifying examination required by the major department must be taken as soon as possible after registration. The results of these examinations become a part of the student's file
in the Graduate Office. If found to be deficient in the work basic to the field in which he proposes to study, he may be required to take undergraduate courses—which do not count in the minimum requirements for the advanced degree—to satisfy the deficiency.

**Supervisory Committee.** When it has been determined that a student is acceptable as a possible candidate for a higher degree, the major professor will suggest a committee to assist in guiding his program and in conducting necessary additional qualifying examinations and the final examination. When the program has been determined and approved by the committee, he will be advanced to candidacy for a degree. Advancement to candidacy must be accomplished before the end of the Winter Quarter if one plans to graduate at the following commencement. When research is best supervised by a federal collaborator, or other person who is not a member of the regular teaching staff, such collaborator or other person may be designated as thesis director. This thesis director is a member of the student's committee.

**Thesis or Dissertation.** A candidate for an advanced degree usually must present a thesis or dissertation on a topic within the field of his major subject, which must represent from nine to fifteen hours of the credit presented for the Master's degree, and as much as forty-five hours of credit for the Doctor's degree. The thesis must be a contribution to the field of knowledge, based upon the student's own research or a treatment and presentation of known subject matter from a new point of view. After final approval by the department, the thesis must be typewritten in standard form; and a copy must be submitted to each member of the advisory and examining committee at least two weeks before the date of final examination. After approval by the committee and the department, and after successfully passing the final examination, three copies of the final draft of the thesis must be deposited in the Graduate Office. One of these copies will be deposited in the library, another sent to the department, and the third returned to the student.

**Microfilming of Thesis.** A Doctoral candidate pays a fee of $20 to have his dissertation microfilmed. This film is produced by and registered with University Microfilms, Ann Arbor, Michigan, who also publish an abstract.

**Thesis Alternate.** The supervisory committee may permit the substitution of one or two advanced reports, valued at three to ten credits, for the regular Master's thesis. These are known as "Plan B" reports. The Master's program is otherwise the same under "Plan B." In certain specialized programs, no thesis or "Plan B" papers are required.

If a student is working under "Plan B" in General Agriculture, the Dean of the College of Agriculture will select a major professor to be the chairman of the student's supervisory committee. This program must include a minimum of six credits each in the fields of Plant Science, Animal Science, and Agricultural Economics.

**Credit Load.** Maximum load for full-time graduate students is sixteen credits. Maximum for assistants engaged in teaching or research is twelve credits, except that students assisting in research which results in their thesis or dissertation may register for the full load, if such registration includes at least four credits of research or thesis.

**Graduate credit.** If properly registered in the School of Graduate Studies, a student may take any
course in the 100 series as graduate credit. If in education and interested in recertification, a student should be sure he is registered in the School of Graduate Studies. Minimum requirement for such registration is the possession of a Bachelor's degree from an accredited institution.

**Degrees of**

**Master of Arts, Science**

The Master of Arts and the Master of Science degrees are offered in most of the basic biological, physical, and social sciences and in various educational, industrial, and professional divisions of the University. Specific departments in which the Master's degree is given, together with the courses provided by the departments, may be determined by consulting the departmental statements in this catalog.

**Requirements.** The program for the Master's degree must include:

1. At least 27 residence credits exclusive of thesis; 9 credits taken at off-campus residence centers may count toward this requirement with the approval of the dean concerned.
2. At least 45 credits in courses numbered 100 or above which are approved for graduate credit;
3. At least ten credits, exclusive of thesis, in courses numbered 200 or above;
4. A thesis with nine to fifteen credits, or thesis alternate;
5. For the Master of Arts degree, two years of a foreign language, or equivalent proficiency in such a language as proved by testing.

**Final Examination.** A candidate for the Master's degree is required to pass a comprehensive final examination on the subjects of graduate study and on his thesis, if one is part of his program. This examination may be oral or written or both as the committee decides, and is open to all faculty members and officials of the School of Graduate Studies.

Arrangements for the time and place of the examination are made by the dean of the School of Graduate Studies. A member of the advisory and examining committee, other than the major professor, or other representative of the Graduate Council, is appointed to act as chairman of the examination and submits to the Graduate Council the results of the examination. If a student is to receive his degree at the June Commencement, the date of the final examination should be not later than May 1.

**Time Limit.** Work for a Master's degree must be completed within six years from the date of matriculation as a regular student in the School of Graduate Studies if the work is done wholly or in part during the regular academic year. If the work is done entirely in summer sessions, a maximum of seven years is allowed. Older work may be revalidated by examination.

**Extension Course Credit.** The amount of extension class or other off-campus credit to be allowed will be determined in consideration of the entire course program. The total of all off-campus credit may not exceed eighteen hours, exclusive of thesis. All extension courses for which graduate credit is sought must be regularly registered for through the School of Graduate Studies, and must have the sanction of the head of the department in which graduate work is being done. Credit toward a Master's degree is not granted for home study (correspondence) courses.

**Transfer Credit.** A maximum of nine quarter credits of graduate work satisfactorily completed at another approved Graduate School
may be allowed toward a Master's degree. The extent to which such credit may reduce either the course or the residence requirements will be determined by the committee.

Degree of

Master of Education

Degree Areas. A course of study leading to the Master of Education degree is offered in the following areas: Elementary School Teaching, Elementary School Administration, Elementary School Supervision, Secondary School Teaching, Secondary School Administration, Secondary School Supervision, and Special Education.

The course of study leading to the Master of Education degree in each of the above areas has for its purpose the preparation of thoroughly prepared teachers, supervisors, and administrators. It provides a broad foundation in the field of education and in the particular area of specialization, and differs from the Master of Science degree by providing more flexible requirements to meet specific needs. This degree emphasizes a proficiency in the interpretation and application of research.

The requirements for the Master of Education degree include: (1) At least 48 credits beyond the Bachelor's degree, subject to the same limitations of off-campus course credit, transfer credit and time limit as the Master of Science degree; (2) General culture courses in the Humanities, Sciences, and Social Sciences; (3) Specified courses in each of seven areas of the field of education; (4) Possession of a teaching, administrative, supervisory or other appropriate state school certificate; (5) Evidence of potential success as a teacher or successful teaching experience.
preparation for those engaged in teaching, supervising, or administering industrial education programs. This program is sufficiently flexible to meet the needs of individuals engaged in the various phases of the work. It is planned to provide the cultural and professional development considered essential to educational leadership in this field. The requirements are essentially the same as for the Master of Science degree except that additional professional course work is taken in lieu of the traditional Master's Thesis requirement. The candidate must complete a scholarly piece of work designated as a Master's Paper. This report should demonstrate the student's competence in professional writing. The degree is awarded only when the candidate's overall record, including course work, the Master's examinations and the Master's Paper, represent creditable accomplishment. Candidates for this degree should have had successful industrial, supervisory, administrative, or teaching experience.

Degrees of

Civil Engineer and Irrigation Engineer

The College of Engineering offers a two-year graduate program in Civil Engineering and in Irrigation Engineering, leading to the degrees of Civil Engineer and Irrigation Engineer. The plan of study for these degrees is similar in many respects to plans at other western institutions for degrees of Civil Engineer, Mechanical Engineer, etc.

Requirements. The program for these degrees includes: (1) A minimum of six quarters of study, of which at least three quarters must be in residence at Utah State University; (2) Completion of 90 credits of approved courses; (3) Completion of a minimum of 30 credits of graduate courses (200 series), exclusive of thesis; (4) Completion of an adequate thesis based on a research program for which a maximum of 30 credits may be allowed by the committee.

For candidates who present the Master of Science degree in an appropriate field of engineering, and who have completed a thesis project for this degree, the requirements will be modified as follows: (1) A minimum of three quarters in residence; (2) Completion of a suitable program of study of not less than 45 credits, of which at least 30 credits must be graduate courses (200 series), and may include a maximum of 20 credits for thesis.

The suggested curriculum for these degrees is detailed in the section on College of Engineering.

Degree of

Master of Fine Arts

This is a specialized professional degree. In 1959 the College Art Association of America approved the MFA, rather than the PhD, as the terminal degree in the Studio Arts. Whereas an exceptional student devoting full time might qualify after four quarters, it is generally considered to require an average of two years to produce enough art works of sufficient quality to be recommended for this degree. The accumulation of credit hours, and the number of quarters in residence are not major factors in granting the MFA degree. The emphasis is clearly on the productive demonstration of high artistic and technical achievement by students with considerable creative abilities. Only students whose
previous art works indicate a promising potential in art will be accepted for admission to the MFA program.

Because this degree is highly individualized, the student should consult the department or his graduate committee for more detailed information on requirements.

**Specialist in**

**Educational Administration (Six-Year Program)**

A new six-year program in the College of Education terminates in the Specialist in Educational Administration and Specialist in Education. Requirements include: (1) a Master's degree or equivalent; (2) a total of 45 quarter hours—27 on the Logan campus, of which 15 hours must be taken in one quarter; (3) at least 12 quarter hours of credit in Secondary Education for candidates with previous preparation in Elementary Education and a minimum of 12 quarter hours credit in Elementary Education for those previously prepared in Secondary Education; (4) written comprehensive examination covering the work taken; and (5) qualifications for Utah State Department of Public Instruction General Administration Certificate.

**Degree of**

**Doctor of Education**

The degree of Doctor of Education is designed especially to prepare for leadership and expert service in the field of Education. Requirements for this degree include the development of competence in an area of specialization in Education plus a thorough development of skills and knowledge of the broad field of Education and in a field supplementary to professional education.

The minimum requirements for the Doctor of Education degree are: (1) a Master's degree or equivalent. (2) A program of at least 90 credits of approved graduate study beyond the Master's degree. (3) An acceptable dissertation for which a maximum of 18 credits may be given. (4) Four quarters of residence at Utah State University, three of which must be in consecutive sequence (minimum 12 hours per quarter).

Detailed requirements for the above degrees may be obtained at the office of either the Dean of the School of Graduate Studies or the Dean of the College of Education or the head of the department in which the degree is to be taken.

**Degree of**

**Doctor of Philosophy**

The degree of Doctor of Philosophy (PhD) is awarded by Utah State University in recognition of high attainment and productive scholarship in a specific field of learning.

**Majors Offered.** The Doctor of Philosophy degree is offered in: Agricultural and Irrigation Engineering, Animal Science, Nutrition and Biochemistry, Botany Chemistry, Civil Engineering, Clothing and Textiles, Electrical Engineering, Food Science and Technology, Forest Science, Mechanical Engineering, Physics, Plant Nutrition and Biochemistry, Plant Science, Psychology, Range Science, Sociology, Soils and Meteorology, Toxicology, Wildlife Resources, Zoology.

Admission to School of Graduate Studies to work toward the degree of Doctor of Philosophy is obtained
in the same manner as for the Master's degree. Qualifying examinations are similarly required, and the program is likewise directed by a supervisory committee.

Requirements. The program for the Doctor of Philosophy degree must include: (1) Three years of full-time graduate study above the Bachelor's degree. If the student has a Master's degree, then two years will be required. The student's supervisory committee may recommend that part of this program be taken at other schools, but the last year must be spent in residence at Utah State University; (2) A minimum of 135 credits of approved graduate study beyond the Bachelor's degree; (3) A major field to which approximately two-thirds of the time is devoted and a minor. The minor may be divided between two suitably related areas. A Master's degree in a suitably related area may satisfy the minor requirement; (4) A research problem on which a dissertation will be presented. Credits for this dissertation will generally not exceed 45, and work on the dissertation should ordinarily occupy most of the third year, but may be carried on with course work throughout the program.

Language Requirement. A reading knowledge of at least one modern language other than English is required in the PhD program. Normally one of the languages of global scientific or scholarly communication—French, German, Russian, Spanish—will be selected according to the candidate's particular need. The requirement of a second modern foreign language is optional with the department in which the major is taken.

Testing and certification of language proficiency will be performed by the faculty of the Department of Languages on the basis of courses completed and/or performance in language proficiency exams offered to eligible applicants semi-annually (in November and April). The required language proficiency should be demonstrated before the beginning of the third year of graduate work.

Comprehensive Examination and Candidacy. Written and oral examinations are conducted by the supervisory committee and the department concerned, usually in the last quarter of the second year of work, to determine fitness for admission to candidacy for the degree of Doctor of Philosophy.

Dissertation. A completed dissertation approved by the department must be presented to the supervisory committee not later than April 15 of the year in which the student would graduate. The dissertation must show ability to do critical and independent research. It must present a contribution to knowledge in scholarly fashion.

Final Examination. The final examination in defense of dissertation will be conducted by the supervisory committee not later than May 1 if the student is to graduate at the following commencement.

Teaching and Research Assistantships

A number of teaching and research assistantships in various departments of the University are available each year to graduate students. Teaching assistantships carry a stipend of $1,100 to $2,200 for one-third to one-half teaching service on a nine-month basis. Remuneration for research assistantships may vary from $1,100 to $3,300 depending upon the time of service involved. Generally assistantships are arranged so that the
student may complete the Master's degree in two years.


Fellowships

*University Research Fellowships* carry a stipend of $2,000 and the remission of non-resident tuition. The student is required to participate successfully in a research project leading to a Master's thesis or Doctor's dissertation. These are tenable in any field in which USU grants an advanced degree. Application must be made by February 1, and awards are made April 1.

*Traineeships.* The University has traineeship programs supported by National Institutes of Health, National Science Foundation, and the National Aeronautics and Space Administration. The basic stipend is $600 per quarter, with tuition and fees paid, and with additional for dependents and progression. Most of the major departments participate in these programs.

*NDEA Fellowships.* These fellowships are available at Utah State in Botany, Chemistry, Civil Engineering, Education, Electrical Engineering, Range Science, Wildlife Resources and Zoology. They are for students who wish to become college and university teachers, and who will undertake a doctoral program. Basic stipend is $600 per quarter with additional for dependents and progression and with tuition and fees paid.

*Other Fellowships.* The University also participates in the Graduate Fellowship Program of the National Science Foundation, and in the Fellowship Program of the National Institutes of Health.

*Tuition Scholarships*

A number of tuition scholarships are available to beginning graduate students who are residents of Utah. Also, there are a limited number of waivers of out-of-state tuition in recognition of excellent scholarship. Applications should be made to the dean, School of Graduate Studies. (Also, see catalog section on Scholarships.)

*Interdepartmental Curriculum in Economics*

This interdepartmental curriculum is primarily provided by combining the resources of the Departments of Economics and Agricultural Economics. The Colleges of Engineering and Natural
Resources provide additional support. The research program on which the curriculum is based is supported by the Agricultural Experiment Station, the Economics Research Institute, and the Utah Water Research Laboratory. Strong support is obtained from the Computer Center.

Admission to the program, selection of supervisory committees and degree requirements are controlled by the interdepartmental faculty.

Doctor of Philosophy Degree Requirements

Students must complete a minimum of 135 approved graduate credits above the Bachelor's Degree, or 90 credits in addition to the Master's Degree. At least 30 hours exclusive of the thesis must be in the 200 series. Additional work may be required of those lacking necessary background courses.

Major. Each student will select and earn approximately 60 hours of credit, not including thesis, on a major subject. Candidates may select an area of emphasis from among the following: economic history and development, quantitative economic analysis, public finance, resource economics, agricultural production economics, and agricultural marketing. Course work that is to be credited to the major must be in fields of study closely related to the major, but may be taken in several departments. The major professor shall propose an outline of courses that are to count for the major. Final approval must then be obtained from the supervisory committee and the Dean of the Graduate School. As a part of all majors, however, the following courses or their equivalent are required: History of Economic Thought (Econ 106, 206), Microeconomic Theory (Econ 107, 207), Macroeconomic Theory (Econ 108, 208), Research Philosophy and Methods (Ag Econ 240, 241), and Applied Statistics (Ap St 131, 132).

Minor. Each student will select a minor area of study. The minor may be chosen from among the areas of emphasis listed above (but not in the same department as the major area of study), or from any other area of work which can be related to the major. The supervisory committee may approve a minor composed of two or more suitably related areas. Approximately 30 quarter hours of credit shall be required for the minor. A Master's Degree in a suitably related field may qualify as a minor.

Thesis. All candidates will complete a suitable thesis. Credit for the thesis may not exceed 45 of the 135 required credit hours. This will include any thesis credit which may have been earned in a program leading to the Master's degree. Normally, the work to complete the thesis should represent at least three full quarters of work.

For course offerings and requirements see Agricultural Economics and Economics under College of Agriculture and College of Business, respectively.

The faculty of the curriculum chooses its chairman each year. Dr. George T. Blanch is chairman for 1966-67.
A graduate program in Food Science and Technology leading to Master of Science or Doctor of Philosophy degree is available to outstanding students. Facilities of the several departments conducting research in Food Science and Technology have been made available in this curriculum to afford students maximum opportunity to gain experience and training. Included in the facilities are an Animal Metabolism Building and equipment for conducting digestion and metabolism studies on large and small animals; several research laboratories are equipped with instruments such as the electron microscope, spectrograph, ultracentrifuge, electrophoresis, gas chromatography, refrigeration, processing pilot plants, respiratory meters, and standard laboratory equipment.

Prerequisites for a major toward an advanced degree should include chemistry (qualitative, quantitative, organic, and elementary biochemistry), mathematics (college algebra, geometry, and a year of calculus for PhD candidate), in addition, appropriate courses in botany, plant pathology, zoology, physiology, bacteriology, public health, English composition, agriculture and foods.

**Master of Science Degree Requirements**

<table>
<thead>
<tr>
<th>Courses</th>
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<tr>
<td>Science and Technology courses (related to research and specialization)</td>
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<tr>
<td>Advanced Biochemistry and/or Organic Chemistry (225, 226, 227, 234, or 220, 281, 282, 284, 285, 291, 293, 295)</td>
<td>6</td>
</tr>
<tr>
<td>Applied Statistics 131, 132, 215</td>
<td>12</td>
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<tr>
<td>Physical Chemistry 101</td>
<td>3</td>
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<tr>
<td>Quantitative Chemistry 115</td>
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<tr>
<td>Food Microbiology 120, 121</td>
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<tr>
<td>Research and Thesis (maximum)</td>
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**Doctor of Philosophy Degree Requirements**

(Beyond MS degree requirements)

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<td>Science and Technology (related to research and specialization)</td>
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</tr>
<tr>
<td>Advanced Biochemistry and/or Organic Chemistry (225, 226, 227, 234 or 281, 282, 284, 285, 287, 295, 298)</td>
<td>12</td>
</tr>
<tr>
<td>Applied Statistics 131, 132, 215 or 220, 233</td>
<td>12</td>
</tr>
<tr>
<td>Physical Chemistry 101 or 104</td>
<td>3 to 9</td>
</tr>
<tr>
<td>Biophysics (140, 141) and/or Radiobiology 143</td>
<td>3 to 9</td>
</tr>
<tr>
<td>Intermediate Quantitative Chemistry 152</td>
<td>7</td>
</tr>
<tr>
<td>and Instrumental Analysis 153</td>
<td></td>
</tr>
<tr>
<td>Food Microbiology 120, 121 or others</td>
<td>4</td>
</tr>
<tr>
<td>Research and Thesis (maximum)</td>
<td>45</td>
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</tbody>
</table>

Chairmanship for the curriculum rotates biennially; D. K. Salunkhe is chairman for 1966-67.
Facilities of the several departments conducting nutrition and biochemical research have been made available in this curriculum to afford students maximum opportunity to gain experience and training. Included in the facilities are an Animal Metabolism Building and equipment for conducting digestion and metabolism studies on large and small animals and several laboratories equipped with such equipment as an electron microscope, spectrograph, ultracentrifuge, electrophoresis apparatus, gas chromatographic equipment, as well as standard laboratory equipment.

Major problems currently being studied are effects of toxic and non-toxic substances on digestion and metabolism of farm animals, atmospheric pollution, cholesterol metabolism, amino acid metabolism, and other basic physiological processes related to nutrition.

Training in the curriculum is designed as preparation for research in educational institutions, governmental and industrial laboratories, and for college teaching.

Prerequisites for a major in the curriculum should include at least one year or equivalent training in English composition, chemistry (including qualitative analysis, analytical, organic, and biochemistry), mathematics through trigonometry, physics, bacteriology, botany, physiology, and zoology. Any deficient prerequisite work must be completed without graduate credit.

**Master's Degree Requirements**

<table>
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<th>Course</th>
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<tr>
<td>Advanced Nutrition</td>
<td>10</td>
</tr>
<tr>
<td>Advanced Biochemistry</td>
<td>10</td>
</tr>
<tr>
<td>Statistics</td>
<td>8</td>
</tr>
<tr>
<td>Electives and Research</td>
<td>17-21</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>45-49</strong></td>
</tr>
</tbody>
</table>

**Doctorate Degree Requirements**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced Nutrition</td>
<td>12</td>
</tr>
<tr>
<td>Advanced Biochemistry</td>
<td>15</td>
</tr>
<tr>
<td>Statistics</td>
<td>12</td>
</tr>
<tr>
<td>Physical Chemistry</td>
<td>9</td>
</tr>
<tr>
<td>Physiology, Zoology, Pathology</td>
<td>20</td>
</tr>
<tr>
<td>Electives and Research</td>
<td>67</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>135</strong></td>
</tr>
</tbody>
</table>

A student shall spend at least two-thirds of his time for the doctorate degree, including thesis, on the major subject. The minor must be in an area of work which can be logically related to that of the department in which the student is doing his major work.

Appropriate minors are Mathematics, Statistics, Chemistry, Physics, Physiology, Genetics and other fields closely related to the major.

For more specific details concerning admissions, requirements, and available scholarships and fellowships write the curriculum chairman.

Chairmanship for the curriculum rotates each two years; chairman for 1966-67 is George E. Stoddard.
Interdepartmental Curriculum in

Plant Nutrition and Biochemistry

Facilities of the various departments conducting research in Plant Nutrition and Biochemistry have been made available for this program. This includes plant growth chambers, laboratories equipped with equipment such as an electron microscope, ultracentrifuge, refrigerated centrifuges, spectrophotometers for ultra violet, infrared visible, fluorescence and recording studies, chromatography equipment, Warburg apparatus, scaling and counting meters, electrophoresis apparatus and general laboratory equipment.

Prerequisites for a major in this curriculum include Botany (general and plant physiology), Chemistry (qualitative, quantitative, and organic), Mathematics (including one year of geometry and calculus) and Physics. Any deficiency must be completed before an individual is accepted as a candidate for a graduate degree.

Master's Degree Requirements

<table>
<thead>
<tr>
<th>Credits</th>
<th>Botany</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-4</td>
<td>1 course (116, 117, 118, 125, 130, 150)</td>
</tr>
<tr>
<td>3-5</td>
<td>1 course (121, 224, 225, 226, 227, 228)</td>
</tr>
</tbody>
</table>

Chemistry

2 courses (190, 191, 192, 287, 296) 6
1 course (101) 3
Seminar 2

Zoology

Biochemical Genetics 212
Genetics 112 or Cell Physiology 130 5
Research 9-15

Doctorate Degree Requirements

(in addition to those listed for MS program)

<table>
<thead>
<tr>
<th>Credits</th>
<th>Botany</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-7</td>
<td>2 courses (224, 225, 226, 227, 228)</td>
</tr>
</tbody>
</table>

Chemistry

Physical Chemistry 104, 105, 106 9
1 course (190, 191, 192, 287, 296) 3

Zoology

Biochemical Genetics 212
Genetics 112 or Cell Physiology 130 8
Seminar 8
Research Maximum 45

Chairmanship for the curriculum rotates; David R. Walker is chairman for 1966-67.

3 Students not allowed to count both Chemistry 180 and 190 for credit.

Students planning to take physical chemistry during PhD program may substitute another approved chemistry course.

Interdepartmental Curriculum in

Toxicology

The toxicology curriculum allows for the study of the deleterious effects of chemicals (plant, animal, insect, or man-made toxins) at the system, organ, tissue, or cell levels. It encompasses both biological and physical disciplines. This inter-departmental approach provides unique opportunity for advanced training in the broad field of toxicology with an emphasis in a chosen discipline.

Graduates in toxicology are prepared as research scientists in edu-
Interdepartmental Curriculum in Toxicology 315

cational institutions, governmental and industrial laboratories, and for university teaching.

Extensive investigations of the effect of fluorine compounds on plants and animals, of the effect and mechanism of action of pesticides on animals and of teratologic effects of poisonous plants have been made at this institution in recent years. Recent investigations have been on animal venoms, noxious air and water pollutants, carcinogens, allergens and toxins of plant and bacterial origin. These toxicoses are studied in wild animals, game birds and fishes as well as in farm and laboratory animals.

Facilities for handling and housing all types of animals are available, either aquatic or terrestrial; wild or domestic. Modern laboratories are equipped to perform technical procedures in chemical and physical analyses, physiologic interpretations, ultracentrifugation, fluorescent tracing, radioactive isotopes, photography, tissue culture, histopathology and food technology.

Applicants for training in the curriculum may be students with MD and DVM degrees or with BS or MS degrees in Nutrition, Animal Science, Food Technology, Biological Sciences or Physical Sciences.

Courses which will be required of candidates will depend upon their previous training and area of interest. Students trained primarily in biological sciences may need to strengthen their knowledge of basic physical sciences and vice versa. Students without medical degrees may need to strengthen their knowledge of pathology, physiopathology, and pharmacology.

The toxicology curriculum is at present partially supported by an NIH Training Grant.

Chairmanship of the curriculum rotates on a three-year basis. Current chairman is Merthyr L. Miner.
Summer Quarter

Ellvert H. Himes, Director
Office in Main 130

Dates: June 12 - August 18, 1967
First Session — June 12-July 14
Second Session — July 17-August 18

The Summer Quarter at Utah State University is more than just the fourth quarter of the University's program of academic and cultural offerings. It is unique in that special programs are devised for early entrance to the University, continuing undergraduate education, and significant professional advancement in certain fields of endeavor.

The Summer Quarter is divided into two sessions of five weeks each as well as providing for numerous short workshops, seminars, clinics, and institutes. Conferences are also held for which credit is offered. High School graduates are encouraged to begin their college career in the Summer Quarter. Those high school students of superior ability may find it most opportune to inaugurate their college program after completing their Junior year. The credit earned can be placed in safe keeping, as it were, awaiting high school graduation. A full quarter's work enables continuing students to complete professional preparation early and thus get into the world of work a year ahead of time. The graduate student may complete requirements for a Master's degree in three summers at less expense; the doctoral candidate will find rich selection to supplement a high-level program.

Numerous challenges and cultural advantages are offered during the Summer Quarter. Recitals, concerts, dramas, and special lectures encourage individuals of all ages in creative work and development of individual talents.

The highly qualified resident faculty of Utah State University, is augmented in the summer by distinguished visiting professors of national and international reputation.

A distinguishing feature of the Summer Quarter, is the carefully planned and carried out program of recreational enrichment. The Director of Recreation supplies all students opportunities in their various interest fields for out-of-class activities on a regular, yet informally scheduled basis. University-wide programs are planned that provide activities both on the campus and in the coolness and convenience of the nearby canyons. Contests and tournaments are conducted both on the campus and in the Utah State Union. The new Student Union, supplies numerous outlets for recreation and relaxation.

The location of Utah State University, with its climate and scenic canyons, nearby national parks and monuments, provides special inducements for comfortable and enjoyable study for collegiate education at all levels.
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Student Services and Activities

Dean of Students Claude J. Burtenshaw
Dean of Women Helen Lundstrom; Assistant Dean of Students, Chairman, Scholarships, Awards, and Honors John R. Williams; Director of the Student Union Evan Stevenson; Coordinator of Student Housing William S. Skidmore; Acting Coordinator, Counseling and Testing Glendon W. Casto; Chairman, Student Health Services S. M. Budge; Student Employment Placement Blair Hale; Foreign Student Adviser Orson Tew; Coordinator of High School Relations and Student Programming Val Christensen; Student Loans Reese Murray; Assistant Coordinator of Student Activities L. Wardell Larson.

Office in Main 102

The program of student services is designed to assist in effective adjustment to University life. It is so organized and coordinated with the academic offerings as to become an integral part of the broad educational program of the institution. Features of the program include:

- High school cooperation; orientation activities;
- Personalized advisement and counseling services;
- Directed organization activity;
- Health services;
- Supervised campus and off-campus living arrangements;
- Financial aids in the form of scholarships, awards, grants-in-aid and loans;
- Employment placement for part-time and graduate needs;
- Special assistance to students from outside the United States;
- Opportunities for meeting religious, moral, and social needs.

The administration and coordination of the entire program of student services is the responsibility of the Dean. Each of the various services is under the direction of specialists and qualified faculty members who have been carefully selected to consider each student in reference to his or her particular needs.

Inquiry from prospective students and those on campus who wish to obtain information and assistance with personal needs or out-of-class activities should be directed to the Office of Student Services.

Religion

The traditional philosophy of separating Church from State does not mean that the University may not have an interest in Religion. A university education, USU officials believe, should permit opportunities for religious participation and exploration.

Catholic, Protestant and LDS Churches offer religious courses for USU students in their near campus educational facilities. Credit earned in non-sectarian University approved courses may be transferred at the request of the student to his University transcript. Credit courses are considered as part of the student's academic quarter load at the University. Academic quarter load limits may be exceeded only with the academic dean's approval.

The churches also provide religious services, personal counseling and social activities. USU officials are interested in the spiritual and moral understanding of students and encourage them to participate in the church of their choice.

Housing

Residents must be regularly enrolled students at Utah State University. (Costs subject to revision.) Students living in dormitories are required to pay a hall activity fee of $2 per quarter in addition to rent.

Supervised Living Accommodations for Single Women

All Freshman women not living at home must live in campus hous-
ing. In rare instances, special permission may be granted by the Dean of Women to live off campus. A request should be written by the parent or guardian at least one month before the opening of school.

**Apartment-Living Residence Halls** will accommodate six to eight women in an apartment. Accommodations consist of combination living-room-kitchen, bath, and three bedrooms. Living-room-kitchen is equipped with electric refrigerator, electric range, table, chairs, and draperies. Housekeeping items are furnished by tenants. Cost of telephone and electricity is shared by the occupants. Rent is $77 to $87 per quarter.

**Lund Hall, a Conventional Board and Room Residence Hall** will accommodate six to eight women in an apartment. Linen changes, bedding, study desks, lamps, and utilities are furnished. Towels and other personal effects are not furnished. Cost of $227 per quarter covers board and room charges. Twenty meals per week are provided in the Student Union Cafeteria. Cost of room without board is $102 per quarter.

**Cooperative Houses on campus** provide for excellent group living experience for 22 upper-class students who share living expenses and housework. Cost for rent including heat and water is $62 per person per quarter. Other utilities are not provided.

**Sorority and Fraternity Houses**

Sorority and Fraternity Houses provide board and room for their members and are managed by their own officers. Each has a University-approved housemother in a supervisory capacity. Rates are determined by the house manager and compare favorably with other living rates on campus.

**High-Rise Dormitories**

The newest residence hall complex on the campus consists of two seven-story high-rise buildings and a Food Service Center. One building will accommodate 392 single women; the other, 392 single men. These are board and room accommodations providing 20 meals per week. Linen changes, bedding, study desks, lamps and utilities are furnished. Towels and other personal effects are not furnished. Each building has 24 single occupancy rooms. The balance of the rooms accommodate two students each. Fine features of this new housing complex include elevators, TV room, study lounges, and typing and music practice rooms.

Rates are $237 per quarter for double occupancy; $257 per quarter for private single room. There are no accommodations without board.

**Supervised Living Accommodations for Single Men**

**Richards Hall, a Conventional Board and Room Residence Hall** will accommodate 360 men. A dwelling unit provides for eight men, two to a bedroom. Twenty meals per week are provided in the Food Service Center. Linen changes, bedding, study desks, lamps, and utilities are furnished. Towels and other personal effects are not furnished. A cost of $227 per person per quarter covers board and room charges. Cost of room without board is $102 per quarter.

**Bullen Hall, an apartment type residence hall** accommodates 144 men. An apartment consists of a living-room-kitchen combination, a bathroom, and three large bedrooms. The living-room-kitchen combination is equipped with an electric refrigerator, built-in electric range, table, chairs and draperies. Housekeeping items are fur-
nished by the tenants. Cost of electricity and telephone expenses are shared by the six men in the apartment. Cost for one quarter is $77 per person.

Housekeeping apartments for 1, 2, 3, 4 single men students are available in the University Apartments (Prefabs).

Quarterly rates are:

Rent for 1 person per apartment each ........ $127.00
Rent for 2 persons per apartment each .......... 72.00
Rent for 3 persons per apartment each .......... 57.00
Rent for 4 persons per apartment each .......... 44.00

For description, see Living Accommodations for Married Students.

Living Accommodations for Married Students

University Apartments, Temporary prefabricated units, located on the east fringe of the campus are within easy walking distance of the campus proper. They are combination living room-kitchen-study arrangements with single bedrooms, bathroom, and clothes closets. These units can be rented furnished, unfurnished, or partly furnished with rent ranging from $40 to $46 per month. Electricity, cooking utensils, bedding, electric refrigerators, washing machines, dishes, window curtains, and other personal effects are not furnished. Apartments are provided with centralized hot air space heat, and electric rangette for cooking. A central laundry room is available to each set of 28 apartments.

New two-bedroom apartments for married students are located at 10th North and 12th East. Monthly rental charge is $65. The tenant pays for electricity and heat in addition. Each apartment includes electric refrigerator and range, and drapery on the living room window. All other furnishings must be provided by the tenant. No television antennas will be permitted on the roof.

University Trailer Court, located on the corner of 12th East and 11th North, provides modern trailer connections to sewer and water mains. Students are encouraged to bring private trailers. These must be modern, sanitary trailers. Parking space is hard surfaced. A utility house provides laundry space, and rest rooms. The University provides coin metered clothes washing machines and dryers. No provision is made for use of private-owned laundry equipment. Monthly space rental per trailer home is $20. Tenants are required to comply with safety regulations.

LDS Student Living Center

The David O. McKay Student Living Center is composed of seven apartment buildings—four for women and three for men. They are designed as family-living units with six students in an apartment, and are located on 10th North and 12th East. Charges are comparable to University housing. The units house 288 women and 216 men. Ample parking. City bus service on the half hour. Address all inquiries and applications to Housing Manager, David O. McKay Student Living Center, 10th North and 12th East, Logan, Utah.
Off-Campus Housing

The Housing Office checks off-campus housing and establishes an approved list for students. Many apartments, rooms, board and room, and batchting quarters are available in the community. In each instance the final arrangements must be made with the landlord. Rates are determined by the accommodations offered. Most board and room situations consist of 12 to 14 meals per week. The noon meal is rarely provided by the landlord. A noon meal can be purchased in the Student Union Cafeteria on campus for about 65c. This arrangement costs an off-campus student about $75 per month. Sleeping rooms range from $15 to $30 per month for a single room, and $45 to $90 per month for apartments.

Students desiring off-campus housing may procure the current housing list upon arrival at the University, Room 103, Main Building.

Application for Housing

Prospective students are invited to direct inquiries and requests for application to Coordinator of Student Housing, Utah State University, Logan, Utah. Upon request, an application form will be furnished. This application should then be completed and returned with the $25 application fee. Housing assignments are made on a receipt of application priority basis.

An accepted housing application qualifies a student for housing accommodations only. Application for University admission should be made to the Office of Admissions and Records, Main 110.

Housing Regulations

Students living in private housing are obligated to retain their accommodations for at least one quarter. Rents are payable in advance. A two-week prior notice of intent to vacate should be made with the householder whenever a student intends to vacate a living accommodation. Students living in University owned residence halls agree by written contract to retain their accommodations for the academic year. Rents are payable in advance. Accounts become delinquent 10 days after scheduled payment. A penalty of $1.00 late fee plus 10c per day thereafter is imposed. The $25 fee is forfeited if (a) notice of withdrawal from University housing is made after August 1, in the case of Fall Quarter; December 1 for Winter Quarter; and March 1 for Spring Quarter, or (b) a student moves from the assigned hall prior to the end of the period covered by the agreement.

Dogs, cats or other similar pets are strictly forbidden within the University Housing area. Very few private home owners permit pets.

Food Service

Food service is obtainable in the University Cafeteria located in the Student Union Building on campus. Monday through Friday schedules and approximate costs are: Breakfast 6:30-8:00 a.m., 50-65c; Lunch 11:00 a.m.-1:00 p.m., 65-85c; Dinner 4:30-6:00 p.m., 75c-$1. Saturdays and Sundays, Breakfast 8-9 a.m., Lunch 12-1:30 p.m., Dinner 4:30-6:00 p.m. Dinner is not served on Sundays. The snack bar operates 8 a.m.-10 p.m., Mondays through Saturdays. Open Sunday evening, 5 to 7 p.m.

Awards, Honors, Scholarships and Grants-in-Aid

The University offers a variety of scholarships and awards. Some of these are actual money grants in
varying amounts, others provide for registration and tuition fees to be waived. The latter kind generally come under the classification of tuition scholarships.

The primary purpose of the tuition scholarships is to assist new students who have high scholarship and financial need in becoming established in college. These scholarships are discussed in greater detail under the section of Scholarships and Grants-in-Aid for new students.

Most of the scholarships which consist of actual money grants are reserved for students who have been attending Utah State University for at least one year and preferably two years or more. These are usually given at the Awards and Honors Convocation which is held early in May of each year. Students who are interested in awards may obtain information from the Office of Student Services, Room 102, Main Building. Closing dates for receiving applications are announced well in advance of such dates.

Scholarships and Grants-in-Aid
(Presented principally to students already enrolled)

All Colleges

The Lieutenant Clyde Parker Baugh Memorial Fund. A gift of Mr. and Mrs. Wilford F. Baugh, it provides four scholarships annually for deserving students of high scholarship and leadership.

Business & Professional Women's Scholarship. A $100 scholarship is awarded annually by the Logan Business & Professional Women's Club to a senior woman student who has maintained high scholarship, demonstrates need, shows qualities of citizenship and leadership, and who would contribute significantly to her chosen profession.

The Johansen Scholarship Fund. A gift of the late Mrs. Johana Johansen, it provides scholarships annually, worth in the aggregate from $125 to $150, for help of worthy students of Junior and Senior rank.

Phi Kappa Phi Scholarship. A $100 cash award given to a Sophomore student of high scholarship and outstanding character.

Rhodes Scholarships. Candidates for Rhodes Scholarships at Oxford University, England, are selected each year from Utah. High scholarship and some definite quality of distinction, whether in intellect, character, or personality, or in any combinations of these, are the most important requirements. Seniors or graduate students are generally chosen as candidates. It is suggested, however, that students would do well to be preparing for the candidacy in earlier years. Information and application blanks may be obtained from the University representative, Rhodes Scholarship Committee.

The 1927 Class Gift to the College. This yields an annual income sufficient to provide four scholarships of $125 each. Application should be made by Juniors and must be accompanied by an approved outline of a proposed study project to be completed during the Senior year. Two copies of the complete thesis are to be filed in the University library.

The Paul M. and Neva Dunn Scholarship in Forestry. See Dean's office for details.

College of Agriculture

4-H Scholarship offered by Alpha Gamma Rho. The national fraternity of Alpha Gamma Rho offers annually, a cash scholarship of $200 to be applied toward a full term course at any suitable accredited college of agriculture. The National 4-H Awards Committee has sole responsibility for selection of the winner from among the candidates nominated by the State 4-H Club Leaders, such selection to be on the basis of scholarship, achievement and demonstrated need. Further information may be secured from Alpha Gamma Rho Fraternity, 706 West Michigan Avenue, Urbana, Illinois.

FFA Scholarship offered by Alpha Gamma Rho. The national agricultural fraternity of Alpha Gamma Rho offers annually a cash scholarship of $200 to be applied toward a full term course at any suitable accredited college of agriculture. The American Vocational Association has sole responsibility for selection of the winner from among candidates nominated by the State Supervisors of Agricultural Education, such selection to be on the basis of scholarship, achievement and demonstrated need. Further information may be secured from Alpha Gamma Rho Fraternity, 706 West Michigan Avenue, Urbana, Illinois.

First Security Foundation. Two scholarships of $500 each, one awarded to a student of Business and Finance and the other to a student in Agriculture, both at the end of their Sophomore or Junior year from either the Sophomore or Junior class.

Jenkin Jones Memorial Scholarship. An award of $500 given to an outstanding upper
326 Student Services and Activities

division student in Agronomy. Available for school expenses the following year.

Ralston Purina Scholarship. A scholarship of $500 given in recognition and assistance to an outstanding Junior in Agriculture for use in his schooling the Senior year.

Sears-Roebuck Foundation Scholarships for Freshmen. Ten scholarships of $300 each are given annually to outstanding high school graduates of Utah who enroll to major in Agriculture at Utah State University. Available for school expenses the Freshman year.

Sears-Roebuck Foundation Scholarship For Sophomore. A scholarship of $500 to a student in Agriculture who, among the recipients of the Sears-Roebuck Awards for Freshmen, had the highest grade point average the Freshman year. Available for school expenses the Sophomore year.

College of Business and Social Sciences

O. Guy Cardon and M. N. Neuberger Scholarship in Social Science. The Bluebird Candy Company at Logan offers a scholarship in the social sciences: Economics, History, Political Science, and Sociology, in honor of the late O. Guy Cardon and of M. N. Neuberger. Applicants majoring in the fields indicated should contact the Dean of Business and Social Sciences.

Harry E. and Vera F. Carleson scholarship in Economics. Two $200 scholarships given to outstanding Junior or Senior students majoring in Economics.

First Security Foundation. Two scholarships of $500 each, one awarded to a student in Business and Finance and the other to a student in Agriculture, both at the end of their Sophomore or Junior year from either the Sophomore or Junior class.

A Cache Valley Cooperative Scholarship. This scholarship of $7,000 bears interest at 6 percent, earning $420 annually. This scholarship is limited to graduate students in the Departments of Sociology, Agricultural Economics and Science. A thesis on some phase of cooperation is involved. For information inquire from the department head involved.

Joseph A. and Grace W. Geddes Scholarship. Limited to graduate students in Sociology. Present value $7,000, comprised of $2,000 contributed by the Utah Cooperative Association and smaller amounts from students and friends. Annual stipend $200. The Sociology staff supervises the funds by adding to its earnings and donations, aiding students to select projects useful to society, and supervising studies.

Louise Y. Robinson National Woman’s Relief Society Scholarship. The General Board of the National Woman’s Relief Society has established a perpetual fund, the annual earnings from which are available for Latter-day Saint women majoring in Social work, or, as graduate students, majoring in Sociology with a special interest in the family or some field closely related to Social Work. The scholarship is in the amount of $100 for undergraduate students and $200 for graduate students. Undergraduate preference is given to Seniors, although Juniors are eligible, and are encouraged to apply. Application should include a transcript of credits, and two letters of recommendation, one of which must be from the Ward Relief Society President of the ward in which the student lives.

College of Engineering

Manufacturing Engineers. Two $100 Scholarships are awarded to Engineering students who show interest, ability, and scholarship in pursuing Tool Engineering curriculum. Donors are Elimeco, and McGhee-Hogan Machine Works, Salt Lake City. Application should be made to the Salt Lake City Chapter 85, or Manufacturing Engineering Department, USU, not later than February 10, each year.

Associated General Contractors Scholarship. A gift of the Intermountain Chapter, AGC, provides a scholarship grant of $300 to a Junior Engineering student. The award is made on the basis of scholarship, promise as an engineer, and need. Selection is made by a committee representing the AGC and the Civil Engineering Department. Applications for the succeeding year must be filed with the Dean on or before April 1.

Industrial Arts Club Scholarship. The Industrial Arts Club of USU awards a scholarship of $50 to an outstanding Sophomore or Junior student majoring in Industrial Arts. The recipient is designated in fall quarter of each year. Applications are made to the Industrial Arts Club and are judged on scholarship, need, school and club activities.

Eric W. Ryberg Scholarship. A grant of $200 from the Utah Sand and Gravel Company is made to a student in Civil Engineering selected by a special committee. Application should be made to the Dean of the College of Engineering by December 1.

Socony Oil Company Scholarship. A $500 scholarship to a Mechanical Engineering student on the basis of scholarship, need, and ability as an engineer.

Western Electronic Manufacturers Association Scholarship Awards. Several WEMA scholarship awards are made each year to Electrical Engineering students based on high scholarship and need. The amounts will be from $150 and up depending on the annual WEMA grant to USU.
College of Family Life

Greaves Memorial Scholarships. Two $100 scholarships in memory of Dr. Joseph E. and Ethelyn O. Greaves for students who have achieved in the field of Family Life.

Moen Memorial Scholarship. Two $125 scholarships in memory of Johanna Moen given to worthy students in the College of Family Life who show outstanding aptitude in the field.

The Phi Upsilon Omicron Scholarship. Two scholarships of $75 are given annually by the Kappa Chapter of that Organization to Sophomore or Junior girls in the College of Family Life who are active members of the chapter.

Sears Roebuck Foundation Scholarships for Freshmen. Two $300 scholarships given annually to outstanding high school graduates of Utah who plan to major in Family Life. Available for school expenses the freshman year.

College of Humanities and Arts

Deseret News Professional Internship in Journalism. The News and Telegram offers the outstanding Junior student in Journalism a scholarship including one year's tuition at the University 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.

Herald Journal Scholarship in Journalism. The Logan Herald Journal annually presents a $50 scholarship at the beginning of the Winter Quarter to help some worthy Journalism student continue at the University.

Esther V. Erickson Wrigley Scholarship. The Robert L. Wrigley family presents two scholarships annually to English majors in memory of Mrs. Wrigley. One $175 scholarship is given to an outstanding student of Sophomore standing and one $225 scholarship is given to an outstanding student of Junior rank.

English Department Scholarship. The English Department awards annually one $150 scholarship to an outstanding student who has completed his Freshman year at USU. He must be an English major.

Scholarships and Grants-in-Aid (Primarily for new students)

The University grants annually scholarships covering from one to three quarters' tuition each on the basis of outstanding academic ability or demonstrated ability in the areas of speech, drama, music, art, athletics, commercial training, and other academic subjects. Tournament and contest winners frequently receive these awards.

High school students who have served in major and responsible positions of leadership in school may receive a leadership award.

To be eligible to apply for an academic award, a high school student must have a full B (3.0) average or better in all academic solid subjects at the end of the first semester of the senior year of school.

To be eligible to apply for an academic award, a high school student must have a C-plus (2.5) average or better in all academic solid subjects at the end of the first semester of the senior year of school.

The University also awards grants-in-aid to help deserving students who have economic need.

To be eligible for a grant-in-aid, a student must meet either of the following requirements:

(1) A Freshman must have been academically rated as in the upper two-thirds of his high school graduating class. For the first year such award shall be made on an annual basis.

(2) A student, other than a Freshman, must be in good academic standing and not on probation. Such award shall be made on a quarterly basis.

All of the above awards are under the jurisdiction of a Scholarship, Awards and Honors Committee, which alone has the authority to promise or grant an award. All applications for grants-in-aid or scholarships should be made to the chairman of this committee.

All scholarships and grants-in-aid must be applied toward the payment of tuition or fees.

Any scholarship or grant-in-aid may be withdrawn at any time for academic or other good and sufficient reasons, if, in the judgment of
the Dean of Student Services, the recipient has clearly demonstrated his failure to comply with both the spirit and the letter of the original terms of the scholarship or grant-in-aid.

Tuition Scholarship. 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 whose domicile is in the state of Utah.

USU Faculty Women's League Annual Scholarship. This provides $125 for one year for a Freshman woman. Selection is based on need, scholarship, and leadership.

Union Pacific Scholarships. The Union Pacific Railroad awards 16 scholarships annually to Juniors or Seniors in high school who are enrolled as 4-H Club members, also 16 to FFA members. These members scholarships are $200 each and are to be used at Utah State University or its branches. The scholarships are available in the following counties: Beaver, Box Elder, Cache, Davis, Iron, Juab, Kane, Millard, Morgan, Rich, Salt Lake, Summit, Tooele, Utah, Washington, and Weber.

Intercollegiate Knight Scholarship. Two $100 scholarships will be given based on a combination of scholastic and leadership ability. The recipients must be single, male, from out of state, and of the Freshman class. They will be asked to attend one of the regular IK meetings and tell the group about their future plans.

Logan Kiwanis Club. A $100 scholarship is awarded each year. The award is made available to one college each year, in alphabetical sequence among the colleges. Each dean, in his turn, selects an outstanding student in his college to receive the award.

Logan Kiwanis Club. One $100 scholarship awarded to an outstanding student who is in need of financial assistance. They also support the Circle K Club.

Logan Lions Scholarship. The Logan Lions club will award two $100 scholarships to be given to students selected by the Logan Lions Scholarship Committee. Nominees for the scholarship will be selected by the Office of the Dean of Students. Emphasis will be given to need. Scholarships will be awarded to a Sophomore or older student for either Winter and/or Spring Quarter.

Logan Rotary Club. Three $100 scholarships awarded to outstanding students who are in need of financial assistance.

National 4-H Club Contests. National scholarships of $300 each are available to 4-H Club members in at least 22 different projects or activities.

Palmer Scholarships. Val W. Palmer scholarship fund gives ten scholarships of $100 each and are awarded each year to students of outstanding scholarship and leadership ability.

Woodey B. Searle Scholarship. A tuition scholarship is awarded each year by Woodey B. Searle to a needy and deserving graduate of the Uintah High School. Applications should be filed before April 15th with the principal of the UHS at Vernal.

Sears-Roebuck Foundation Scholarship. Thirteen scholarships of $300 each are awarded annually by the Sears-Roebuck Foundation to Freshmen in the College of Agriculture. Selection is made from graduating Seniors of the high schools of Utah on the basis of interest in agriculture, scholarship, leadership, and financial need. The winner who has the best scholastic record at the end of his Freshman year receives an additional scholarship for use in his Sophomore year.

Sears-Roebuck Foundation Scholarship in Family Life. Two scholarships of $500 given to an incoming Freshman student in the College of Family Life who has a high scholastic standing, leadership ability, and promise of achievement.

Standard Oil Scholarships. The Standard Oil Co. of California offers five scholarships to 4-H Club members in Utah as follows: $350, 1st; $300, 2nd; $250, 3rd; $250, 4th; and $200, 5th; also five scholarships to FFA members.

Utah Dairy Federation. The Utah Dairy Federation gives an annual scholarship of $100 each to a 4-H boy and a 4-H girl who will enroll in Dairy or Home Economics at USU.

Awards and Honors

William Alger Awards. A gold key is awarded annually by Alpha Epsilon Delta, pre-medical society, to the outstanding Freshman pre-medical or pre-dental student. Scholarship, character and possibilities in medicine or dentistry represent the basis for the award.

Alpha Kappa Psi Scholarship Key Award. Alpha Kappa Psi Fraternity, Alpha Theta Chapter, established at Utah State University, awards annually the Alpha Kappa Psi Scholarship Medalion to the male Senior in Business with the highest scholastic average for four years of study in this University.

Alpha Kappa Psi Scholarship Key Award. Alpha Kappa Psi Fraternity, Alpha Theta Chapter, established at Utah State University, awards annually the Alpha Kappa Psi Medalion to the male Senior student in Business who possesses the highest scholastic average for three years of work taken in this University.

Alpha Lambda Delta Award to Senior Students. Book Award: An award to a Senior...
woman who has been an Alpha Lambda Delta member and who carries the highest grade-point during her 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 or Forestry who made the highest scholastic record in his Freshman year. The name of the winner is engraved upon a permanent trophy.

American Institute of Electrical Engineers. Awarded annually to the member of the student chapter who has contributed most to the IRE organization, and who has demonstrated professional ability. This award consists of a certificate of merit and one year's dues as an associate member of AIEEE.

American Institute of Electrical Engineers Student Award. This award is made each year to the outstanding Senior Electrical Engineering and AIEEE member. The award consists of one year's dues as associate member of AIEEE and a certificate of achievement.

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.

The American Rambouillet Sheep Breeders' Association Challenge Cup. To be presented each year to the student showing the greatest efficiency in fitting and showing Rambouillet sheep.

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 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 basis of scholarship, activities, and personality. Selection is made by the Intermountain Section upon recommendation 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.

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.

Burberry 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.

Cardon Jewelry Company Award. A Longines-Wittnauer watch to the most outstanding Senior Art student for the year.

Chemical Rubber Publishing Company Freshman Chemistry Award. The Chemical Rubber Publishing Company annually awards to an outstanding Freshman in General Chemistry, a copy of its Handbook of Chemistry and Physics.

Chemistry Faculty Award. The staff of the Chemistry Department annually awards a copy of the Handbook of Chemistry and Physics to the outstanding Freshman student completing Chemistry 10 and 11.

Chi Omega Fraternity Award. An award of $25 is given annually to the girl 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 Fraternity each year from the teaching staffs of the Sociology and Economics Departments.

Civil Engineering Faculty Award. Junior membership in the ASCE or ASAE awarded by the Engineering Faculty to a graduating Senior in Engineering on the basis of scholar-
ship, and promise of success in engineering. Selection is made by the Engineering Faculty.

**Virginia Dare Award.** A cash award of $25 to the outstanding Junior in Dairy Manufacturing.

**Danforth Foundation Family Life Fellowships.** The first is awarded jointly by the Danforth Foundation andRalston Purina Company to an outstanding Junior in the College of Family Life. The award provides for two weeks’ study of business problems in St. Louis, followed by two weeks of leadership training at the American Youth Foundation Camp on Lake Michigan. The second is awarded by the Danforth Foundation to an outstanding Freshman in Family Life. The award provides for two weeks’ leadership training at the American Youth Foundation Camp.

**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 expenses of two weeks marketing and research study at St. Louis and at the Purina Research Farm near by and two weeks leadership training at the American Youth Foundation Camp on Lake Michigan.

**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 in chemistry.

**Distinguished Service Awards.** Awards are given annually to outstanding students in Theatre, Music, Library, and Physical Education.

**Faculty Women’s League Democracy Award.** This is awarded to Senior women. Candidates must have evidenced the best understanding of the democratic ideal 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 interest to what seems to be the common good. (University award winner excluded.)

**Faculty Women’s League Scholarship Award.** Awarded to Senior women, based on scholastic records for full undergraduate work. To be eligible for this award, candidates must have spent at least two years at this institution. (Valedictorians excluded.)

**Farm Bureau Agricultural Leadership Award.** An award of $200 to the Senior who has exhibited the greatest measure of growth and excellence in scholarship, constructive organization and leadership in the College of Agriculture throughout his university course. The winner’s name will be engraved on the Caine Leadership Plaque.

**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 his undergraduate study.

**The Hawaiian Steamship Company’s Challenge Cup.** Awarded each year to the student who shows the most proficiency in judging wool.

**Institute of Radio Engineers Award.** This award is made each year to the outstanding senior Electrical Engineer and IRE student member. The award consists of one year’s dues as associate member of IRE and a certificate of achievement.

**The John K. Madsen Challenge Cup.** Awarded each year to the student who shows the greatest proficiency in judging sheep.

**Logan Kiwanis Club Trophies.** Each year, the Dean of each of the eight Colleges selects an outstanding student in his college to receive the Kiwanis Club Trophy.

**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.

**Merk Award.** Merck and Company, manufacturing chemists, award annually a copy of the Merck Index to an outstanding student in organic chemistry and biochemistry.

**The Ogden Union Stockyard Challenge Cup.** Awarded each year to the student who shows the most proficiency in judging beef cattle.

**Phi Upsilon Omicron Award to Freshman Students.** A charm necklace is given to a freshman in the College of Family Life on the basis of scholarship, activities, and personality. The candidate must be a member of Zeta Epsilon.

**Proctor and Gamble Award.** A trophy is given to a graduating senior in the College of Family Life on the basis of scholarship, activities, and personality.

**Rolla M. Rich Memorial Award.** An award of $50 to an outstanding student in Agriculture in the upper division, who is active in the LDS Church.

**The ROTC Medal.** A gift of the institution, it 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 and interest in Military Science, 20 points; (f) Physique and bearing, 10 points.

The Salt Lake Union 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 gold pins, these awards are given to students who present evidence that their grades are all “A’s” for three consecutive quarters of their residence. At least fifteen credits exclusive of basic Physical Education and basic Military Science must be carried. The grades of any quarter can be used but once towards a Scholastic Award.

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.

J. Fish Smith Award. An award of $100 for the promotion of international relations, given to a foreign student in recognition of excellence in scholarship and contribution to international understanding and good will.

Son of Paul 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.

United Business Education Association. An award presented by the Smoot Manufacturing Company to the Senior who has distinguished himself in Business Education.

A University Award. This award is conferred annually upon the male student of the institution who shows evidence of being able, in greatest measure, to repay the nation the investment which it has made in him, on the following basis: (A) The potential vocational or professional efficiency of the student as shown by his scholarly attainments, industry, and natural ability and talent (50 points) and (B) His patriotism, honesty, and good judgment as a student citizen, as an indication of his future attitude as a voter or public servant, combining a progressive spirit with a love of country and a concern for the safety and development of American institutions of liberty and justice and his qualities of social leadership as shown in student affairs, based upon physical and moral cleanliness and strength of character (50 points).

A University Award. This award is also conferred annually upon the woman student of the institution who shows evidence in greatest measure of (a) potential vocational or professional efficiency as shown in scholarship, industry, and natural ability (50 points); and (b) womanly qualities, development of the social graces, not necessarily social prominence, and attitude of mind (50 points).

Utah Association of Certified Public Accountants. An award for the purpose of stimulating interest to the Outstanding Senior student majoring in Accounting.

Utah Feed Manufacturing and Dealers’ Association Award. An award of $100 to an outstanding Senior with a major in some phase of Animal Science, preferably one interested in Animal Nutrition.

Utah Society of Professional Engineers. An annual presentation of certificate of merit to the outstanding Senior Engineering student at USU.

The Utah State University Science Medal. A gift of the late Director Emeritus William Petersen, it is given each year to the student writing the best review of recent scientific research in either mathematics, physics, chemistry, geology, zoology, botany or astronomy.

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.

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, (4) adjustment to meet the daily demands in character, social and general culture.

Grants

The Educational Opportunity Grants Program, authorized by the Higher Education Act of 1965 provides that the University can award an educational opportunity grant to students of exceptional financial need. The University can grant to a student for each academic year, during which he is in need of grant aid to pursue his course of study, an amount not in excess of $800. Freshmen who are selected for the grants must be enrolled as a fulltime student and judged capable of finishing a college degree. A student already attending Utah State must be in good standing and full-time attendance. The student should not, but for a grant, be financially able to pursue a course of study at Utah State University.
Loans

_**Long Term Loans.**_ An extensive loan program to assist students of limited financial means is supervised by the Office of Student Services. Utah State University is affiliated with the National Defense Education loan program. To qualify a student must be enrolled or have been accepted for enrollment as a full-time student working toward a degree and must prove scholastic ability by maintaining a good academic standing. He must be in need of the amount of the loan to pursue the course of study.

Undergraduate students may borrow up to $1,000 a year, to a total of not more than $5,000. Graduate students may borrow $2,500 per year, up to $10,000. The total maximum loan to any one during undergraduate and graduate study is $10,000.

Under the program, repayment of principal and 3 per cent interest begins when the student has ceased his course of study.

A portion of the loan and interest thereon of any borrower who serves as a full-time teacher for the full school year may be canceled.

Application forms for these long-term, low-interest loans may be obtained in Room 102 of the Main Building.

_**Short Term Loans.**_ It is the desire of USU that no student fail to complete school because of some temporary financial limitation. As a phase of the program of financial aid to students, small, short-term loans are made available on a business-like basis in Room 118 of the Main Building. Personal qualifications and need for financial assistance are the principal criteria.

Except in cases of extreme emergency no loans will be made during the last two weeks of any quarter, or a period of time exceeding the academic school year except for graduating Seniors.

The total Student Loan Fund is composed of the following individual loan funds generously contributed by friends of USU: (Donors as now in the catalog)

- **Clyde Foundation Loan Fund.** See Student Services for details.
- **USU Faculty Women's League.** A loan fund for women students. Loans may range from $25 to $250. Preference is given to Senior students.
- **USU Faculty Women's League Revolving Loan Fund.** A loan fund which provides for short time loans, not to exceed $20, to women students for emergency purposes.
- **Senior Loan Fund.** A gift of the class of 1911, and added to by the class of 1922, has helped many students complete school.
- **Rotary Club Senior Loan Fund.** The Logan Rotary Club has provided a special loan fund to assist students in meeting expenses during their Senior year.
- **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.
- **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.
- **Bureau of Land Management Loan Fund.** This provides loans up to $100 to deserving students in the College of Natural Resources. Application should be made to the Dean's Office.
- **Marjorie Paulsen Loan Fund.** A fund provided by the father of a former Aggie student active in student body affairs.
- **Ichel Water Loan Fund.** An individual gift to assist students in need.
- **J. Reuben Clark Small Loan Fund.** A reserve specifically provided for assistance to students in meeting school obligations.
- **O. W. Israelson Loan Fund.** This loan fund is available to Senior Engineering students only. Application is made in the College of Engineering.
- **Harold R. Kepner Loan Fund.** A fund established in memory of Professor Harold R. Kepner by his students and friends. Available through the general loan funds of the University.
Employment Placement, Counseling 333

Eugene Santschi Loan Fund. A fund established in memory of Eugene Santschi. The applications may be made through the NDEA Loan Fund of the University.

John P. Holmgren Loan Fund. A fund established in memory of John P. Holmgren. The applications may be made through the NDEA Loan Fund of the University.

Employment Placement

Employment. The Office of Student Employment Placement assists students who are capable of carrying an academic load and need to supplement regular income through part-time employment. Students' wives are also assisted in obtaining positions on and off campus.

All students and students' wives desiring campus employment must register with this office and be appropriately cleared before being hired. An undergraduate student within the colleges of the University may not earn more than $100 per month in University employment. Students employed on assistantships are not eligible for work on an hourly basis without the approval of the President.

To extend off-campus services, the University has established a cooperative arrangement with the Logan Branch of the Utah State Employment Service. Requests for information on employment should be addressed to Chairman, Student Employment Placement.

Students from foreign countries must obtain a work permit before they may receive employment. Such permits may be acquired from the Foreign Student Adviser, Main 102, or the Immigration and Naturalization office in Salt Lake City, Utah.

Students under eighteen who find employment must obtain a work permit. These are controlled by the Logan City Board of Education.

Placement. The Employment Placement Office assists all seniors and post-graduates to obtain employment. Private employers, as well as governmental agencies, coordinate their recruiting programs through the Employment Placement Office.

The University is a member of the National Placement Association which lists many placement opportunities for the graduating student.

Further information is available in the Office of Student Employment Placement, Room 310 Union Bldg.

Counseling

Because students are faced with many problems throughout their University career, the services of a staff of professional counselors are available to help students learn more about and better understand their own abilities, interests, personalities and emotions. These counselors assist students with their progress in college and with problems related to University life.

The student counseling service, Old Main 101, offers specialized counseling and testing services to students who wish to learn more about themselves or who have personal problems which they would like to discuss with a professional counselor. Many of our University students have talked at some time with a counselor about educational problems, vocations they are considering, problems they have with study skills or personal situations involving dating, engagements, marriage or family relations.

A file of current information about occupations is also available to students. Students may use this information to investigate and appraise occupations in which they have an interest.

A close relationship with community and state agencies is maintained so whenever a counselor feels that a student might profit from these services an appropriate referral is made available.
Health

A Health Service is provided for all registered students on the campus. The Student Health Service is located in the basement of the Union Building. The staff consists of one full-time physician, two registered nurses and a receptionist. All Freshmen and transfer students are required to complete the Medical Examination Record and return it directly to the Office of Admissions and Records before a permit to register will be issued. Whenever possible the Medical Examination Record should be completed by the family physician.

University officials strongly urge students to purchase the Voluntary Student Accident and Sickness Insurance available to them at the time of registration. Included in the services available at the Student Health Service are medical and surgical care for minor illnesses and injuries, inoculations and immunizations and limited laboratory facilities. Services not included are hospital care for non-emergency condition, X-ray examinations or special prescriptions. Students not covered by personal or group insurance should not be without the student insurance.

In case of illness or emergency during office hours, students should notify or go directly to the Student Health Service. After office hours the student should go to his private physician or to the Logan LDS Hospital, where the doctor on call will be available. If the student is unable to go to the hospital, he may call 752-2050 and the doctor on call will be sent to the residence of the caller.

Medical care at the Student Health Service is free. Any further medical care beyond that provided at the Service must be paid for by the student or his insurance plan.

The Student Health Service is open from 8 a.m. to 12 noon and 1 p.m. to 5 p.m. Monday through Friday. Telephone: 752-4100 Ext. 435.

Orientation

A program of activities has been designed to acquaint students with the life and environment of the University community. Participation in these orientation activities is required of all new students at the beginning of each quarter. In addition to group meetings for instruction in traditions, policies and procedures, there are opportunities for pre-registration interviews with faculty and administrative personnel. Entertainment through movies, dances, mixers and game rooms of the Student Union all reflect the many purposes for which this program is established.

At the beginning of each academic quarter each new student in the University who has not completed a full year of freshman English, and who has less than 96 quarter credit hours is required to have the results of the American College Testing Program Examination (ACT) on file with the University Counseling & Testing Service. The results are used by faculty and counselors to assist in placement and as guidance aids.

Foreign Student Advisement

Students from outside the United States are provided counseling and assistance in personal and academic matters as well as those related to immigration procedures, through the office of the Foreign Student Adviser. All students from abroad must register with the Adviser, in Room 102 Main, at the beginning of each quarter, and must keep him informed concerning such matters as local address, change in student
status, acceptance of employment, etc. Requests for extensions of visa, work permits, immigration certifications, and money exchange letters must be submitted through the office of the Foreign Student Adviser. Students are urged to consult frequently with the Adviser, and to keep him apprised of their problems and special needs.

Speech Clinic

The Speech Clinic provides help for persons having speech handicaps. The services of the speech clinic are available to any student. The types of problems handled include stuttering, delayed speech development, lisping and other articulation disorders, cleft palate speech, paralytic speech, "nervous" speech conditions, nasal speech, voice quality deviations, etc. All University students who have defective speech should register for Speech 75, Remedial Speech. Time and credit are arranged. The Instructor is available for individual consultation, Main 79.

Helpful Courses

Several courses are taught especially to help students with such personal affairs as marriage, food, clothing and finance. The description of these courses is found in the departments offering them. They include: Preparation for Marriage and Family Relations, FCD 20; Early Childhood, FCD 67; Family Finance, HEM 155; Home Management, HEM 149; Principles of Nutrition, FN 24; Laboratory for Nutrition and Food Preparation, FN 24a; Basic Clothing Construction, CT 8; Clothing Selection for Men, CT 15; Art in Everyday Living, FL 5.

Student Activities

Intramurals. The intramural program provides individual and team competition in badminton, basketball, golf, handball, horse-shoes, pentathlon, swimming, softball, tennis, touch football, track and field, volleyball, weightlifting, winter carnival, and wrestling.

The purpose of the intramural program is to give each student unlimited opportunity for leadership, development of skills, sportsmanship, and good wholesome use of leisure time.

Musicals. Performances are given by band, orchestra, choral groups, and music clubs. These organizations present several concerts and recitals during the year, and participate in tours to the surrounding area.

Theatricals. Numerous productions are staged each year by student groups. Students participate in the lighting, staging, directing, and managing, as well as the acting.

Debating and Public Speaking. The University is a member of the Rocky Mountain Forensic League, and each year meets schools of this group in discussion. Participation in debate tournaments in the Intermountain and Pacific Coast Region provides opportunity for experience in tournament debating. Utah State is noted for its Mid-Winter Speech Meet.

Student Publications. Students publish a thrice-weekly paper, Student Life, a yearbook, The Buzzer, and a literary magazine, Crucible; Blue Book, the official student handbook which contains the Student Directory, is available to all regularly registered students. Some campus organizations sponsor publications of their own.

Radio-Television. The University owns and operates radio station KUSU-FM and television station KUSU-TV, both of which provide broadcast services available to students and the public, and both of
which provide participation opportunities in broadcasting for qualified students registered in any course of study in the university.

KUSU-FM is managed by a staff member of the Radio-Television Department, but all department heads and operating staff positions are open to qualified students whose academic standing permits participation in extra-curricular activities. KUSU-FM broadcasts ten hours per day during regular school periods.

KUSU-TV operates on Channel 12 with 30,000 watts of power. The station broadcasts a daytime schedule of classroom programs available to the school systems of the area from September to June. The evening schedule continues year round transmitting national educational network programs in the areas of cultural and public affairs, as well as carrying an extensive schedule of programs featuring university and community resources, and exchange programs with other educational broadcasting stations. Television programs are also recorded in the USU studios for broadcast from other stations in Utah. Qualified students assist in all phases of television production.

KUSU-FM and KUSU-TV are under the direction of the Chairman of the University Radio-Television Department. Students interested in participating in these University broadcasting services should apply to that office.

Utah State University Entertainment Bureau. The Utah State University Entertainment Bureau serves to provide challenging opportunities to the entertainment arts and is designed to assist in the development, promotion, encouragement and coordination of student vocal, instrumental, dramatic, dance and specialty talent. Students may apply for membership in one of the bureau's eleven departments, including bureau assemblies, traveling assemblies, competitive assemblies, public affairs assemblies, civic programming, talent development, publicity, production, varsity show, student speakers, and technical arrangements, or students may audition for performance opportunities.

Bureau sponsored and produced programs travel throughout the Intermountain West, appearing before conventions, at church and civic meetings, and at area high schools and colleges. The Bureau is directed by the coordinator of Student Programming. Offices are maintained in the Utah State Union.

The Bureau sponsors a wide variety of performing groups, including a twenty member folk-singing chorus, the Balladiers, numerous duets, trios, and other kinds of singing groups, in addition to individual talent. A master file of all student talent is maintained in the Bureau offices.

Program requests should be directed to the Coordinator of Student Programming, Room 102, Main Building, Utah State University.

Utah State Union Activity Board. The purpose of the Union Activity Board is to provide students with the opportunity to plan and present activities and events which they would enjoy and to help develop their talents, creative abilities and leadership traits.

All students are encouraged to apply for membership on one of the following educational, cultural, recreational, or social committees: concert (sponsors concerts by national and internationally renown artists, together with campus and off-campus chorales, bands, and orchestra groups); dance (plans student body evening and matinee dances); games (arranges campus tournaments, intercollegiate competitions, and professional exhibitions); gallery (schedules and displays exhibi-
tions of paintings, prints, ceramics, sculpturing, and photographs of both local and national artists); hospitality (members serve as receptionists for campus visitors, as host for teas and receptions, conduct guided tours); movies (sponsors campus wide entertainment movies); music (sponsors talent shows, stereo rooms); publicity (conducts all publicity for events in the total Union program); publications (responsible for planning, designing and preparing Union brochures, pamphlets and programs); special events (sponsor all Union programs of a special nature); world culture (provide for displays and programs related to the varied cultural backgrounds of students enrolled at the University).

Student Government

Associated Students. All students of Utah State University, upon payment of student activity fees, become members and are therefore entitled to participate in and attend all activities sponsored by the association. Athletic events, musicals, dramas, dances, lyceums, etc., are events to which members of the ASUSU are admitted by activity card.

The Executive Council consists of five elected major officers of Associated Students: president, social vice president, cultural vice president, financial vice president and secretary. The council plays a major role in directing all student-conducted activities on campus.

The Student Senate is the legislative branch of student government and initiates policies for the welfare of the entire student body. Membership in the Student Senate includes: the Executive Council, the president of each of the four classes, a representative of each of the eight colleges, AWS president, three representatives of independent students, an international representative elected by the foreign students on campus, the president of Panhellenic, president of Interfraternity Council, President of Inter-residence Council and President of CoOrgs.

Associated Women Students. Every woman student properly registered and enrolled in the University is a member of AWS. This organization fosters interest and participation in campus activities. It is governed by its own elected officers and board.


Student Organizations
Departmental and Professional

Agriculture. Ag Clubs Council, Ag Economics Club, Agronomy Club, Alpha Tau Alpha, Alpha Zeta, Dairy Club, Horticulture Club, 4-H Club, Pre-Vet Club, Rodeo Club, Animal Husbandry Club.

Business. Alpha Kappa Psi.

Chemistry. American Chemical Society.

Education. Phi Kappa Delta, Student Education Association, Utah State Education Association.

Engineering. Engineering Council, American Society of Civil Engineers, American Welding Society, Industrial Teachers Education Club, Sigma Tau, Society of Auto-
motive Engineers, Flying Techs, Institute of Electrical and Electronics Engineers, Theta Tau, American Society of Tool and Manufacturing Engineers, American Society of Mechanical Engineers.


Geology. Geology Club.

History. Phi Alpha Theta.

Home Economics. Phi Upsilon Omicron, Zeta Upsilon Club.

Landscape Architecture. Landscape Architecture Club. Student Chapter of the American Society of Landscape Architecture.

Military. Arnold Air Society, Pershing Rifles, Sponsors, Angel Flight, Sabre Squad, USU Rifle Team, ROTC Rifle Team.

Music. Band, Orchestra, Madrigals, University Marching Band, University Concert Band, Varsity Band, Scotsmen Dance Band, University Symphony Orchestra, University Opera and Chamber Orchestra, Music Educators National Conference.

Physical Education. Badminton Club, Dance Club, PEMM (PE majors and minors), Ski Club, Square Dance Club, Swimming Club, Women's Intramural Association, Men's Intramural Association.

Political Science. International Relations Club, Pi Sigma Alpha, Pre-Law Club.

Pre-Med. Alpha Epsilon Delta.

Psychology. Psychology Club, Psi Chi.

Sociology. Sociology Club.

Speech and Drama. Tau Kappa Alpha, Theta Alpha Phi, Utah State University Speech and Hearing Association.

Zoology. Utazoa Club.

Social and Special Interest

Fraternities, Social. Alpha Gamma Rho, Delta Sigma Phi, Phi Gamma Delta, Pi Kappa Alpha, Sigma Alpha Epsilon, Sigma Chi, Sigma Nu, Sigma Phi Epsilon.

Sororities, Social. Alpha Chi Omega, Alpha Omicron Pi, Chi Omega, Delta Delta Delta, Kappa Delta, Sigma Kappa.

Recognition and Honorary. Alpha Sigma Nu, Alpha Zeta, American Student Academy, Arnold Air Society, Pershing Rifles, Phi Alpha Theta, Sigma Phi Eta, Sigma Tau, Xi Sigma Pi.


Scholarship. Alpha Lambda Delta, Phi Alpha Theta, PhiEta Sigma, Sigma Tau, Phi Kappa Phi.


Public Services and Information

Public Relations, Services
LeRoy A. Blaser, Director

Publications
John J Stewart, University Editor
Evelyn Lawrence, Assistant University Editor
Christian P. Nielsen, Extension Services Editor
Millard E. Wilde, Agricultural Experiment Station Editor
Donna Jean Higgins, Utah Water Research Laboratory Editor
Gwen H. Haws, School of Graduate Studies Editor
Lois M. Cox, University Research Division Technical Writer
J. Lyn Larson and Gerald R. Sherratt, Alumni Association Editors

Newspaper News Releases
J. R. Allred, Editor, University News
Cleon M. Kotter, Information Specialist, Extension Services and Agricultural Experiment Station
Harvey Kirkpatrick, Editor, Athletic News

Radio-Television News and Programs
Burrell F. Hansen, Chairman, University Radio and Television
Arthur L. Higbee, Extension Services Radio and Television Specialist
Lea Ward, Producer-Director, KUSU-TV
Gerald L. Allen, Assistant Manager, KUSU-TV
James Kay Randall, Assistant Program Director
Boyd V. Humpherys, Radio-TV Chief Engineer
L. Jay Smith, Graphics Artist

Photographic Service
Arlen L. Hansen, University Photographer
Nile Greenhalgh, Assistant Photographer

Duplicating Service
Clark Kidd, Supervisor

Art Service
Jerold Bishop, Production Artist
Public Services and Information

Office in Information Services Building

Good teaching, sound research and other practical services performed well are USU's chief means of public relations.

Being a public tax-supported institution, the University has the responsibility of keeping the public informed as to its operations. It can best fulfill this responsibility by utilizing the mass communication media of newspapers, magazines, radio and television stations, and by publishing appropriate bulletins and journals.

Information is disseminated daily and weekly through the press, radio and television. These releases include informational articles and programs of educational worth. They include articles on research in many fields and news of general campus events.

The University radio and television stations, KUSU-FM and KUSU-TV, broadcast a daily schedule of educational, informative and entertaining programs in the Logan area, as well as preparing programs for use on commercial radio and television stations in Utah.

University publications include:

(1) A monthly University Bulletin series, devoted to the University Catalog, Summer Quarter Catalog, Correspondence Catalog, Audio-Visual Aids Catalog and to bulletins featuring the various departments and offerings of the University, and to research by the Division of University Research and the Engineering Experiment Station.

(2) Brochures for conferences, workshops and other events.

(3) Extension Service Circulars of an instructional type, in agriculture and homemaking especially.

(4) Agricultural Experiment Station Bulletins, reporting results of research.

(5) Utah Science, a quarterly magazine of state-wide distribution, featuring research conducted by the University and its affiliated organizations.

(6) A Monograph Series featuring essays and lectures of USU faculty members.

(7) A magazine containing news and features for USU Alumni.

(8) Student publications, including Student Life, a tri-weekly newspaper; Crucible, a semi-yearly magazine, and Buzzer, the yearbook.
Department of

Intercollegiate Athletics

Director Frank Williams; Assistant Director Dale L. Gardner; Publicity Harvey Kirkpatrick; Ticket Manager Tom Moulton; Trainer Jim Railey; Equipment Manager Mike Carlisle; Football Tony Knap, Head Coach, George Galli, Ralph Maughan, George Porter, John Math, Norvel Hansen; Basketball Ladell Andersen, Head Coach, Evan Sorenson, Norvel Hansen; Baseball Jim Railey; Golf Dean Candland; Tennis Lincoln McClellan; Track Ralph Maughan; Swimming Dale L. Gardner; Wrestling Skip McCrary.

Office in Fieldhouse

Organization. USU's Intercollegiate Athletics is organized under the rules and by-laws of the National Collegiate Athletic Association, and the Utah State University.

Participation. Varsity teams at USU schedule in the University division of the NCAA. Our teams compete on a national and area basis and are recognized for their successes at these levels. Fall quarter participation includes football, cross country, golf, and tennis. Winter quarter participation is basketball, wrestling, skiing, swimming, and indoor track. Spring quarter is spring football, baseball, track, golf, and tennis. Qualifiers in all sports may represent USU in NCAA post-season activity.

Facilities. Our home football games are played in Romney Stadium with a 15,000-spectator capacity. Our basketball arena is the 6,000 capacity George Nelson Fieldhouse. The fieldhouse also has a practice area for football, baseball, golf, tennis, and an indoor running track. Golf course and ski areas are near the campus.

Registration and Eligibility. All male students at USU are encouraged to participate in the various varsity and freshmen intercollegiate activities. Registration for participation may be accomplished by contacting any of the coaches or registering for the class work listed in the registration bulletin. Eligibility for participation is governed by rules and regulations established by the National Collegiate Athletic Association and by the Faculty Senate of the University.

Awards and Grants-In-Aid. USU offers awards and grants-in-aid in all sports for athletic excellence. A student or prospective student desiring consideration for one of these awards may contact one of the coaches for further application. Any awards granted will fulfill the arrangement between the coach and the recipient with approval of the Scholarship Committee.

Supervision. Supervision and direction of athletics for men 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.
RESEARCH AND INSTITUTE PROGRAMS
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Research and Institute Programs

Vice President, Research, Director, Agricultural Experiment Station, D. Wynne Thorne; Director, Engineering Experiment Station, Clayton Clark; Director, Utah Water Research Laboratory, Vaughn E. Hansen; Acting Chairman, Utah Center for Water Resources Research, J. Whitney Floyd; Chairman, Inter-American Center for The Integral Development of Water and Land Resources, Bruce Anderson; Chairman, East-West Institute, LeRoy A. Blaser; Chairman, Economic Research Institute, E. Boyd Wennergren; Chairman, Management Institute, Calvin D. Lowe; Chairman, Utah Studies, S. George Ellsworth; Chairman, Bureau of Educational Research, Walter R. Borg; President, Utah Scientific Research Foundation, Wilford W. Lundberg; Dean, School of Graduate Studies, J. Stewart Williams; Leader, Utah Cooperative Wildlife Research Unit, Jessop B. Low; Leader, Utah Cooperative Fishery Research Unit, Robert H. Kramer; Leader, Utah Cooperative Forest Recreation Research Unit, J. Alan Wagar.

Utah State University was among the first of the colleges and universities in the Intermountain area to have Research and Institute programs. Originally these were principally in agriculture. Now research and or institute projects are in every college and almost every department of the University.

Research and institutes are closely associated with teaching and student activities. Most are conducted by staff members who are also employed to teach part of their time. Many students, both graduate and undergraduate, 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 and institute operations are in several organizations. The principal organizations and areas of research and institutes are as follows:

Division of University Research

D. Wynne Thorne, Vice President, Research
Office in Main 127

It is the policy of the University to encourage and support research and all forms of creative, scholarly activities by staff members. Much of the research not associated with the Agricultural Experiment Station is administered under the Division of University Research. This research is supported by institutional funds and by grants from various private and public agencies.

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: A. Ray Johnson, Literature and Arts; Vernon L. Israelsen, Business and Social Sciences; Datus M. Hammond, Biological Sciences; W. Farrell Edwards, Physical Sciences; Walter R. Borg, Education; C. Wayne Cook, Natural Resources; Elveda Smith, Family Life; Clayton Clark, Engineering and Technology; J. Stewart Williams, School of Graduate
348 Research and Institute Programs

Studies, and D. Wynne Thorne, Research Division.

University research is especially devoted to developing the natural resources and the well being of people of the Intermountain area. Research is closely associated with teaching in that individual projects are conducted by members of the teaching staff with the aid of students.

Income to the state from federal lands is apportioned in part to institutions of higher education. That part coming to Utah State University is used for research purposes. A part of this is available to faculty members for projects approved by the Research Council. Information concerning this program can be obtained from the Office of the Division of University Research. The Division also gives assistance with applications to off-campus agencies for research funds.

Agricultural Experiment Station

D. Wynne Thorne, Director
Kenneth W. Hill, Associate Director
Office in Agricultural Science 225A

The Agricultural Experiment Station is a major division of the University. It 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 and prepare food and fiber, and to develop and improve rural homes and rural living.

The investigations needed to fulfill Experiment Station responsibilities involve the full or part time services of about 125 professional staff members associated with 17 departments of the University: Agricultural Economics, Animal Science, Applied Statistics and Computer Science, Bacteriology and Public Health, Botany, Chemistry, Agricultural and Irrigation Engineering, Dairy Science, Food and Nutrition, Forestry, Plant Science, Range Science, Sociology, Soils and Meteorology, Veterinary Science, Wildlife Resources, and Zoology. The staff includes about 50 employees of the U.S. Department of Agriculture who are assigned to collaborate in agricultural research activities. A large number of undergraduate and graduate students are employed on a part-time basis to assist with the studies.

The Experiment Station investigations are organized into about 180 research projects. Some of the areas of research include: basic biology, breeding and testing of new and improved crop varieties; the diagnosis and control of plant diseases; the control of insects; diagnosis and control of diseases and parasites of animals; the breeding and nutrition of dairy and beef cattle, sheep and swine; breeding and testing improved lines of laying hens and turkeys; the feeding and nutrition of poultry; production of vegetable and fruit crops; weed control; mapping and classification of soils; fertilizing and managing soils; irrigation and drainage; managing watersheds and rangelands; forestry; wildlife management; conservation of water and soils; gathering snow survey data and predicting stream flows; research on processing and marketing
of farm products; finding new or improved uses of farm products; the economics of agricultural production; human nutrition; social relations of rural people; and recreation. The investigations range from applied field tests to fundamental research under controlled laboratory conditions.

Station research is periodically reviewed by advisory committees representing every segment of the agricultural industry. These committees evaluate the progress of research efforts and recommend problems in need of further study.

Main offices of the Agricultural Experiment Station are on the University campus in the Agricultural Sciences Building. Most of the research laboratories used by the Experiment Station are also on the campus, distributed among the various University buildings.

Field stations, farms, and research laboratories are operated in cooperation with College of Southern Utah at Cedar City, Snow College at Ephraim, and at about 14 other off-campus locations. Individual studies are conducted in cooperation with farmers, ranchers, retail stores, and many other business organizations.

Engineering Experiment Station

Dean F. Peterson, Dean, College of Engineering
Clayton Clark, Director, Engineering Experiment Station
Office in Engineering Building C216

The Engineering Experiment Station is a major part of the College of Engineering. It has a broad purpose of furthering engineering sciences, engineering arts, and engineering education.

The Engineering Experiment Station was established in 1918 by act of Board of Trustees. The Director has supervisory responsibility to the Dean of Engineering for all research conducted by the various departments.

Staff members of the Civil, Electrical, Manufacturing, and Mechanical Engineering Departments, and the Industrial and Technical Education Department are also members of the Engineering Experiment Station. Staff members may be employed full or part time on research.

The Station conducts basic and applied research in civil, electrical, mechanical, tool and manufacturing, and agricultural engineering, as well as in industrial and technical education. Results of these studies are published in research bulletins, in engineering reports and papers, or otherwise made available to those interested.

In addition to the regular academic laboratories and facilities, the Engineering Experiment Station has the following specialized research laboratories and institutes under the supervision of the senior research staff as noted. Projects under these laboratories are financed by Federal Grants, Utah Uniform School Funds and industry.

Antenna and Propagation Laboratory. Dr. Clayton Clark, Dr. Ronnery D. Harris.

Control and Simulation Laboratory. Dr. Bruce O. Watkins, Professor Duane G. Chadwick.

Electroacoustic Laboratory. Professor Larry S. Cole.

Electro-Dynamics Laboratories. Dr. Doran J. Baker, Dr. John J. Merrill, Dr. Craig Rushforth. Consisting of the following laboratories:
350 Research and Institute Programs

Luminescence Laboratory—Dr. J. J. Merrill, Mr. F. R. Brown, Jr.
Concord Radiance Laboratory—Mr. S. P. Stewart, Jr., Mr. J. E. Hoffman, Mr. T. P. Condon
Chemiluminescence Laboratory—Dr. William M. Moore
Aerospace Radiation Laboratory—Mr. W. K. Barlow
Aerospace Instrumentation Laboratory—Mr. C. L. Wyatt
Fluid Mechanics Research Laboratory—Dr. Calvin G. Clyde, Professor Ronald McKay, Dr. Gordon Flammer.
Gas Dynamics Research Laboratory—Dr. Calvin G. Clyde.

Soil Mechanics Research Laboratory, Dr. Irvin S. Dunn, Dr. R. K. Watkins.

Solid State Electronics Laboratory, Professor Wm. L. Jones, Professor W. Arnold Finchum.

Structural Materials Research Laboratory, Professor Wm. Cordon, Professor J. Derle Thorpe.

Technical Education Research Institute, Dr. Austin G. Loveless, Dr. Carl Bartel, Dr. William Mortimer.

Thermodynamics and Heat Transfer Laboratory, Professor Ronald McKay.

Utah Water Research Laboratory

Dean F. Peterson, Dean, College of Engineering
Vaughn E. Hansen, Director, Utah Water Research Laboratory

Facilities and staff exist at the Laboratory to conduct research on a wide variety of water problems affecting all users of our water resources.

The Utah Water Research Laboratory was authorized by the Utah State Legislature in 1959 and was built at a total cost of $1,600,000 with funds supplied by the State Legislature, the National Science Foundation, and the National Institutes of Health.

The unique design of the Laboratory provides 80,000 square feet of space with flexibility for attacking a wide variety of problems. Specialized laboratories for instrumentation development, microbiological and chemical analysis, sedimentation studies, and analog developments are included.

The research staff of the Utah Water Research Laboratory are also staff members of the academic departments. Students are employed at the Laboratory, and graduate theses and dissertations are supported by laboratory research projects.

The research program of the Utah Water Research Laboratory is financed by federal, state, and private agencies. Both basic and applied research are encouraged. Some of the nationally recognized current research of the Laboratory is as follows:

A Hydrologic Analog Model of the Sevier River is analyzing data that will permit better understanding and fuller utilization of the limited water resources. The hybrid design allows the analog to be used to study other river basins.

An expanded water quality program is underway augmented by chemical and biological laboratories and cooperative effort with other departments of the University.

Improved methods of controlling, handling, and distributing water are being developed.

A Rainfall Simulator has been designed and built which permits storms of desired characteristics to
be moved across model watersheds similar to storm movement on the prototype.

Watershed Characteristics are being studied for better methods of predicting flood flows and runoff characteristics.

Studies of the Hydraulics of Overland Flow have produced significant advances in the theory and practical aspects which apply to the design of surface irrigation systems and the characteristics of flow over watersheds.

Tumbling Flow. The turbulent flow that characterizes mountain streams, has been of great interest and is being intensively investigated.

New Ultrasonic and Electronic Methods are being developed for measuring sediment size and concentration in streams.

New techniques are being developed for transmitting snow depth and water content information by radio from watersheds to central headquarters.

An effective plan for the utilization of Utah's water resources is under study in cooperation with the Utah Water and Power Board. The Great Salt Lake, the Weber and Bear River Basins are receiving intensive study.

New ways are being developed for using climatological data to predict the evaporation of water from lakes and to predict water use by plants. Water requirements of marshlands are being determined.

Reduction of evaporation from large reservoirs and lakes is being accomplished by application of hexadecanol by airplanes.

New instrumentation concepts for field use in measuring and evaluating water resources and flow phenomenon are being developed.

Cloud seeding along the Wasatch Front using new concepts of instrumentation, control, and evaluation is under way.

An Inter-American Center for Land and Water Resource Development is being established in Latin America to assist in the development of land and water in the 20-member nations of the Organization of American States.

Utah Center for

Water Resources Research

Dean F. Peterson, Chairman; J. Whitney Floyd, Eldon J. Gardner, Vaughn E. Hansen, Kenneth W. Hill, Vearl R. Smith, D. Wynne Thorne, Council Members; Howard B. Peterson, Executive Secretary.

The Utah Center for Water Resources Research was created by the Board of Trustees of Utah State University on November 23, 1964. The governing body of the Center is a Council composed of the deans of the colleges of Agriculture; Engineering; Natural Resources; and Science; the Vice President for Research; the Director of Agricultural Experiment Station; and the Director of Utah Water Research Laboratory.

The purposes of the Center are:

1. To coordinate University-wide research in the field of water resources as described by "The Water Resources Research Act of 1964."

2. To administer the provisions of the Water Resources Research Act as they relate to Utah State University and the state of Utah.

1J. Whitney Floyd, Acting Chairman, 1965-66.
3. To encourage and foster the development of inter-departmental research and educational programs to the water resources field.

All University staff members and collaborators engaged in water resources education or research are associates of the Center. The Center encourages development of instructional programs that will further the training of water resource scientists and engineers and implements programs related to water resources research in education both on and off the campus. It maintains liaison relationships with appropriate state, national, and international organizations and agencies having similar objectives, including the Universities Council on Water Resources. It is cognizant of the total program of water resources research of the University and its relationship to the activities of state and federal agencies and communities and conducts seminars on various aspects of water resources research needs.

**Inter-American Center for**

**The Integral Development of Water and Land Resources**

Bruce Anderson, Director

The Inter-American Center for the Integral Development of Water and Land Resources is operated for the Organization of American States by Utah State University in cooperation with the University of the Andes.

The Center was established in 1965 at Merida, Venezuela, for training Latin American leadership from the 20 member nations of OAS in water and land resources development. The curriculum and procedures developed by the Center allow maximum participation of the Latin Americans and the infusion of their background and experience into the program.

Curriculum being presented includes the philosophy of resource development; resource data collection and evaluation in terms of regional planning needs; principles and procedures of resource planning; logistics of project development, and successful project operation and management for optimum return.

This material is presented through regular, short, and intensive courses.

**East-West Institute**

LeRoy A. Blaser, Chairman

Office in Public Services and Information

An East-West Institute is conducted annually at Utah State University to foster improved understanding between East and West. Each year a well known scholar on the Far East is brought to the campus for a series of lectures to students, faculty and townspeople.
Economic Research Institute

E. Boyd Wennergren, Director
Office in Agricultural Science 252

This is a research organization that promotes and coordinates research on economic and related problems. The Institute was organized in 1962 by action of the Board of Trustees and serves as a clearing house for ideas and methods related to research on economic and related problems. It provides leadership in planning and conducting research and gives assistance to staff members in seeking financial support from other agencies interested in supporting research related to economic problems.

Management Institute

Calvin D. Lowe, Director
Office in Mechanic Arts 212

In response to the educational needs of business and industry, the Management Institute of the College of Business and Social Sciences offers a variety of seminars, workshops, and conferences throughout the year. These are all non-credit offerings and cover such materials as the management of small business, executive development, decision making, sales promotion, professional secretarial training, etc.

Institute of Utah Studies

S. George Ellsworth, Director
Office in Main 317

By virtue of its Library holdings, its faculty, and research programs, Utah State University is a leading center for the study of all phases of Utah's historic and contemporary development. The Institute of Utah Studies has been established to collect and preserve the written and oral record of Utah's distant and recent past, of training persons in the use of the sources and literature of Utah history, and encouraging and assisting all persons, especially teachers and research writers in the social sciences and humanities, in the detailed study of any and all phases of Utah's development, and of offering courses and seminars in regular history. The Institute appeals especially to teachers desiring to specialize in the teaching of Utah history and to writers of historical and analytical studies of a regional nature.
The College of Education maintains a Bureau of Educational Research which serves the following functions:

(1) Coordinates research activities in the College of Education. The bureau cooperates closely with the Division of University Research and the School of Graduate Studies.

(2) Plans and conducts educational research in problem areas of interest to Utah educators.

(3) Provides information and research services to Utah educational administrators.

(4) Represents the University in state-wide and nation-wide cooperative educational research projects.

(5) Provides guidance and research source materials to graduate students in the College of Education.

Utah Scientific Research Foundation

Wilford W. Lundberg, President
Office in USRF Building on Campus

This is a non-profit corporation organized in 1944 as an affiliate of Utah State University with the primary objective of encouraging scientific investigation. The Foundation conducts independent investigations and serves in the interest of the University in obtaining and developing patents, profits from which are dedicated to the support of further research at the University in the public interest.

Among the accomplishments of the Foundation are the development of a farm mower which eliminates the traditional Pittman rod; the design and production of a soil core sampling machine which has proved useful in soil and drainage investigations, and the development of a vehicle suspension and power selection system which has been incorporated into a snowmobile, which is in use by various public and private agencies in the United States and Canada, and a number of units which are used for transportation on the DEW (Distant Early Warning) Line in the Arctic.

The Foundation also serves departments of the University in the design and production of special precision apparatus, not available on the market, for use in research and teaching. In addition to the staff of the Foundation, technical assistance is given by faculty members from various departments.

Officers and directors of the Foundation are: Wilford W. Lundberg, President and Director, Daryl Chase, President of the University; Dee F. Wangsgaard, Hubert C. Ward, Ernest G. Earl, Blaine W. Hancey, Robert P. Collier, Eldon J. Gardner, Dean F. Peterson, and D. Wynne Thorne, Directors; J. Le-Mar Larsen, Secretary-Treasurer.
Each year at Utah State University more than three hundred students complete their work for an advanced degree. These degrees include the Master of Arts, Master of Business Administration, Master of Education, Master of Industrial Education, Master of Music, Civil Engineer, Irrigation Engineer, Master of Science, Doctor of Education, and Doctor of Philosophy.

In most cases, to qualify for one of these degrees the student must complete an intensive, carefully supervised research project and thesis in the area of his major interest. The data obtained in these research projects not only help qualify the student vocationally, but also make a real contribution of knowledge and understanding in the area studied.

The thesis prepared from the research project is bound and microfilmed and is permanently available in the University Library. Abstracts of all theses are periodically published by the School of Graduate Studies. Ofttimes, scholarly or popular articles, based upon the thesis, are submitted to and published in various magazines and journals. Newspaper, radio, television, classroom, and other uses are also made of these research findings.

Such projects in graduate studies have been conducted in, and made contributions to, a great variety of specific areas in agriculture, home and family living, engineering, forestry, range and wildlife, business, social sciences, exact sciences, the arts and humanities, education—in fact, in nearly every subject taught at the University.

Utah Cooperative Wildlife Research Unit

Jessop B. Low, Leader
Office in Forestry and Zoology 167

The Utah Cooperative Wildlife Research Unit was initiated in 1935 through a Memorandum of Understanding between the Utah State University, Utah Fish and Game Commission, Wildlife Management Institute and the U. S. Fish and Wildlife Service, Bureau of Sport Fisheries and Wildlife. The Unit's objectives are to:

1. Train students in wildlife management, research demonstration and administration.
2. Conduct research basic to proper utilization of wildlife and fisheries resources.
3. Promote wildlife education through demonstration, lecture and publication.
(4) Make results of investigations available to cooperators and the public.

Through the Research Unit’s program, students are trained for state, regional, and national positions in wildlife management, research and other phases of natural resource conservation. Students whose studies are financed through the Unit program are selected from high ranking candidates of institutions in wildlife management, zoology, botany, fish and related fields.

Utah Cooperative

Fishery Research Unit

Robert H. Kramer, Leader
Office in Forestry and Zoology 279

A Utah Cooperative Fishery Research Unit was established at USU January 1, 1962, to conduct sport fishery training and research.

It was the first of eighteen such units to be established in the country.

Objectives of the program include teaching and training of fishery scientists and fishery management biologists and research related to problems of regional or national interest.

Utah Cooperative

Forest Recreation Research Unit

J. Alan Wagar, Leader
Office in Forestry and Zoology 271

A Utah Cooperative Forest Recreation Research Unit was established at Utah State University in August, 1962. It was the first of four such units established in the United States. Objectives of the unit are to:

(1) Train graduate students in recreation management and research.

(2) Conduct and stimulate research in the biological and sociological aspects of forest recreation.

Cooperating in the unit are USU, with its Department of Wildlife Resources; the Bureau of Sport Fisheries and Wildlife, U.S. Department of the Interior; and Utah State Department of Fish and Game.

Students financed by the Unit program receive graduate training for positions in fishery research, fishery administration and fishery management.

Utah Cooperative
EXTENSION SERVICES
Extension Services

Director W. H. Bennett; Associate Directors J. Clark Ballard, Lloyd R. Hunsaker, Lloyd A. Drury; District Directors Marden Broadbent, William F. Farnsworth; Supervisor, Extension Family Life Programs Margaret B. Merkley; Supervisor, Training and Evaluation Stephen L. Brower; Supervisor, Youth Programs Glen T. Baird; Associate Supervisor, Youth Programs Amy R. Kearsley; Controller’s Representative Arthur Cahoon; Secretary to Director Libbie B. Maughan; Youth Programs Assistant LaRee A. Petersen; Bulletin Room Clerk Laura P. Cheney.

State Subject Matter Program Leaders

Agricultural Engineering, Wayne B. Ringer; Agronomy, Louis A. Jensen; Animal Science, Russell R. Keetch, Doyle J. Matthews; Clothing/Textiles, Theta Johnson; Consumer Information, Carolyn Dunn; Dairy Manufacturing, A. J. Morris (part-time); Dairy Science, John J. Barnard; Economist, Leon C. Michaelsen; Entomology, George F. Knowlton, Reed Roberts; Extension Publications, Christian P. Nielsen; Farm/Economic Adjustments, Lloyd A. Clement; Forestry/Outdoor Recreation, John D. Hunt; Foods/Nutrition, Flora H. Bradwell; Graphics Artist Jay Smith; Home Management/Furnishings Rhea H. Gardner; Horticulture Anson B. Call, Jr.; Information Cleon M. Kotter; Landscape Horticulture Arvil Stark; Marketing Paul Grimshaw, Morris H. Taylor, Morris D. Whittaker (part-time); Poultry Science C. I. Draper; Radio-TV Arthur L. Higbee; Range Management Carl G. Parker; Rural Civil Defense Courtney Brewer; Soil Science Paul D. Christensen; University Defense (Urban) Wesley T. Maughan, Rulon Buck; Veterinary Science Don W. Thomas; Water Resources Richard E. Griffin; Youth Programs Kay R. Bendixsen.

County and Area Extension Agents

Beaver, Grant M. Esplin, Freda L. Harris; Box Elder, A. Fullmer Allred, Jessie Eller, Ray Finch; Cache, Ray Burtenshaw, Bessie K. Lemon, Gerald R. Olson; Carbon, Ralph Horne, Barbara Fluckiger; Davis, L. Darrell Stokes, L. S. Rogers, Margaret Hall, Karma P. Swindle; Duchesne, William Lloyd Smith, Mary Boender; Emery, Lavon Day, Barbara Fluckiger; Garfield, Harold Lindsay, Evon Olsen; Iron, Wallace D. Sjoblom; Juab, Lynn Esplin, Clara Schofield; Kane, Harold Lindsay, Evon Olsen; Millard, Jay Hall, Beth N. Crossland, MarGene B. Rowley; Morgan, Ray Thatcher, Margaret Hall; Piute, Ruth Coates, Keith Chapman; Rich, Gerald Olson, Helen Wamsley; Richfield Area Office, Marven J. Ogden; Roosevelt District, Max Sudweeks, Jo Ann Callister; Salt Lake, Joseph F. Parrish, Melvin S. Burningham, Bernice Palfreyman, D. Wayne Rose; San Juan, Rell F. Argyle; Sanpete, Delbert C. Purnell, C. Dennis Funk; Sanpete Schofield, Sarah Tuttle; Sevier, Rodney Rickenbach; Summit, J. Reed Moore, Mary R. Bacon; Tooele, Ernest O. Biggs, Naomi Jensen; Uintah, Ben W. Lindsay, Carolyn Garrison; Utah, Clare R. Acord, Joel C. Barlow, Robert L. Hassell, Irene

1On leave.
Utah State University's Extension Services include the Cooperative Extension Service, Extension Class Division, Conferences and Institutes Division and Correspondence Study Division.

Cooperative Extension Service

The Cooperative Extension Service is one of the main divisions of the University and in Utah is the educational arm of the U.S. Department of Agriculture. It was established in 1914 with passage of the Smith-Lever Act by Congress. The 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 human leadership, resourcefulness and initiative; to supply factual information for discovering and solving problems, and to help people become more efficient, increase their incomes and raise their standards of living. The Extension Service takes the findings of research to the people of the state and brings unsolved problems back to the research workers at the University for solving.

Extension programs are planned jointly with the people. The demonstration method of teaching and the mass media are used extensively. Farm and home visits, group meetings, personal and circular letters and publications are used to supply educational information.

Several administrative and supervisory personnel and 30 subject-matter program leaders comprise the staff at the state office on the USU campus. In addition several specialists and program leaders are located out in the state.

County Extension Agents are located in 27 of Utah's 29 counties. At present there are 64 Extension Agents serving on a county or area basis.

To facilitate operations the state has been divided into districts and a District Director placed in charge of each district to handle budget and relations matters in the Districts and to supervise county Extension personnel.

The Extension program includes work with both adults and youth. About one-third of the time of Extension workers is devoted to 4-H Club work.

Programs emphasized are: (1) Efficiency in agricultural production; (2) efficiency in marketing, distribution and utilization; (3) conservation, development and use of natural resources; (4) management on the farm and in the home; (5) family living; (6) youth development; (7) leadership develop-
Extension Class Division, Conferences and Shortcourses Division, Correspondence Study Division

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 the Logan campus to register for resident courses. For this group, USU provides a liberal program of educational offerings, including Extension Classes, Correspondence Study and a number of other educational services. USU is a member of the National University Extension Association.

Extension Class Division

Courses offered by Utah State University are made available in approximately thirty different communities of the state for groups of people who cannot take advantage of residence study opportunities at the Logan campus. Such courses are designated as Extension Classes. They carry USU credit, are equivalent in content, hours of class instruction and preparation and otherwise meet the same prerequisites as comparable classes on the University campus.

Except for the 45 credits which must be earned in residence on the Utah State University campus, Extension classes may meet the requirements for a Bachelor's degree. Extension classes are also accepted to meet requirements for a Master's degree with approval of the School of Graduate Studies.

All instructors in Extension courses are either members of the regular University teaching faculty officially assigned to the teaching project concerned, or non-resident members approved by the head of the department, and by the University administration.

The registration fees charged for Extension classes conform to the prevailing regulations fixed by the Board of Trustees.

Conferences and Shortcourses Division

The University cooperates with a variety of organizations in planning and sponsoring educational conferences, and shortcourses. The foregoing activities are offered primarily for those not planning to earn a degree. The Conferences and Shortcourses Division wishes to serve individuals desiring academic stimulation, new skills, greater appreciation of fine arts and awareness of current national and international problems.

School districts are encouraged to organize teacher in-service and parent-teacher improvement programs.

Correspondence Study Division

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
Correspondence Study courses in many of the departments of the University. This program furnishes an excellent opportunity to students of high school or college level, and to adults generally, who desire general education and professional improvement in selected fields.

An enrollee must be at least 19 years of age, or submit fifteen units of high school work, or be a graduate of a high school for admission to Correspondence Study courses of college grade.

High School students demonstrating superior ability may enroll for University Credit Courses.

One-fourth of the credits necessary for a Bachelor's degree (45) may be earned through Correspondence Study courses. Each college of the University, subject to faculty approval, determines the nature and the amount of correspondence study credit accepted for admission and graduation. In no case is more than 25 per cent of the total number of credit hours accepted for graduation to be Correspondence Study credit.

Graduation Deadline. Seniors who plan to apply Correspondence Study credits toward graduation, in any one year, must have their courses completed by May 1, so that lessons and examination may be evaluated and credit filed in the Admissions and Records Office two weeks prior to the day of graduation.

An enrollee is allowed one year in which to complete a course. An extension of time may be granted upon payment of a small fee.

USAFI Courses. USU is cooperating with the United States Armed Forces Institute (USAFI) at Madison, Wisconsin, by providing Correspondence Study courses at a reduced cost to men and women in active service in the Army, Navy, Air Force, Marine Corps, or Coast Guard. A member of any one of the armed forces desiring to enroll for Correspondence Study courses should contact that education and information center at the base where he is located.

Fees. A fee of $9.00 per credit hour is charged for Correspondence Study courses of college level. High School courses fees are $25.00 per unit and $17.00 per half-unit. All fees are subject to change.

Correspondence Study Catalog. If an individual is interested in Correspondence Study courses he may request a Correspondence Study Catalog, which contains full information concerning this program.
Snow College

Daryl Chase, President
Floyd S. Holm, Director

Snow College was founded in 1888. It was originally known as Sanpete Stake Academy and was operated by The Church of Jesus Christ of Latter-day Saints. The institution became known as Snow Normal College in 1912 and as Snow Junior College in 1922. It was operated as a State Junior College from 1932 until July 1, 1951, when it became a branch of Utah State University.

Tits affairs are under the immediate supervision of the Board of Trustees of Utah State University and administered by the President through a director who is responsible directly to the President of Utah State University.

Location. Snow College is located adjacent to Highway 89, at Ephraim, which is the geographic center of Utah.

Accreditation. Snow College is accredited by the Northwest Association of Secondary and Higher Schools.

Campus and Facilities. The main campus of Snow College consists of 45 acres including an athletic field, and 15 buildings. In addition to the main campus, Snow College cooperates with the Experiment Station in the operation of a 96-acre college farm.

Degrees and Certificates. Snow College is authorized to confer the certificates of Associate in Science and Associate in Arts upon completion of a two-year college program. Students who follow terminal curricula are awarded a two-year certificate of completion.

Curricula. Snow College is authorized to teach lower division courses in all basic areas of instruction.

Courses offered at Snow College parallel lower division courses offered at Utah State University. Course numbers generally coincide with those listed at Utah State University. A student may complete all lower division requirements at Snow College and transfer to Utah State University for completion of upper division work. Course instruction is offered in divisions and departments which correlate with lower division work in the academic colleges on the Logan Campus.

For Information. A special catalog for Snow College is issued each year. It contains a detailed announcement of all curricula, statement of courses, entrance requirements, rules and regulations for the college. For a copy of the Snow College catalog, or for information concerning the work of Snow College, address:

Director’s Office,
Snow College,
Ephraim, Utah
ALUMNI ASSOCIATION AND UNIVERSITY DEVELOPMENT FUND
USU Alumni Association

Conley Watts, President
J. Lyn Larson, Executive Secretary
Office in Alumni Center, Student Union Building

Utah State University Alumni Association now numbers more than 35,000 members. These members are the graduates and other former students of Utah State, who are now keeping in touch with the University and supporting its activities through the work of the Association.

Purpose. It is the purpose of the Alumni Association to promote the interests and welfare of Utah State University.

Membership. (1) Regular Member: All persons receiving degrees, diplomas or terminal vocational certificates from Utah State University or Snow College are eligible for membership in the Association upon payment of dues. (2) Associate Member: All students who have been regularly enrolled in one of the two aforementioned institutions and have successfully completed any work therein, may become members of the Association upon payment of dues. (3) Sustaining Member: All parents of graduates or students and faculty members and others who have shown an interest in the University or the Association may become sustaining members by payment of dues. (4) Honorary Member: Persons eligible for honorary membership are those who have done outstanding service to the Institution and who are recommended for this honor by the Executive Committee, or the Council of the USU Alumni Association.

Dues. Annual dues are $5 per year and joint annual dues (husband and wife) $7.50 per year. Life membership may be obtained singly at $35, or $50 for a joint membership, both payable in five annual installments.

Government. The governing power of the Association is vested in the Alumni Council, composed of 15 elected members and ex-officio members. The current president of the Senior class and the president of the Associated Students’ organization are both ex-officio members of the Council. The Alumni Executive Secretary is the official representative of the Association on campus. The President of the Alumni Association is a member of the Utah State University Board of Trustees, as provided by Chapter 5, Article 75-5-0, School Laws, State of Utah.

Function. The Alumni Association is the medium through which former students of Utah State are kept in contact and are served after leaving the campus. Efforts are made to maintain a complete record of every alumnus throughout life, and his accomplishments and progress are recorded. Active members receive the Utah State Alumnus, an official publication of the Association, full of Aggie news and reports on the University. The Association maintains Alumni chapters in all major areas where Aggies are located. Through this local organization, Aggies 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 Association endeavors to keep in contact with all Aggies and assists them in reference and contact problems.
Membership in the Association is the best way for an Aggie to demonstrate his interest and support of the University and its program after leaving the campus.

The Alumni Association takes the leadership in sponsoring such campus events as Homecoming and the Senior Reception, as well as aiding in athletic and other school events.

Alumni Association-Library Endowment Fund. The Library Endowment 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 it in the purchase of books which ordinarily could not be bought from the regular library budget.

University Development Fund

Leron Johnsen, Fund Director
Office in Alumni Center, Student Union Building

A key part of USU's Development program is a Development Fund, a non-profit corporation (established August 11, 1958) to encourage grants, bequests, and gifts of money, property, works of art, historical papers and documents, and museum specimens having educational, artistic or historical value. The Development Fund thus helps the University increase and improve its educational and other services.

A fifteen-man board of directors of this non-profit corporation represents five groups: USU Board of Trustees, Alumni Association, the University Administration and Faculty, the Associated Students and General Public.

Fund officers are: Rudy Van Kampen, Chairman; Conley Watts, Vice-chairman; Dee A. Broadbent, Treasurer; Leron Johnsen, Fund Director.

Functions and powers of the Board of Directors are: (1) to determine, after consultation with the President of the University or with a University officer designated by him, and after consultation with the Alumni Council of the Alumni Association, the specific University projects for which gifts of money or property will be solicited; (2) to obtain from alumni and former students of the University and from other interested persons, corporations or foundations voluntary contributions to the University, and to establish such by-laws and policies as are necessary to carry out the purpose of the Fund; (3) to determine from time to time the methods of solicitation and publicity and to maintain the active interest of alumni and of the public in the Development Fund; (4) to elect and appoint such officers and committees and incur necessary expenses within its budget allowance as are needed for the proper accomplishment of its purpose; (5) to coordinate all University efforts relating to the Development Fund.

Solicitation programs of the Development Fund include: the "Fair Share Formula" used in the Annual Alumni Gift; the Century Club and the Old Main Society which recognize large single donors to the University's programs; and the Estate Planning Program for those wishing to bequeath property, securities, and money to the University in their wills.
CHASE, DARYL (1945) President; Professor. BA 1927 U of U, MA 1931, PhD 1936 U of Chicago.

ABRAMS, MILTON C. (1940) Librarian; Asso. Prof. of Political Science, Library Science. BS 1948, MS 1952 USU, PhD 1962 U of U.


ADKINS, BRYCE E. (1964) Asso. Prof. of Elementary Education. AB 1949 Peru St. Coll. MA 1954, PhD 1962 U of U.


ALLRED, A. FULLMER (1945) Asst. Prof., Extension Services; Box Elder Co. Agent. BS 1938 BYU.


ALLRED, J. R. (1958) University News Editor; Instr. in Journalism. BA 1950 U of U, MS 1964 Colo St U.

ALLRED, KEITH REID (1957) Asso. Prof. of Plant Science. BS 1951 BYU, PhD 1955 Cornell U.

ANDERSEN, LADELL (1961) Head Basketball Coach; Instr. in Physical Education. BS 1951 USU.


ANDERSON, JAY O. (1951) Prof. of Animal Science. BS 1948, USU, MS 1948, PhD 1951 U of Maryland.

ANDERSON, JON I. (1964) Asst. Prof. of Art. BFA 1956 Art Center Sch.

*On leave.

NOTE: Date in parentheses indicates year the person joined USU staff, not necessarily in present position.

ANDERSON, LOWELL Lecturer in Mathematics. MS.

ANDERSON, RICHARD C. (1963) Asst. Prof. of Chemistry. BS 1964, PhD 1961 BYU.

ANDERSON, ROICE H. (1947) Prof. of Agricultural Economics. BS 1939 U of Wyo, MS 1941, PhD 1943 Cornell U.

ANDERSON, WENDELL B. (1947) Prof. of Political Science. BS 1935, MS 1940 USU, LLB 1941 George Wash U.

ANDREWS, WADE H. (1965) Prof. of Sociology. BS 1947, MS 1949 USU, PhD 1955 Mich St U.

ARAVE, CLive WEnDeLL (1964) Asst. Prof. of Dairy Science. BS, MS USU, PhD U of Calif.

ARGYLE, REll F. (1964) Asst. Prof., Extension Services; San Juan Co. Agent. BS 1940, USU, MEd 1964 Col St U.

ARRINGTON, LEONARD J. (1946) Prof. of Economics. BA 1939 U of Idaho, PhD 1952 U of No Carolina.


BAGLEY, JAY M. (1955) Asso. Prof. of Civil, Agricultural and Irrigation Engineering. BS 1952, MS 1953 USU, PhD 1964 Stanford U.

BAHLER, THOMAS L. (1949) Prof. of Zoology, Physiology. BA 1943 C of Wooster, PhD 1949 U of Wis.

BAIRD, GLENN T. (1948) Supv., Youth programs; Asso. Prof., Extension Services. BS 1935 USU, MS 1964 Univ of Md.

BAKER, DORAN J. (1959) Director, Electrodynamics Laboratory, Asso. Prof. of Electrical Engineering. BS 1955, PhD 1966 U of U.
BAKER, GERALD M. (1965) Asst. Prof. of Botany. BA 1956 Willamette U, MA 1959 Indiana U.

BALLAM, ORAL L. (1963) Assistant to the Dean and Asso. Prof. of Education. BS 1949, MS 1955 USU, EdD 1961 UCLA.


BALPH, DAVID F. (1964) Asst. Prof. of Business Administration. BS 1963 USU, EdM 1964 USU.


BARDWELL, FLORA H. (1950) Asso. Prof., Extension Services; Food and Nutrition Specialist. BS 1940 BYU, MS 1963 USU.

BARLOW, JOEL C. (1946) Assoc. Prof., Extension Services; Utah Co. Agent. BS 1938, MS 1963 USU.


BARON, GLEN L. (1958) Instr. in Landscape Arch. BS 1958 USU.


BATTY, JOSEPH CLAIR (1963) Asst. Prof., Mechanical Engineering. BS 1961, MS 1963 USU.


BENDIXSEN, KAY R. (1952) Asso. Prof., Extension Services; Juab Co. Agent. BS 1941, MS 1952 USU, PhD 1965 Mich St U.

BENNED JAMES A. (1945) Prof. and Head, Dept. of Animal Science. BS 1940, MS 1941 USU, PhD 1957 U of Minn.

BENNED, WILLIAM H. (1957) Director, Extension Services; Prof. of Soils and Meteorology. BS 1936, MS 1948 USU, PhD 1957 U of Wis.

BENSON, SERGE N. (1964) Lecturer in Business Law, Business Administration. LLB 1934 Wash U.

BERG, FREDRICK S. (1966) Assoc. Prof. of Speech and Special Education. BS 1952 Wash U, MS 1956, PhD 1960 So Ill U.

BEUTLER, G. LEON (1954) Asst. Prof. of Education. BS 1960, MS 1969 USU.

BEVERS, JOHN M. (1957) Asst. Prof. of Languages and Philosophy. BA 1949, MA 1953 U of U.

BIDDULPH, GWEN B. (1965) Instr. in Home-making Education. BS 1934 BYU, MS 1965 USU.

BIGGS, ERNEST O. (1944) Asst. Prof., Extension Services; Tooele Co. Agent. BS 1926 USU.

BILLS, JUDITH C. (1962) Asst. Prof. of Business Administration. BS 1960, MS 1961 USU.

BISHOP, A. ALVIN (1946) Prof. and Head of Ag. and Irrigation Engineering. BS 1934, MS 1938 USU, PhD 1961 Colo State U.


BLACK, THEREI R. (1950) Prof. and Acting Head of Sociology; Rural Sociologist. BS, MA 1939 BYU, MA 1941 Louisiana State U, PhD 1951 U of Wis.


BLANE, GEORGE T. (1934) Prof. and Head, Dept. of Agricultural Economics. BS 1930, MS 1931 USU, PhD 1941 Cornell U.

BLASER, LEROY A. (1952) Director of Public Services and Information; Asso. Prof. of Education. BS 1936, MS 1944 USU, EdD 1955 U of Calif.

BOENDER, MARY (1960) Asst. Prof., Extension Services; Roosevelt Dist. Home Agent. BS 1933 USU.

BOOTH, THORNTON Y. (1953) Asst. to Dean, C of Humanities and Arts; Coordinator of Liberal Studies; Prof. of English. AB 1941 BYU, PhD 1961 Stanford U.


BOWDEN, JOAN C. (1960) BA 1943 usu. Chemistry. MIT.

BOYD, BOYER, BOYER (1960) Business Education. BA 1960 Calif.


BREWERS, COURTNEY H. (1969) Rural Civil Def. Leader and Safety Specialist, Extension Service. BA 1949 BYU, MS 1953 USU.

BRINDLEY, WILLIAM H. (1965) Asst. Prof. of Entomology. BS 1960, MS 1963 Iowa St.


BRITE, J. DUNCAN (1953) Prof. and Head Dept. of History. BA 1922 U of Wyo., MA 1924, PhD 1937 U of Chicago.

BROADBENT, DEE A. (1938) Vice President of Business Affairs; Prof. of Agricultural Economics. BS 1936 USU, MS 1938 U of Ill.

BROADBENT, MARDEN (1938) District Director—Provo and Prof., Extension Services. BS 1937 USU, MS 1951, PhD 1960 U of Wis.


BUCK, RULON W. (1949) Asst. Prof., Extension Services; Dairy Records Agent at Large. BS 1948, MS 1953 USU.

BUDGE, PEARL S. (1947) Asst. Prof. of Education. BS 1927, MS 1956 USU.


BULLER, PATRICK E. Asst. Res. Engr. in Elec. Engr. BS.


BURNETT, NOLAN K. (1958) Asst. Prof. in Health, Physical Education. BS 1950, MS 1958 USU.


BURTENSHAW, CLAUDE J. (1962) Dean of Students, Prof. of Political Science. BS 1946, MS 1948, PhD 1955 U of U.


BURTON, WARREN L. (1965) Instructor in Music. BS 1962, MA 1965 USU.


CALLISTER, JOANN (1964) Instr. Extension Home Agent, Indian Program, Extension Services. BS 1964 BYU.
CANNON, LAWRENCE O. (1958) Asst. Prof. of Mathematics. BS 1958 USU, MS 1959 U of Wis, PhD 1965 U of Wis.

CANNON, MELVIN C. (1947) Prof. and Head, Dept. of Chemistry. BS 1933, MS 1938 U of U, PhD 1941 Boston U.


CANNON, ORSON S. (1948) Prof. and Head, Dept. of Botany. BS 1936, MS 1937 USU, PhD 1943 Cornell U.

CANNON, WILFORD G. (1965) Asst. Prof. of Accounting. BS BYU, MBA 1964 Wash St U.

CARLISLE, HOWARD MYRON (1963) Asst. Prof. of Business Administration. BS 1960 USU, MS 1962 U of Wis.


CARTER, DON C. (1948) Prof. and Head, Dept. of Family and Child Development. BS 1940 U of U, MSW 1947 U of So Calif., EdD 1955 Columbia U.


CARTER, WINFRED O. (1965) Asst. Prof. of Civil Engineering. BS U of Maryland, MS 1959, PhD 1964 Stanford U.


CHATELAIN, JACK E. (1957) Asso. Prof. of Physics. BS 1947, MS 1948 USU, PhD 1967 Lehigh U.


CHEN, CHEN-LUNG (1963) Asst. Prof. of Civil Engineering. BS 1964 Nat'l Taiwan Univ. MS 1960, PhD 1962 Mich St Univ.

CHILD, RAWSON D. (1948) Asso. Prof. of Manufacturing Engineering. BS 1947, MS 1953 USU.


CHRISTENSEN, RONDO A. (1967) Asso. Prof. of Agricultural Economics. BS 1964 USU, MS 1965, PhD 1957 Cornell U.

CHRISTENSEN, VAL R. (1965) Chairman of High School Relations and Student Programming in Student Services. BS 1966, MS 1964 USU.


CHRISTENSEN, JERALD E. (1946) Prof. of Civil, Agricultural and Irrigation Engineering. BS (AE) 1927 USU, MS (CE) 1935 U of Calif.

CHRISTENSEN, VANCE T. (1960) Asst. Prof. of Civil, Agricultural and Irrigation Engineering. BS 1959, MS 1960 U of Wyo.

CLARK, C. ELMER (1952) Asso. Prof. of Animal Science; Poultry Specialist, Extension Services. BS 1950 USU, MS 1959, PhD 1962 U of Maryland.

CLARK, CLAYTON (1937) Director, Engineering Experiment Station; Prof. of Electrical Engineering. BS (Physics) 1933 USU, EE 1947, PhD 1967 Stanford U.


CLAYTON, RUTH V. (1961) Instr. in Clothing and Textiles. BS 1947, MS 1953 USU.


*On leave.

COCHRAN, GEORGE W. (1948) Prof. of Botany. BS 1941, MS 1942 Kansas State C, PhD 1946 Cornell U.

COLE, LARRY S. (1939) Prof. and Head, Dept. of Electrical Engineering. BS 1940 U of U, MS 1945 USU, DEng 1960 Stanford U.

COLLIER, ROBERT P. (1968) Dean, C of Business and Social Sciences; Prof. of Business Administration. BA 1942 Reed C, PhD 1955 Stanford U.


COMPTON, NORMA H. (1963) Prof. and Head, Dept. Clothing and Textiles. AB 1940 Geo Wash U, MS 1942 U of Md.


CONDON, THOMAS P. (1962) Assoc Research Physicist, USU Concord Radiance Laboratory. BA 1941, MS 1946 USU.

COOK, C. WAYNE (1940) Assistant Dean of College and Prof. of Range Science. BS 1940 Kansas State C, MS 1942 USU, PhD 1950 Texas A & M.

CORDON, WILLIAM A. (1956) Asso. Prof. of Civil Engineering. BS 1956, MS 1962 USU.


CRAVEN, JOHN R. (1965) Asst. Prof. of Business and Psychology. BS, MS USU, PhD 1965 Purdue U.

CROCKETT, ZENNA BETH (1956) Asst. Prof. in English. BS 1949, MS 1960 USU.


CULMSEE, CARLTON F. (1945) Dean, C of Humanities and Arts; Prof. of American Civilization. BS 1922 BYU, MA 1937, PhD 1940 State U of Iowa.

DAINES, SPENCER H. (1943) Asst. to Dean, C of Engineering; Asso. Prof. of Civil Engineering. BS 1942 USU, MS 1950 Kansas State U.


DALEY, MARVIN (1965) Asst. Prof. of Psychology. BS, MS U of New Mexico, PhD 1962 U of Houston.

DANIEL, T. W. (1944) Prof. of Forest Science. BS 1934, MS 1936, PhD 1945 U of Calif.


DAVIS, LYNN H. (1952) Asso. Prof. of Agricultural Economics. BS 1949, MS 1953 USU, PhD 1960 Ore State U.

DAVIS, ROBERT (1961) Res. Asso., Veterinary Science. BS 1964 BYU.

DAY, WILFORD LAVON (1964) Instr. and County Agricultural Agent in Extension Service. BS 1964 USU.

DEGNER, CARL T. (1965) Assoc. Prof. of Languages. MA, LLD Gottingen U. (Germany).

DEHART, WILLIAM A. (1951) Asso. Prof. of Sociology. BS 1937 BYU, MA 1941 U of Minn, PhD 1950 U of Wis.


DEWEY, WADE G. (1956) Asso. Prof. of Plant Science. BS 1953 USU, PhD 1965 Cornell U.


DOIDGE, JOHN R. (1964) Asst. Prof. of Psychology. BS 1955, MA 1964 U of U.

DOWNS, LOIS (1949) Assoc. Prof. of Health, Physical Education and Recreation. BS 1945, MS 1949 USU.

DRAKE, ELDON M. (1961) Prof. of Education. BS 1943 USU, MS 1949, PhD 1951 Iowa State C.

DRAKER, C. I. (1946) Prof. of Animal Science. BS 1939 USU, PhD 1953 Iowa State C.

DRAPER, RULON (1964) Res. Asso., Plant Science. BS 1949 USU.
ERICKSON, SYLVAN


DURDAN, SCOTT (1965) Asst. Prof. of Business Admin. BA U of Hawaii, MS U of Oregon.


EISENSTEIN, IZYDOR (1959) Asso. Prof. of Mechanical Engineering. BS 1940, Dipl. Ing. 1942 Israel Institute of Technology, Haifa.

ELICH, JOE (1948) Director of Summer Institute and Prof. of Mathematics. BS 1940 USU, MA 1942 Calif.

ELLER, JESSIE (1954) Asst. Prof., Extension Services; Box Elder Co. Home Agent. BS 1940 USU.

ELLIS, LEGRANDE (1964) Asst. Prof. of Physiology. BS 1964, MS 1968 USU, PhD 1961 Okla St U.

ELLSWORTH, S. GEORGE (1951) Prof. of History. BS 1941 USU, MA 1947, PhD 1951 U of Calif.

ELSNER, LARRY E. (1960) Asst. Prof. in Art. BS 1957 USU, MFA 1958 Columbia U.


ENSIGN, DONALD (1963) Instr. in Landscape Architecture and Environmental Planning. BA 1963 USU.

ERICKSON, SYLVAN (1928) Controller. BS 1928 USU.

ERNSTROM, CARL A. (1965) Prof. of Dairy Science. BS 1949, MS 1951 USU, PhD 1966 U of Wis.

ESPLIN, GRANT M. (1946) Asso. Prof., Extension Services; Beaver Co. Agent. BS 1943 USU, MS 1942 U of Ariz.

ESPLIN, JAMES LYNN (1958) Asso. Prof., Extension Services; Juab Co. Agent. BS 1954 USU, MS 1956 Colo St U.


FINCH, RAY H. (1955) Asst. Prof., Extension Services; Box Elder Co. Agent. BS 1938 USU.

*FINCHUM, W. ARNOLD (1961) Asst. Prof. of Electrical Engineering. BS 1949, MS 1959 USU.


FLAMMER, GORDON H. (1958) Prof. of Civil Engineering. BS 1962, MS 1963 USU, PhD 1968 U of Minn.

FLETCHER, JOEL (1963) Res. Prof. Hydrology. (CE Sta.) BS 1934, MS 1937 USU.


FLOYD, J. WHITNEY (1936) Dean, C of Natural Resources; Prof. and Head, Dept of Forest Science. BS 1936 USU, MSc 1942 U of Calif.


FOGELBERG, THELMA (1930) Prof. of Languages. BS 1929 USU, MA 1933 U of South Calif., PhD 1939 L'Universite' de Paris, France.

FOK, YU-SI (1964) Asst. Res. Engr., Engr. Experiment Station. BS 1955 Nat'l Taiwan U, MS 1959, PhD 1964 USU.


FOULGER, ANN (1965) Instr. in Household Econ. and Management. BS 1960, MS 1963 Purdue U.

*On Leave.
FRANCE, EDWARD LeROY (1940) Asso. Prof. of Industrial and Technical Education. BS 1941, MS 1960 USU.

FRANDSEN, ARDEN N. (1938) Prof of Psychology. BS 1927, MS 1929 U of U, PhD 1932 U of Minn.

FULLER, PAULINE (1961) Asst. Prof. of Health, Physical Education and Recreation. BS 1939, MS 1963 USU.


*FUNK, C. DENNIS (1953) Asst. Prof. Extension Services; Sanpete Co. Agent. BS 1953 USU, MS 1956 USU.


FURNESS, DEWEY (1964) Lecturer in Mathematics. BS 1966 Ricks College, MS 1965 USU.

GALLI, GEORGE (1965) Asst. Football Coach, Wrestling Coach. BS 1957 USC.


GARDNER, DALE L. (1965) Adm. Asst. Athletics; Instr. in Physical Education. BS 1953, MS 1962 USU.

GARDNER, ELDON J. (1949) Dean, College of Science; Prof. of Zoology. BS 1934, MS 1935 USU, PhD 1939 U of Calif.


GARDNER, RHEA H. (1939) Home Management and Furnishings Specialist, Extension Services; Asso. Prof. BS 1938 USU, MA 1947 Cornell U.

GARFIELD, GENE JENSEN (1963) Instr. in Library Science, BS 1961, MS 1965 USU.


GRAPE, EUGENE F. (1965) Asst. Prof. of Business Administration. AB Brooklyn Col, MBA, PhD 1966 Ohio St U.

GREENWOOD, DELBERT A. (1946) Prof. of Biochemistry and Pharmacology. BS 1926, MS 1930 BYU, PhD 1946 U of Chicago.


GRIFFIN, RICHARD E. (1965) Asso. Prof. and Water Use Specialist in Agricultural and Irrigation Engr. BS, MS USU.

GRIMSHAW, PAUL R. (1952) Marketing Specialist and Asso. Prof., Extension Services; Ext. Marketing Spec. BS 1948, MS 1949 USU.


GROVER, BEN LEO (1964) Asso. Prof. of Soils and Meteorology. BS 1949, MS 1960 USU, PhD 1959 Iowa State U.


GUNNELL, MERRILL H. (1947) Director of Summer Institute and Asso. Prof. of Zoology. BS 1930, MS 1948 USU.

HAAS, JOHN DAVID (1964) Asst. Prof. of Secondary Education. BA 1953 Hope College Minn, MA 1959, PhD U of Mich.

HAILES, CHARLES W. (1949) Asso. Prof. of Industrial and Technical Education. BS 1948, MS 1953 USU.

HALE, BLAIR (1965) Supervisor of Student Placement Office. BS 1941 Wyo U, MS 1956 Colo U.


HALSTROM, FRANCES J. (1964) Asso. Prof. of Special Education. BA 1938 Iowa St Col, MA 1960, EdD 1962 Colo St Col.

*HAMMOND, DATUS M. (1936) Prof. and Head, Dept. of Zoology. BS 1932 USU, MA 1934, PhD 1936 U of Calif.


HAMMOND, ROBERT G. (1956) Asst. Prof. of Mathematics. BS 1948, MS 1962 USU.

HAMSON, ALVIN R. (1955) Prof. of Plant Science. BS 1948 USU, PhD 1952 Cornell U.

HANSEN, ARLEN L. (1967) University Photographer; Asst. Prof. of Photography. BS 1962, MS 1958 USU.

HANSEN, BASIL C. (1954) Prof. of Education. BA, MA 1933 BYU, EdD 1947 Stanford U.

*On leave.
HANSEN, BURRELL F. (1948) Chairman, Radio and Television; Coordinator of Broadcasting; Prof. of Speech. BS 1940 USU, MS 1942 Purdue U, PhD 1953 U of Minn.

HANSEN, NORVEL (1963) Head Baseball Coach. BS 1950, MS 1964 USU.

HANSEN, RICHARD (1965) Asst. Prof. of Mathematics. BS 1969, MS 1961, PhD 1965 U of U.

HANSEN, VAUGHN E. (1949) Director of Utah Water Res. Lab. and Coord. of Venezuela Program; Prof. of Civil and Irrigation Engineering. BS 1943, MS 1947 USU, PhD 1949 State U of Iowa.

HANSON, GARTH A. (1965) Asst. Prof. of Business Education and Office Admin. BS, MS USU.


HARPER, ELAINE B. (1962) Asst. Prof. in Bookstore.

HARRIS, RONNEY (1957) Custodian.

HARRIS, LORIN (1945) Prof. of Animal Science. BS 1943, MS 1948, PhD 1949 Ohio State U.

HARMON, M. JUDD (1951) Prof. and Head, Dept. of Political Science. BS 1948 USU, MS 1950, PhD 1953 U of Wis.


HARRIS, LORIN E. (1945) Prof. of Animal Science. BS 1937 USU, MS 1938, PhD 1940 U of Ill.

HARRIS, RICHARD Asst. Res. Engr in Electrical Engr. MS 1964 USU.

HARRIS, RONNEY D. (1964) Asst. Prof. of Electrical Engineering. BS 1954, PhD 1964 U of U.

HARWARD, JANET (1962) Instr. in English. BS 1961, MS 1962 USU.

HASLEM, DEAN W. (1950) Manager, USU Bookstore. BS 1949 BYU, MS 1957 USU.


HASSELL, ROBERT L. (1947) Asso. Prof., Extension Services; Carbon Co. Agent. BS 1942 BYU, MS 1957 Cornell U.


HAWS, B. AUSTIN (1957) Asso. Prof. of Entomology. BS 1948, MS 1949 USU, PhD 1955, Iowa State U.

HEALY, MARILYN (1965) Instr. in English. BS 1964 USU.

HELMS, WILLIAM T. (1959) Asst. Prof. of Wildlife Resources. BS 1960, MS 1951, PhD 1958 U of Wis.

HENDRICKS, DAVID W. (1965) Asso. Prof. in Utah Water Res. Lab. BS U of Calif, MS USU, PhD St U of Iowa.

HENDRICKS, KING (1935) Prof. and Head, Dept. of English and Journalism. BS 1923 USU, MA 1926, PhD 1941 Stanford U.

HEYBORNE, ROBERT L. (1967) Asst. Prof. of Electrical Engineering. BS 1949, MS 1960 USU.


HIGGINS, DONNA JEAN (1965) Editor, Utah Water Res. Lab. BS 1963 USU.

HILL, KENNETH WILFORD (1963) Asso. Director, Agricultural Experiment Station and Prof. BS 1940 USU, MS 1947 U of Alberta, PhD 1951 U of Nebr.

HILL, LEON M. (1957) Instr. in Industrial, Technical Education. BS 1952 USU.

HIMES, ELLVERT G. (1954) Prof. of Education; Director of Summer School; AA 1929 Kansas City Jr. C., BS 1931 U of U, MA 1937 U of Kansas, PhD 1959 U of U.


HOBBROCK, BRICE G. (1963) Asst. Prof. of Chemistry. BA 1959 Kans St Tea Col, MS 1961, PhD 1963 Kansas St U.


HOFFMAN, C. A. (1965) Asso. Prof. of Economics. BS, MBA, PhD 1965 U of U.

HOLMEN, ARTHUR H. (1943) Asso. Prof. of Botany. BA 1936 U of U, MS 1942 USU.

*HORNE, RALPH H. (1963) Asst. Prof. Extension Services; Carbon Co. Agent. BS 1960 USU.


HUBER, DON (1961) Asst. Prof., Extension Services; Washington Co. Agent. BS 1960, MS 1962 USU.


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Griffin, Gerald D., BS, MS, PhD Agricultural Research Service
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- Reed M. Broadbent, Omar S. Budge, John H. Carlquist, W. Ezra Cragun, Newel G. Daines, Jr., Vern B. Eyre, Russell S. Fraser, George W. Gasser, L. Keith Gates, J. Clare Hayward, Harry G. Hicks, Clyde F. Hurst, R. N. Malouf, Clair L. Payne, Sidney Roskelley, Keith L.
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