1963

General Catalog 1963

Utah State University

Follow this and additional works at: https://digitalcommons.usu.edu/universitycatalogs

Recommended Citation
Utah State University, "General Catalog 1963" (1963). University Catalogs. 92.
https://digitalcommons.usu.edu/universitycatalogs/92
UTAH STATE UNIVERSITY

Founded at Logan in 1888

USU DIAMOND JUBILEE 1888-1963

1963-64 Catalog
USU Calendar, 1963-64

Summer Quarter, 1963

June 8, Monday
  Registration

June 9, Tuesday
  Class Instruction for First Session Begins

July 4, 5, Thursday, Friday
  Holidays

July 10, Friday
  First Session Ends

July 13, Monday
  Second Session Begins

July 24, Friday
  University Holiday

August 14, Friday
  Second Session Ends

Fall Quarter, 1963

September 9, Monday
  All Staff on Campus

September 11, Wednesday
  General Staff Meeting

September 12, 13, Thursday, Friday
  Utah Conference on Higher Education

September 16, Monday
  University Faculty Meeting

September 23, Monday
  Testing for entering freshmen and foreign student English placement

September 24, Tuesday
  Orientation

September 25, Wednesday
  New Student Registration

September 26, Thursday
  Former Student Registration

September 27, Friday
  First Day of Classes

September 28, Saturday
  Late Registration Fee Effective

October 18, Friday
  Last Day for Changing Registration

October 26, Saturday
  Homecoming

November 28-29, Thursday and Friday
  Thanksgiving Recess

December 13-17, Friday - Tuesday
  Final Examinations

December 18, Wednesday
  Christmas Vacation Begins

Winter Quarter, 1964

January 3, 4, Friday and Saturday
  Until Noon
  Registration

January 6, Monday
  Class Instruction Begins

January 7, Tuesday
  Late Registration Fee Effective

January 24, Friday
  Last Day for Changing Registration

March 16-19, Monday - Thursday
  Final Examinations

Spring Quarter, 1964

March 23, 24, Monday and Tuesday, Until Noon
  Registration

March 25, Wednesday
  Class Instruction Begins

March 26, Thursday
  Late Registration Fee Effective

April 14, Tuesday
  Last Day for Changing Registration

May 30, Thursday
  Memorial Day Holiday

June 1 - 4, Monday - Thursday
  Final Examinations

June 5, Friday
  Baccalaureate

June 6, Saturday
  Commencement
Guide to Catalog Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Board of Trustees, Administration</td>
<td>6</td>
</tr>
<tr>
<td>University Departments of Instruction</td>
<td>8</td>
</tr>
<tr>
<td>Tuition and Other Fees,</td>
<td>4</td>
</tr>
<tr>
<td>General Information on the University</td>
<td>9</td>
</tr>
<tr>
<td>University Library,</td>
<td>12</td>
</tr>
<tr>
<td>Catalog Numbering System,</td>
<td>13</td>
</tr>
<tr>
<td>Admissions and Records,</td>
<td>15</td>
</tr>
<tr>
<td>Admission: Entrance Requirements, Registration and Credits,</td>
<td>20</td>
</tr>
<tr>
<td>Lower Division Requirements,</td>
<td>25</td>
</tr>
<tr>
<td>Upper Division Requirements,</td>
<td>27</td>
</tr>
<tr>
<td>Graduation Requirements,</td>
<td>28</td>
</tr>
<tr>
<td>College of Agriculture,</td>
<td>31</td>
</tr>
<tr>
<td>Dept. of Agricultural Economics,</td>
<td>37</td>
</tr>
<tr>
<td>Dept. of Agronomy,</td>
<td>39</td>
</tr>
<tr>
<td>Dept. of Animal Husbandry,</td>
<td>43</td>
</tr>
<tr>
<td>Dept. of Dairy Industry,</td>
<td>46</td>
</tr>
<tr>
<td>Dept. of Horticulture,</td>
<td>48</td>
</tr>
<tr>
<td>Dept. of Poultry Husbandry,</td>
<td>51</td>
</tr>
<tr>
<td>Dept. of Veterinary Science,</td>
<td>52</td>
</tr>
<tr>
<td>College of Business and Social Sciences,</td>
<td>57</td>
</tr>
<tr>
<td>Dept. of Business Administration,</td>
<td>60</td>
</tr>
<tr>
<td>Dept. of Business Education and Office Administration,</td>
<td>66</td>
</tr>
<tr>
<td>Dept. of Economics,</td>
<td>73</td>
</tr>
<tr>
<td>Dept. of History and Political Science,</td>
<td>75</td>
</tr>
<tr>
<td>Dept. of Sociology and Social Work,</td>
<td>82</td>
</tr>
<tr>
<td>Division of Military and Air Sciences,</td>
<td>86</td>
</tr>
<tr>
<td>College of Education,</td>
<td>99</td>
</tr>
<tr>
<td>Dept. of Agricultural Education,</td>
<td>103</td>
</tr>
<tr>
<td>Dept. of Education,</td>
<td>104</td>
</tr>
<tr>
<td>Dept. of Health, Physical Education and Recreation,</td>
<td>113</td>
</tr>
<tr>
<td>Library Science,</td>
<td>121</td>
</tr>
<tr>
<td>Dept. of Psychology,</td>
<td>122</td>
</tr>
<tr>
<td>College of Engineering,</td>
<td>129</td>
</tr>
<tr>
<td>Dept. of Civil and Irrigation Engineering,</td>
<td>135</td>
</tr>
<tr>
<td>Dept. of Electrical Engineering,</td>
<td>144</td>
</tr>
<tr>
<td>Dept. of Mechanical Engineering,</td>
<td>148</td>
</tr>
<tr>
<td>Dept. of Tool and Manufacturing Engineering,</td>
<td>152</td>
</tr>
<tr>
<td>Dept. of Industrial and Technical Education,</td>
<td>154</td>
</tr>
<tr>
<td>College of Family Life,</td>
<td>169</td>
</tr>
<tr>
<td>Dept. of Clothing and Textiles,</td>
<td>172</td>
</tr>
<tr>
<td>Dept. of Family and Child Development,</td>
<td>174</td>
</tr>
<tr>
<td>Dept. of Food and Nutrition,</td>
<td>177</td>
</tr>
<tr>
<td>Dept. of Homemaking Education,</td>
<td>179</td>
</tr>
<tr>
<td>Dept. of Household Economics and Management,</td>
<td>181</td>
</tr>
<tr>
<td>College of Forest, Range and Wildlife Management,</td>
<td>185</td>
</tr>
<tr>
<td>Dept. of Forest Management,</td>
<td>189</td>
</tr>
<tr>
<td>Dept. of Range Management,</td>
<td>193</td>
</tr>
<tr>
<td>Dept. of Wildlife Resources,</td>
<td>196</td>
</tr>
<tr>
<td>College of Humanities and Arts,</td>
<td>199</td>
</tr>
<tr>
<td>Liberal Studies,</td>
<td>202</td>
</tr>
<tr>
<td>Dept. of English and Journalism,</td>
<td>204</td>
</tr>
<tr>
<td>Dept. of Fine Arts,</td>
<td>211</td>
</tr>
<tr>
<td>Dept. of Landscape Architecture and Environmental Planning,</td>
<td>225</td>
</tr>
<tr>
<td>Dept. of Languages,</td>
<td>227</td>
</tr>
<tr>
<td>Dept. of Speech,</td>
<td>233</td>
</tr>
<tr>
<td>College of Science,</td>
<td>237</td>
</tr>
<tr>
<td>Dept. of Applied Statistics and Computer Science,</td>
<td>240</td>
</tr>
<tr>
<td>Dept. of Bacteriology and Public Health,</td>
<td>243</td>
</tr>
<tr>
<td>Dept. of Botany and Plant Pathology,</td>
<td>247</td>
</tr>
<tr>
<td>Dept. of Chemistry,</td>
<td>249</td>
</tr>
<tr>
<td>Dept. of Geology,</td>
<td>253</td>
</tr>
<tr>
<td>Dept. of Mathematics,</td>
<td>254</td>
</tr>
<tr>
<td>Dept. of Physics,</td>
<td>257</td>
</tr>
<tr>
<td>Dept. of Zoology,</td>
<td>260</td>
</tr>
<tr>
<td>School of Graduate Studies,</td>
<td>267</td>
</tr>
<tr>
<td>Summer School,</td>
<td>279</td>
</tr>
<tr>
<td>Branch Colleges,</td>
<td>281</td>
</tr>
<tr>
<td>College of Southern Utah,</td>
<td>283</td>
</tr>
<tr>
<td>Snow College,</td>
<td>284</td>
</tr>
<tr>
<td>Extension Services,</td>
<td>285</td>
</tr>
<tr>
<td>Cooperative Extension Service,</td>
<td>287</td>
</tr>
<tr>
<td>Extension Classwork and Home Study,</td>
<td>288</td>
</tr>
<tr>
<td>Information Services,</td>
<td>291</td>
</tr>
<tr>
<td>Research Programs,</td>
<td>293</td>
</tr>
<tr>
<td>Division of University Research,</td>
<td>295</td>
</tr>
<tr>
<td>Agricultural Experiment Station,</td>
<td>297</td>
</tr>
<tr>
<td>Engineering Experiment Station,</td>
<td>300</td>
</tr>
<tr>
<td>Utah Scientific Research Foundation,</td>
<td>302</td>
</tr>
<tr>
<td>School of Graduate Studies,</td>
<td>303</td>
</tr>
<tr>
<td>Utah Cooperative Wildlife Research,</td>
<td>303</td>
</tr>
<tr>
<td>Utah Cooperative Fishery Research,</td>
<td>304</td>
</tr>
<tr>
<td>Bureau of Educational Research,</td>
<td>304</td>
</tr>
<tr>
<td>Student Services and Activities,</td>
<td>305</td>
</tr>
<tr>
<td>Alumni Association and University Development,</td>
<td>327</td>
</tr>
<tr>
<td>University Faculty and Collaborators,</td>
<td>331</td>
</tr>
<tr>
<td>Index,</td>
<td>353</td>
</tr>
<tr>
<td>Campus Map, insid e back cover,</td>
<td></td>
</tr>
</tbody>
</table>
Tuition and Other Fees

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

Fees Per Quarter

Fall, Winter and Spring Quarters, each

<table>
<thead>
<tr>
<th></th>
<th>Resident Students</th>
<th>Non-Resident Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuition and</td>
<td>$53.50</td>
<td>$108.50</td>
</tr>
<tr>
<td>Registration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Fees</td>
<td>19.50</td>
<td>19.50</td>
</tr>
<tr>
<td>Total Fees</td>
<td>$73.00</td>
<td>$128.00</td>
</tr>
</tbody>
</table>

Summer Quarter

Total Fees: $40 for one session or $65 for both sessions, whether resident or non-resident student.

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, Air Science, or one hour of Physical Education) $10.00

Students may register for 19 hours per quarter without paying excess registration fees.

Automobile Parking Permit: $1.00 per year.

LATE REGISTRATION FEE: $5 beginning second day after specified Registration Days: additional $1 for each additional 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 $4 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

1 Part ........................................ 3.50
2 Parts ...................................... 5.50
Graduation Fee ................................ 5.00
Teacher Supervision 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

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

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.

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

College of Forest, Range, and Wildlife Management—

Senior Field problems:

Forestry 146 .................................. 35.00
Range Management 196 ....................... 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:

One lesson per week (10 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, Chester J. Myers, 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.

After a student has paid a total of $30.00 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.

Notice on Liberal Arts Degrees

By a law passed by the 1963 Utah State Legislature, Utah State University is now authorized to grant Liberal Arts degrees.

Because of the time of passage of the law it was impossible to make specific reference to this throughout the catalog. Interested students should check with their advisers on this matter.
Utah State University Board of Trustees

CHAIRMAN
Alma Sonne, Logan

VICE CHAIRMAN
Fern Erkanbrack*, Provo

Newell V. Sanders*, Kaysville
R. J. Potter, Garland
Henry R. Hurren, Logan
Ralph S. Blackham, Moroni
David W. Evans, Salt Lake City
Phillip A. Bullen, Salt Lake City
Reed W. Farnsworth, Cedar City
Sid H. Eliason, Sr., Salt Lake City
N. D. Salisbury, Logan
E. O. Larson**, Salt Lake City
Lucile O. Petty**, Ogden
Alva C. Snow**, Roosevelt

EX-OFFICIO MEMBERS
Lamont F. Toronto, Salt Lake City, Secretary of State
Joseph E. Whitesides, Salt Lake City, President, USU Alumni Assn.

SECRETARY TO THE BOARD
L. Mark Neuberger, Logan

*Term Expires June 30, 1963
**Term Begins July 1, 1963
Officers of Administration

Daryl Chase, President
M. R. Merrill, Vice President
Dee A. Broadbent, Vice President
Alan A. Matheson, Assistant to the President
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
Phyllis R. Snow, Dean, College of Family Life
J. Whitney Floyd, Dean, College of Forest, Range and Wildlife Management
Carlton F. Culmsee, Dean, College of Humanities and Arts
Eldon J. Gardner, Dean, College of Science
D. Wynne Thorne, Director, University Research and Agricultural Experiment Station
William H. Bennett, Director, Extension Services
L. Mark Neuberger, Dean, Admissions and Records
Claude J. Burtenshaw, Dean of Students
Leah Dunford, Dean of Women
Royden C. Braithwaite, Director, College of Southern Utah
Floyd S. Holm, Director, Snow College
Gene S. Jacobsen, Director, Summer School
Milton C. Abrams, Librarian
Sylvan Erickson, Controller
LeRoy A. Blaser, Director, Information Services
Vaughn E. Hansen, Director, Engineering Experiment Station
H. B. Hunsaker, Director, Athletics
# University Departments of Instruction

<table>
<thead>
<tr>
<th>Department</th>
<th>Department Head</th>
<th>Office Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural Economics</td>
<td>George T. Blanch</td>
<td>Ag Science 133</td>
</tr>
<tr>
<td>Agricultural Education</td>
<td>Stanley S. Richardson</td>
<td>Ag Science 15</td>
</tr>
<tr>
<td>Agronomy</td>
<td>Howard B. Peterson</td>
<td>Ag Science 225</td>
</tr>
<tr>
<td>Air Science</td>
<td>Lloyd R. Pugh, Jr.</td>
<td>MS 104</td>
</tr>
<tr>
<td>Animal Husbandry</td>
<td>James A. Bennett</td>
<td>Animal Ind. 307</td>
</tr>
<tr>
<td>Applied Statistics and</td>
<td>Rex L. Hurst</td>
<td>Main 15</td>
</tr>
<tr>
<td>Computer Science</td>
<td></td>
<td>Plant Ind. 310</td>
</tr>
<tr>
<td>Botany, Public Health</td>
<td>W. Whitney Smith</td>
<td>Plant Ind. 201</td>
</tr>
<tr>
<td>Business Administration</td>
<td>Orson S. Cannon</td>
<td>Main 181</td>
</tr>
<tr>
<td>Business Education and</td>
<td>Robert P. Collier</td>
<td>Main 376</td>
</tr>
<tr>
<td>Office Administration</td>
<td>Robert E. Wiper</td>
<td></td>
</tr>
<tr>
<td>Chemistry</td>
<td>Melvin C. Cannon</td>
<td>Widtsoe 111</td>
</tr>
<tr>
<td>Civil and Irrigation Engineering</td>
<td>Elliot Rich (acting)</td>
<td>EPS 150</td>
</tr>
<tr>
<td>Clothing and Textiles</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dairy Industry</td>
<td>Norman H. Compton</td>
<td>Family Life 204</td>
</tr>
<tr>
<td>Economics</td>
<td>George E. Stoddard</td>
<td>Animal Ind. 101</td>
</tr>
<tr>
<td>Education</td>
<td>Evan B. Murray</td>
<td>Main 315B</td>
</tr>
<tr>
<td>Electrical Engineering</td>
<td>John C. Carlisle</td>
<td>Education 203</td>
</tr>
<tr>
<td>English and Journalism</td>
<td>Larry S. Cole</td>
<td>EPS 130</td>
</tr>
<tr>
<td>Family and Child Development</td>
<td>King Hendricks</td>
<td>Library 320</td>
</tr>
<tr>
<td>Fine Arts</td>
<td>Don C. Carter</td>
<td>Family Life 118</td>
</tr>
<tr>
<td>Food and Nutrition</td>
<td>Twain Tippetts</td>
<td>Main 333</td>
</tr>
<tr>
<td>Forest Management</td>
<td>Inez L. Schoultie</td>
<td>Fam. Life 104-D</td>
</tr>
<tr>
<td>Geology</td>
<td>J. Whitney Floyd</td>
<td>FBS 101</td>
</tr>
<tr>
<td>Health, Physical Education and</td>
<td>J. Stewart Williams</td>
<td>Main 182-F</td>
</tr>
<tr>
<td>Recreation</td>
<td>H. B. Hunsaker</td>
<td>Smart Gym 26</td>
</tr>
<tr>
<td>History and Political Science</td>
<td>M. R. Merrill</td>
<td>Main 103</td>
</tr>
<tr>
<td>Homemaking Education</td>
<td>Virginia H. Harder</td>
<td>Family Life 209</td>
</tr>
<tr>
<td>Horticulture</td>
<td>Leonard H. Pollard</td>
<td>Ag Science 204</td>
</tr>
<tr>
<td>Household Economics and Management</td>
<td>Edith Nyman</td>
<td>Fam. Life 204-B</td>
</tr>
<tr>
<td>Industrial and Technical Education</td>
<td>Carl R. Bartel</td>
<td>Mech. Arts 105</td>
</tr>
<tr>
<td>Landscape Architecture and</td>
<td>Laval S. Morris</td>
<td>Main 34</td>
</tr>
<tr>
<td>Environmental Planning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Languages</td>
<td>Austin E. Fife</td>
<td>Main 360</td>
</tr>
<tr>
<td>Mathematics</td>
<td>Neville C. Hunsaker</td>
<td>EPS C-306</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>Reynold K. Watkins</td>
<td>EPS 168</td>
</tr>
<tr>
<td>Military Science</td>
<td>Chester H. Anderson</td>
<td>MS 101</td>
</tr>
<tr>
<td>Physics</td>
<td>John K. Wood</td>
<td>EPS 140</td>
</tr>
<tr>
<td>Poultry Husbandry</td>
<td>Carroll I. Draper</td>
<td>Animal Ind. 203</td>
</tr>
<tr>
<td>Psychology</td>
<td>Arden N. Frandsen</td>
<td>Education 302</td>
</tr>
<tr>
<td>Range Management</td>
<td>L. A. Stoddart</td>
<td>FBS 122</td>
</tr>
<tr>
<td>Sociology and Social Work</td>
<td>R. Welling Roskelley</td>
<td>Main 212</td>
</tr>
<tr>
<td>Speech</td>
<td>Rex E. Robinson</td>
<td>Main 77</td>
</tr>
<tr>
<td>Tool and Manufacturing Engineering</td>
<td>Frederick Preator</td>
<td>Mech. Arts 101</td>
</tr>
<tr>
<td>Veterinary Science</td>
<td>Merthyr L. Miner</td>
<td></td>
</tr>
<tr>
<td>Wildlife Resources</td>
<td>William F. Sigler</td>
<td>Vet. Science</td>
</tr>
<tr>
<td>Zoology</td>
<td>Datus M. Hammond</td>
<td>FBS 131</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FBS 116</td>
</tr>
</tbody>
</table>
Utah State University

Utah’s State-wide University

History and Organization. Utah State University and its two branch colleges belong to a great family of institutions known as Land-Grant Universities. These had their origin in 1862 when Abraham Lincoln signed the Morrill Bill, which provided federal lands to aid in their material support.

USU operates under the constitution and laws of Utah, under which it and its Agricultural Experiment Station were established in 1888 as a part of the public educational system of the state.

Land-Grant institutions added two significant dimensions to educational theory and practice for the United States and eventually for the world.

The first is that educational opportunities at the highest levels should be offered to all—to children of farmers and of ordinary workers, as well as to children of the leisureed and well-to-do.

The second is that man’s applied, practical concerns are worth his full, dedicated, intelligent effort, and that education in them can help eliminate many of his ills. The breadth of curricular offerings and research projects in Land-Grant institutions is comparably greater than that found in universities before the movement started. Particularly significant is the part played by these new institutions in leading man to his present mastery of water and soil, of plant and animal life.

So spectacular, in fact, have been the contributions of Land-Grant Universities in such areas that some people not directly acquainted with them overlook their contributions in more traditional education. The Morrill Act specified that the institutions were to give “liberal” as well as practical education, were to include “scientific and classical studies” as well as technical.

Thus when the Land-Grant system opened higher education’s curriculum to subjects and its doors to students never before admitted, to neither the students nor the curriculum did it deny association with the scientific and humanistic traditions central to older style universities. It broadened higher education with its unique additions, but it did not discard our educational heritage. Instead, with its democratic admissions policy, it put ordinary citizens in touch with their own culture more thoroughly than any society had ever let them do before.

Last year the Land-Grant System observed its Centennial year. This year Utah State University celebrates its own Diamond Jubilee. From its origin in 1888, USU has been faithful to its Federal and State charters in providing educational opportunities both liberal and practical. It has provided training in physical and biological sciences, in social sciences, in the humanities and in the arts. A student at USU may study agriculture in any of its many branches. He may also study art and music and literature. He may study forestry or floriculture, business or political science, engineering or languages.
A Land-Grant university rests upon a firm educational tripod of teaching, research, and extension services. It is not a loose aggregate of individual schools and colleges, but an institution of higher education which provides for students any combination of technical, scientific, liberal and professional training that they may desire. It offers scores of refresher short courses to thousands of Utahns in all occupations, and on-the-spot help of many types through its county and home demonstration agents.

Utah State University comprises eight residence colleges, a graduate school, and two branch colleges—Snow College at Ephraim and the College of Southern Utah at Cedar City.

Foreign Technical Assistance. The international influence of USU has best been demonstrated through its program with the government of Iran. The University has a contract with the Agency for International Development, of the U. S. State Department, to give technical assistance to the people of Iran in the fields of plant science, agricultural engineering, animal science and agricultural extension work. In addition, the University serves in an advisory capacity to Karadj Agricultural College to aid in its program of services to the agricultural interests of Iran. The University has supplied more than fifty technicians to work in Iran.

This year it has also begun important pilot programs in the cultures of the Far East and of Latin America, both of which have been extensively represented in the student body at USU for many years.

USU students from foreign lands are being trained for leadership positions in their respective countries, in agriculture, engineering, drainage and farm mechanics, humanities, social sciences, natural and physical sciences, business administration and education.

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

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.

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

College of Engineering is a member of the American Society for Engineering Education, Engineering College Research Council and Engineering College Administrative Council. Its curricula in civil
engineering, electrical engineering and mechanical engineering are accredited by the Engineering Council for Professional Development.

College of Forest, Range and Wildlife Management is accredited by the Society of American For-
University Library

Library Milton C. Abrams; Assistant Librarian D. Lamont Chappell; Public Services Librarian R. Kent Wood; Reference Librarian Ida Marie Logan; Assistant Reference Librarian Martha Dixon; Circulation Librarian Anne M. Caine; Cataloging Librarian Dixie Drage; Serials Librarian Jeanne Chapin*; Documents Librarian Vilate Ransom; Acquisitions Librarian Helen Harmon; Anne Carroll Moore Children's Librarian Anna Marie Smith; Audio-Visual Librarian G. Leon Beutler.

Office on Library Mezzanine

The University Library maintains a program consistent with the growth and increased demands of the faculty and student body. The organization of the Library system is as follows:

(I) Branch Libraries, located in the colleges they serve: (A) Engineering. (B) Forest, Range and Wildlife Management.

(II) 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. (B) Audio-Visual Library, in the basement of Old Main. Provides film services on and off the campus. (C) Claypool Map Library, in the Geology department in Old Main. Features geologic maps as well as several other types which are available for general campus use. (D) Hatch Memorial Library, represents an authentic Sixteenth century setting. It houses the Library's collection of rare books along with the most valuable books on art and architecture.

*On leave.

(III) Resources of the Library includes: (A) Approximately 365,000 volumes; (B) 2,600 periodical subscriptions; (C) 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.

(IV) 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 teaching major in any field and the courses may be used to meet the Library requirements of the Northwest Association of Secondary and Higher Schools.


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, S, 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 (5F, W, S) 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, SW, SS). That means that each of the three courses, 1, 2, and 3, offers three credits.

Where a single course, for example Music 132, Choir, has such an entry: (1F, 1W, 1S) 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 be only tentative; it is well to check the Class Schedule or to consult the course instructor or department head for verification.
Office of Admissions and Records
Office of

Admissions and Records

Admission: Entrance Requirements, 18
Registration and Credits, 20
Lower Division Requirements, 25
Upper Division Requirements, 27
Graduation Requirements, 28
Office of Admissions and Records

DEAN L. Mark Neuberger; RECORDS OFFICER Asa L. Beecher; ADMISSIONS COUNSELOR Thelma B. Waddoups.

Office in Main 131

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: Entrance Requirements

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 two weeks prior to registration day. If his application is received after this deadline but prior to registration day, a student will be scheduled to register after the regular registration schedule is completed.

If one registers late as a result of late application he is subject to the late registration fee.

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.

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 below 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 Academic Standards 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 insufficient 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 list them in their college and departmental sections in this catalog.
Even though a student is not a high school graduate he may be admitted by presenting satisfactory evidence of ability to do University work. This evidence may be demonstrated by presentation of an official transcript showing collegiate work previously taken as an unmatriculated student, or by examination taken in advance of registration. Such examinations as American College Testing Program (ACT), College Entrance Examination Board, the School and College Ability Test, or other approved standardized tests which provide appropriate appraisal of scholastic abilities of the applicant shall be accepted for fulfilling this requirement.

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 Academic Standards 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 130, or, in the case of LDS accommodations, to David O. McKay Student Living Center, 10th North and 13th East, Logan.

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 his 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 Academic Standards Committee. Test scores, recommendations of counselors and others, and 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 Academic Standards 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 at least two weeks in advance, except that for the autumn quarter applications are not required of those in attendance the previous spring quarter.

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-eight credits of approved college work in addition to the prescribed entrance requirements are required for Sophomore rank; 96 credits for Junior and Upper Division rank; and 136 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.

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.

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.

Procedure for Dropping Classes or Withdrawing from the University After the Third Week of the Quarter. If for any reason it is necessary to leave the campus before the end of the quarter, take the necessary steps to withdraw from the Institution officially.

Dropping Classes. (1) Obtain change of registration card from Office of Admissions and Records; (2) Obtain the signature and recommendation of the adviser. (3) Obtain the signature and recommendation of the dean. (4) Pay change fee at Controller’s Office. (5) Take card to instructor for signature and grade. (6) Instructor returns card to dean who sends it to the Office of Admissions and Records.

Students, who withdraw or drop a class after the third week of the quarter, will have grades of WP (passing) or WF (failing) recorded on their official records.

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 (c) Office of Veteran’s Affairs (if applicable). (4) Pick up yellow class card from each instructor. (5) Take class cards, Withdrawal Permit, and Withdrawal Notice to the Office of Admissions and Records. (6) Take Withdrawal Notice to Controller’s Office for refund.

Visitor’s Permit. 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. A fee of $10 per class is charged for the privilege of auditing. Visitor’s permit forms may be obtained from the Office of Admissions and Records. These forms include an authorization to the instructor for admittance to the class. These 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 without approval for excess credit is set at nineteen quarter hours exclusive of two credits in basic Military Science, or Air Science, or one credit in Physical Education. Only the dean of the college in which the student is registering has authority to approve registration in excess of this maximum. 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 page 6—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 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 credit is forfeited.

**Low Scholarship and Probation.** If a student has not maintained an average grade of "C" or better, or if he is failing to obtain passing grades in twelve or more credits during the preceding quarter, he is automatically 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 over-all 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 Academic Standards 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 Academic Standards 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 Academic Standards Committee to re-register in that unit. In such cases the Chairman of the Academic Standards 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 probation and fails to maintain a satisfactory grade point average for two quarters, he may be suspended at the end of the second quarter if coming directly into the University from high school. Students transferring from another collegiate institution, who are admitted on probation, may have only one quarter in which to remove probationary 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.

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 comprises the work of 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 Upper Division.

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 assure the best choice of courses for filling the groups and to provide the proper foundation for advanced work. Failure to do this may necessitate an extra year to complete the work for the desired degree.

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

1. Remove any deficiencies that may exist in the entrance requirements.

2. Complete 96 credits (quarter hours) of work (including Military Science, Air Science, or Physical Education) with an average of "C" or higher.

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

4. Satisfy the (A) English, (B) Group, (C) Military Science, Air Science or Physical Education requirements, as follows:

   (A) English Composition

   1. A placement examination in English is required of all freshmen.

   2. 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.

   Note: For graduation all students must present nine hours in Basic Communication or its equivalent. See Paragraph 6 under "Summary of Requirements for Graduation."

   (B) Group Requirements

   A minimum of 43 credit hours must be completed in general education, including not fewer than 18 hours in the natural sciences—which should include five hours in the biological sciences and five hours in the physical sciences—and 25 hours in the humanities and in social and behavioral sciences. At least 10 hours in humanities and 10 in the social and behavioral sciences must be included in the total of 25. Departments can require of their major students up to 25 hours credit in any of these three areas: natural sciences, social and behavioral sciences, and humanities.

   Courses and conditions for filling group requirements in each of these three areas are as follows:

   1. Natural Sciences: Bacteriology, Botany, Chemistry, Geology, Mathematics, Physics, Physiology and Zoology.

   *Note: For graduation in engineering see College of Engineering section of catalog for recommended social science and humanities courses.
At least one course must include a lab. Courses should be taken in both the biological sciences and in the physical or exact sciences. No more than five hours of math can be counted toward fulfillment of the requirement. Courses for filling the natural sciences are: Bacteriology 1, 10, 70, 71; Botany 1, 24, 25; Chemistry 3, 4, 5, 10, 11, 12, 31; Entomology 13; Geology 1, 3, 4, 5, 31; Mathematics 20, 30, 34, 35, 44, 46, 97; Physics 6, 17, 18, 19, 20, 21, 22; Physiology 4; Zoology 1, 3, and 4.

If a student can demonstrate adequate preparation at the level of these courses, permission can be obtained to use more advanced courses, including upper division courses, to fill the science group requirement.


Offerings from at least two different departments or academic areas should be represented. Courses for filling the social and behavioral sciences are: Agricultural Economics 71, 72, 73 (not more than three hours to apply); Economics 51, 52, 150, 170, 180; History 1, 2, 3, 4, 5, 13, 14; Political Science 1 or 10, 101, 102; Psychology 53; Social Science 1; Sociology 10 or 70, 90.


Students must draw from at least two of the following areas, with a maximum of eight hours in any one area:

English—Any literature course of lower division; any literature course of upper division with the approval of the instructor of the course; English 117 a, b, c.


Fine Arts—(a) Music: 1, 101, 102, 103, with the approval of the instructor and department head. A maximum of three hours may be drawn from the following: Music 25, 125, 27, 127, 28, 128, 33, 133, 138, 139. (b) Theater Arts: 1, 2, 10; also 100, 102, 104, with the approval of the instructor and department head. (c) Visual Arts: 1, 2, 3, 4, 10, 40.

Horticulture 118
Landscape Architecture 3

Language—(a) Any upper division foreign language course, with the approval of the instructor. (b) A maximum of five hours in any lower division language course.

Speech—1, 4, 16, 21, 24, 81, 105; also 110 and 113 with the approval of the instructor and department head.

(C) Physical Education or Military

Three quarter hours of Physical Education activity classes are required of all women under 31 years of age. Three quarter hours of PE activity classes, Military Science or Air Science are required of all men under 31 years of age, except veterans who have served on active duty for six months or more. No PE is required of students who have reached the age of 31.

Explanation on Group Classes

Classes used to satisfy the above group requirements are not to be counted toward the major or minor. Departments may prescribe not fewer than thirty and not more than fifty credits in the major subject, exclusive of those used to satisfy group requirements.
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 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 Science, Master of Arts, Master of Science, Master of Business Administration, Master of Education, Master of Forestry, Master of Industrial Education, Civil Engineer, Irrigation Engineer, 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, Business and Social Sciences, 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 B.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.

To qualify for a Certificate:

(1) Satisfy the Entrance requirements.

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

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

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

(5) 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.

(6) 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 degree of Bachelor of Arts or Bachelor of Science upon students who meet the specified requirements of any of the eight resident colleges.

Before one can become a candidate for a baccalaureate degree, the abstract of his record in the University must show: first, that he has satisfied the entrance requirements prescribed for the class with which he expects to be graduated; second, that the collegiate work for which he has credit, his conditional and other pending credits, the completion of which he is reasonably assured, and the work for which he is registered or is planning to register, together satisfy the requirements for graduation, including Physical Education, Military Science, or Air Science, as prescribed for his class.

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.

Graduation Requirements

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

(1) For women, three quarters of work in Physical Education, provided that candidates officially excused from Physical Education present one credit of other work for each quarter that they have been excused.

(2) Men must complete three quarters of either Physical Education, Military Science or Air Science. If exempt from Air Science, 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.

(3) 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.

(4) Sixty credits of Upper Division work.
(5) The completion of a major, a minor, and related work as outlined under *Upper Division*.

(6) The completion of the group requirements and of nine hours in Basic Communication or its equivalent. For students who entered the University prior to 1955, the completion of English 10 and 110 or of English 17, 18, and 19 will be considered as the equivalent of nine hours in Basic Communication.

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

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

(9) Candidates for a Bachelor's degree must complete at least 45 credits in residence on the campus at Utah State University, exclusive of courses taken at a residence center, or by extension, or by correspondence study as provided in No. 7 above.

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

(11) 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.

(12) The candidate should file an application for graduation with his academic dean at the beginning of his senior year and in no event later than the first week of the winter quarter in which he expects to graduate. 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.

(13) 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.

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

(15) 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.

(16) *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.
College of Agriculture
College of Agriculture

Curricula in Agriculture, 35
  Agricultural Science, 35
  Agricultural Business, 35
  General Agriculture, 36
  Agricultural Education, 36
  Two-Year Program in Agriculture, 36

Department of Agricultural Economics, 37

Department of Agronomy, 39
  Agronomy, 40
  Crop Science, 40
  Soil Science, 41

Department of Animal Husbandry, 43

Department of Dairy Industry, 46
  Dairy Production, 46
  Dairy Manufacturing, 47

Department of Horticulture, 48

Department of Poultry Husbandry, 51

Department of Veterinary Science, 52

Interdepartmental Curriculum in Food Science, Technology, 54

Degrees Offered:
  Bachelor of Science
  Master of Science
  Doctor of Philosophy
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.

There are seven departments in the College of Agriculture: Agricultural Economics, Agronomy, Animal Husbandry, Dairy Industry, Horticulture, Poultry, and Veterinary Science.

The programs of study of the College of Agriculture are designed to provide the training needed to enable a student to:

- Become a research scientist in industry, in an agricultural experiment station, or in a government agency.

- Qualify for employment in agricultural industry: farm equipment, farm building, water and irrigation, agricultural chemicals, fertilizers, food processing, grain and seed processing, meat and poultry packing, feed manufacturing, dairy processing, fats and oils, textiles and fibers, floriculture, and hatcheries.

- Enter public and private services: U.S. Government, foreign agricultural service, city, county, and regional planning, agricultural consultant work, private business.

- Make a career in agricultural communications: radio, television, news, publications, advertising agencies, photography.

- Become a successful farmer or rancher.

- Become a teacher of agriculture in high school or college, a county agent, or an extension specialist in a land-grant university.

- Become a conservation specialist, to help conserve and rebuild our natural resources.
• Become a leader in the community in which he lives so he can intelligently serve his fellowmen and fulfill his obligations as a citizen of a free world.

Utah State University, Utah’s land-grant institution, is equipped to help one qualify for these 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 Departments of Agricultural Economics, Agronomy, Horticulture, and Agricultural Education are also housed in this building, where modern class rooms and well equipped laboratories are available for teaching and research.

The Animal Husbandry, Dairy Industry and Poultry Husbandry Departments are housed in the Animal Industry Building.

The Animal Husbandry Farm is one-half mile north of the campus. Facilities are available for housing of livestock and for animal research work. These facilities include equipment for the study of animal metabolism, physiology, and nutrition. This farm is being taken over by married student’s housing. A new Animal Husbandry Farm, located five and a half miles south of Logan, has been purchased. This will be developed during the near future.

The Dairy Farm is one mile north of the campus. Here are modern facilities for housing dairy cattle and for research in dairy cattle management, nutrition and breeding. Milk is transported from the dairy farm to the processing plant on the campus by a large refrigerated tank truck.

The Poultry Farm is one mile north of the campus, adjacent to the Dairy Farm. The poultry plant is well equipped for instruction and research in poultry husbandry. Extensive investigations are under way on methods of feeding, housing, and disease control, to obtain the most economical production.

The Turkey Farm is one mile north and east of the campus. Research in turkey breeding and management is conducted at this farm.
The Veterinary Science Building has well equipped laboratories, isolation rooms, and facilities for teaching and research in animal and poultry physiology, hygiene, and disease. A veterinary clinic is maintained for diagnostic service for livestock and poultry producers.

Curricula in Agriculture

Students may work toward the Bachelor of Science degree in one of four divisions or areas of interest as follows:

1. **Agricultural Science**, which will prepare a candidate for graduate work in one of the basic agricultural sciences and for a career in scientific or technical agriculture. He may select between Biological Science or Applied Science (Animal Science, Plant Science).

2. **Agricultural Business**, which will give considerable training in the business phases of agriculture.

3. **General Agriculture**, which will give a broad, general training in scientific and practical agriculture and prepare a student for general farming, agricultural service work, etc. A major in General Agriculture is offered in the departments of Agricultural Economics, Agronomy, Animal Husbandry, Dairy Industry and Horticulture.

4. **Agricultural Education**, which will prepare the student to become an agricultural teacher.

Minimum requirements for the B.S. degree under each of these divisions are listed below. In addition candidates must fill University requirements and the requirements of the department in which they major.

### General Program 35

#### Agricultural Science

(a) Biological Science

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exact Science</td>
<td>30</td>
</tr>
<tr>
<td>Biological Science</td>
<td>15</td>
</tr>
<tr>
<td>Social Science</td>
<td>10</td>
</tr>
<tr>
<td>Language and Arts</td>
<td>10</td>
</tr>
<tr>
<td>Basic Communications</td>
<td>9</td>
</tr>
<tr>
<td>P.E. or M.S.</td>
<td>3</td>
</tr>
</tbody>
</table>

Meet all departmental requirements for major, and University requirements for graduation.

For many students the 30-hour requirement in exact science is not enough, but in fields like taxonomy, some courses other than exact science are more helpful. The department decides what additional courses are required.


<table>
<thead>
<tr>
<th>Subject</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exact Science</td>
<td>45</td>
</tr>
<tr>
<td>Biological Science</td>
<td>15</td>
</tr>
<tr>
<td>Language and Arts</td>
<td>10</td>
</tr>
<tr>
<td>Social Science</td>
<td>10</td>
</tr>
<tr>
<td>Language and Arts</td>
<td>10</td>
</tr>
<tr>
<td>M.S. or P.E.</td>
<td>3</td>
</tr>
</tbody>
</table>

Meet all departmental requirements for major, and University requirements for graduation.

#### Agricultural Business

**Freshman and Sophomore Years**

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exact Science</td>
<td>23</td>
</tr>
<tr>
<td>Biology</td>
<td>10</td>
</tr>
<tr>
<td>Social Science</td>
<td>32</td>
</tr>
<tr>
<td>Language and Arts</td>
<td>8</td>
</tr>
<tr>
<td>M.S. or P.E.</td>
<td>6</td>
</tr>
<tr>
<td>Basic Communications</td>
<td>9</td>
</tr>
<tr>
<td>Electives</td>
<td>7</td>
</tr>
</tbody>
</table>

Meet all departmental requirements for major, and University requirements for graduation.

1. **Exact Science requirements** must be filled from the following courses: Math 35, 44 or 46, 97, 98, 99; Physics 17, 18, 19 or 20 and 21 and 22; Chemistry 3, 4, 5, 12, 115 (under exceptional circumstances 10 and 11 may be authorized by the head of the major department), Geology 3, and any upper division courses authorized by the student's major department.

2. **Biological Science requirements** must be filled from the following courses: Botany 24, 25; Zoology 3, 4, 112; Bacteriology 70, 71.

3. In addition to the courses listed above Math 24, 25, 26 and Geology 31, Chemistry 31, Physics 6 will be allowed.

4. In addition to the courses listed above Zoology 1 and Physiology 4 will be allowed.
36 College of Agriculture

General Agriculture

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exact Science</td>
<td>23</td>
</tr>
<tr>
<td>Biological Science</td>
<td>15</td>
</tr>
<tr>
<td>Language and Arts</td>
<td>8</td>
</tr>
<tr>
<td>Basic Communications</td>
<td>9</td>
</tr>
<tr>
<td>Irrigation and Drainage</td>
<td>3</td>
</tr>
<tr>
<td>General Agriculture</td>
<td>1</td>
</tr>
<tr>
<td>P.E. or M.S.</td>
<td>3</td>
</tr>
<tr>
<td>Social Science</td>
<td>8</td>
</tr>
</tbody>
</table>

1. Exact science requirements should be filled from the following courses: Chemistry 10, 11, 12 or equivalent; Math 24, 25, 26, 34, 35, 44 or 46; Geology 3.

2. Biological science requirements should be filled from the following: Botany 24, 25; Zoology 3, 4; Bacteriology 10 or 70 and 71.

3. Limited to new freshmen in Agriculture.

In addition, under the General Agriculture curriculum students must take Agronomy 56, Agricultural Economics 71, 72, and 73, (nine hours), or the equivalent, and a minimum of one three-credit course in each of two departments in applied animal science and one three-credit course in each of two departments in applied plant science. Any deviations from these requirements must have the approval of the Dean.

Agricultural Education—Four Years

<table>
<thead>
<tr>
<th>Subject</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biological Science</td>
<td>20</td>
</tr>
<tr>
<td>Exact Science</td>
<td>23</td>
</tr>
<tr>
<td>Agriculture</td>
<td>84</td>
</tr>
<tr>
<td>Education</td>
<td>35</td>
</tr>
<tr>
<td>Humanities</td>
<td>10</td>
</tr>
<tr>
<td>Social Science</td>
<td>10</td>
</tr>
<tr>
<td>Basic Communications</td>
<td>5</td>
</tr>
<tr>
<td>M.S. or P.E.</td>
<td>3</td>
</tr>
</tbody>
</table>

Meet all departmental requirements for major and University requirements for graduation.

1. Biological Science requirements must be filled from the following courses: Botany 24, 25; Zoology 3, 4; Bacteriology 70, 71; Zoology 12.

2. In addition to the courses listed above, Math 24, 25 or 26 and Geology 31, Chemistry 31, Physics 6 will be allowed.

Two-Year Program

In Agriculture

A two-year course in practical agriculture may be taken if students do not wish to take more than two years of college work. They may register for any of the regular non-prerequisite production, marketing, and management courses in the College of Agriculture. Practical farm problems are emphasized.

In addition to completing a 20 credit major in the plant sciences, the animal sciences or agricultural economics, students must take six credits in the groups in which they do not major. For example, a major in animal science must complete, in addition to 20 credits in the major field, six credits in plant science, six credits in agricultural economics and six credits in agricultural engineering. He must also take the following courses: Basic Communications, nine credits; Biology, five credits; Physical Science, five credits, and Social Science, five credits.

Students may also take the following courses: Agricultural Economics 71, 72, 73; Agricultural Engineering 1, 14, 15; Agronomy 7, 8, 56; Animal Husbandry 1, 10; Dairy Husbandry 2, 6; Horticulture 1, 2, 4; Landscape Architecture 3; Poultry Husbandry 1; Veterinary Science 20; Irrigation and Drainage 10.

To obtain a certificate, 96 credits must be completed.

1. General Agriculture. Open only to freshmen students in Agriculture. A course to assist Agricultural freshmen in adjusting to college life and to acquaint them with our changing Agriculture. (1F) Dean and Staff
Agricultural Curricula Compatible with ROTC Training. Wherever possible, students in agriculture are encouraged to take advantage of the Military Science training offered at USU. Under present programs a number of courses in the College of Agriculture will be accepted for ROTC credit, and students in agriculture should not find it too difficult to complete requirements for a degree in Agriculture and at the same time meet the ROTC requirements. The training in leadership that comes through ROTC is some of the most valuable training in college.

Department of Agricultural Economics


Office in Agricultural Science 133

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 B.S. 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.

Graduate Study

Master of Science Degree. There are excellent facilities in the department for graduate study in several divisions of Agricultural Economics such as: agricultural business management, farm management, land economics, agricultural finance, and agricultural marketing. Research in these areas is conducted by the Department Staff and the Federal Collaborators, with the assistance of graduate students. The M.S. degree is accepted by other universities as work done toward the Ph.D. degree. All upper division courses in Agricultural Economics
38 College of Agriculture

may be used for graduate credit in an Agricultural Economics major.

Agricultural Economics 71, 72 and 73 or their equivalents, or upper division standing are prerequisites to all other courses in Agricultural Economics.

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.

Area of Work Hours
Basic Communications 9
Humanities 10
Exact Science1 23
Biological Science2 15
Social Science2 10
P.E. or M.S. 3
Agricultural Production 9
Agricultural Economics 9
Economics and Business Adm. 8

1Math, Chemistry
2Botany, Zoology, Bacteriology
3To be selected from History, Political Science, Psychology, Sociology.

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.

(a) General Agriculture
Area of Work Hours
Agricultural Economics 25
Economics 18
Business Administration 10
Agricultural Production 12
Irrigation and Drainage 3

(b) Agricultural Business
Area of Work Hours
Agricultural Economics 25
Economics 18
Business Administration 20
Agricultural Production 6

Agricultural Economics Courses

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

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


**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. (3S) Blanch

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

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

*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

150. Special Readings. Directed readings on selected problems for undergraduates. Credit arranged. (F, W, S, 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. (3F) Morrison

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

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. (3W) Lamborn

*Taught 1963-64.
**Taught 1964-65.
Agronomy 39

186. Land Problems and Appraisal. The application of economic principles and techniques to the appraisal, conservation and development of land and water. (3S) Gardner

202. Advanced Farm Management. Economic principles and their application to specific production functions in agriculture. (3F) Davis

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

235, 236, 237. Student and Faculty Seminar. Required of all senior and graduate majors. No credit. (F, W, S) Staff

240. Research Methods. Methods and techniques of doing research in Agricultural Economics. (3F) Roberts

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

263. Advanced Marketing. Economic principles applied to the solution of agricultural marketing problems. (3W) Anderson


*Taught 1963-64.
**Taught 1964-65.

Department of Agronomy

(Agronomy, Crop Science, Soil Science, Soils Irrigation)


Office in Agricultural Science 225

Study and research in Agronomy focus upon problems of crop production and soil conservation in arid regions. Course offerings emphasize inter-relations of plants, soil, precipitation, and irrigation water in production of maximum crop yields under a variety of conditions. Three types of majors for the bachelor’s degree are offered: Agronomy, Crop Science, and Soil Science.

 Majors must have a grade point of 2.5 or better in all Agronomy courses. Any Agronomy course with “D” grade must be repeated. Transfer students are required to take at least 15 credits of the major in residence at Utah State University.
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, soil physics, soil chemistry, soil fertility or plant nutrition, soil genesis, soils and irrigation, and agronomy. 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.

Upper division courses acceptable for graduate credit toward the Master of Science degree in Agronomy are: 109, 110, 120, 155, and 165; in addition, for transfer majors in Crops, 107.

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 or plant nutrition, soil genesis, soils and irrigation, and irrigation and crop management. 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.)

Agronomy

A major in Agronomy prepares for positions in the Agricultural Extension Service; as an agronomist, farm planner, conservationist, and soil scientist in the United States Civil Service; or as field man or farm manager in the commercial field.

In addition to the general University group requirements students should take Ag. Econ. 71, 72, and 73 (nine hours, or the equivalent); Ag. Eng. 10 or 110; Agronomy (Crops) 7, 8, 103, 109, 112, 118, and 120; Agronomy (Soils) 56, 107, 111, 114, and 155; Animal Sciences six hours (three hours in each of two departments); Bacteriology 10, or 70 and 71; Botany 24, 25, and 120 or 130; Chemistry 10, 11, and 12; Entomology 108; Gen. Agric. 1; Geology 3; Horticulture, three hours; Math 24, 25, and 26, or Math 34, 35, and 44, or 46; and Zoology 112.

Crop Science

A major in Crop Science is prepared to do graduate work or to take technical employment in research and teaching in crop production, plant breeding, weed control, and seed technology. If students have special aptitudes in the fundamental sciences and are interested in plant sciences they will find unlimited opportunities in this field.

In addition to the general University group requirements students should take Ag. Eng. 10 or 110; Agronomy (Crops) 7, 8, 103, 109, 112, 118, and 120; Agronomy (Soils) 56, 107, 111, and 155 or 165; Appl. Stat. 131 and 132; Bacteriology 70 and 71; Botany 24, 25, 30, 120, and 130; Entomology 108; Exact Science, 45 hours to be filled from the following courses: Math 35, 44 or 46, 97, 98, 99; Physics 17, 18, 19, or 20, 21, and 22; Chemistry 3, 4, 5, 12, 115 (under exceptional circumstances 10 and 11 may be authorized by the head of the department); Geology 3; and any upper division Math, Chemistry, Physics, or Geology courses authorized by the major department; and Zoology 112.
Crops Courses

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

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

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. (4F, S) Allred

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

109. Plant Breeding. Principles, techniques, and practices in breeding improved varieties of crop plants. Prerequisite: Zoology 112. (5W) Staff

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

118. Weeds. Identification of weeds, the weed problems in agriculture, and methods of control. An assessment is made for field trips. Three lectures, one lab. (4F) Tingey

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

201. Hays and Pastures. Recent advances in current problems related to the production and use of hays and pastures. Prerequisite: Agronomy 108 or equivalent. (3W) Allred

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

213. Crop Seminar. Current scientific topics in farm crops. Required of all graduate majors. One conference weekly. (1F, 1W, 1S) Staff

Soil Science

A major in Technical Soils is prepared for graduate work or employment in research, soil testing, and soil management. Students will find real opportunities in this major if they achieve high scholastic standing and have a marked ability in the fundamental sciences.

In addition to general University group requirements one should take Ag. Eng. 10 or 110; Agronomy (Crops) 7 or 8, 103, 112, Agronomy (Soils) 56, 107, 111, 114, 155 and 165; Appl. Stat. 131 and 132; Bacteriology 70 and 71; Botany 24, 25, and 120; Chemistry 3, 4, 5, and 115; Geology 3; Math through 99; Physics 17, 18 and 19, or 20, 21 and 22; plus five hours of either Organic Chemistry or advanced Physics. A minimum of 63 hours in mathematics, physics and chemistry are necessary to meet the minimum approved by the Soil Science Society of America.

Soils Courses

56. Introductory Soils. A terminal survey course. A brief study of soil formation, classification, fertility and management. Prerequisite: Inorganic Chemistry. Three lectures, one lab. (4F, W) Staff

57. Introductory Soils Laboratory. Offers credit for the laboratory of Agronomy 56 for students who have had a general soils course without a laboratory. (1F, W) Staff

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. (5S) Miller

107. Fertility and Management of Irrigated Soils. Application of soil principles to management practices of soils including water-soil relations, organic matter maintenance, fertilizers, and reclamation and management of saline soils. Prerequisite: Agronomy 56, or 58, or approval of the instructor. (5F or W) Staff
42 College of Agriculture

110. Soil Microbiology. See Bacteriology 110.

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

114. Soil Survey and Conservation. A study of soil forming factors and of soil classification, survey, and conservation. Prerequisite: Agronomy 56 or 58 and 3 credits in field crop production or range management. Two lectures, three labs. (68) Miller

115. Soil and Plant Relations. Plant and soil relations with respect to physical environment and the availability and absorption of minerals. Laboratory in soil and plant analysis in relation to soil productivity. Prerequisite: Agronomy 56 or 58. For seniors. Two lectures, one lab. (3W) Peterson

115. Physical Edaphology. The physical relationships of soil moisture, temperature, penetrability, and aeration to plant growth. Mineralogical composition, structural conditions, tillage, irrigation, and other soil management practices are considered as factors that affect these relationships. Prerequisites: Agronomy 107, General Physics or Chemistry. (3F) Taylor

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

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: Agronomy 165. (3S) Taylor

219. Saline and Alkali Soils. Survey of literature and technical problems in the development, evaluation, classification, reclamation and management of saline and alkali soils. (2F, or W) Peterson

221. Genesis, Morphology and Mineralogy of Soils. A critical review of soil mineralogy and of soil forming factors in relation to genetic and morphological patterns of soils. Prerequisite: Agron. 114 or equivalent. (3F) Miller

224. Soil Chemistry. Composition and reactions of soil colloids. (3S) Miller

227. Chemical Analysis of Soils. A laboratory course in chemical analysis of soils and plants. Two laboratory periods. Prerequisite: Permission of the teacher. (2W) Miller

266. Physical Analysis of Soils. A laboratory course in Soil Physics. Prerequisite: Agronomy 165. (2F) Taylor

Special Courses

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

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

218. Special Problems. Crop production, crop breeding, soil fertility, or other phases of agronomic work. Students review literature on the problem and conduct experiments. Credit arranged. (F, W, S, Su) Staff

230. Research and Thesis. Outlining and conducting research in soils or farm crops and preparation of thesis. Credit arranged. (F, W, S, Su) Staff

* Taught 1963-64.
** Taught 1964-65.
Department of Animal Husbandry


Office in Animal Industry 307

Courses in Animal Husbandry are designed to train students to solve problems encountered in producing beef cattle, sheep, and swine.

A major in Animal Husbandry may obtain a Bachelor of Science degree in either General Animal Husbandry or an Applied Science Program of study. A two-year certificate course in Animal Husbandry is also offered.

A major in General Animal Husbandry will prepare to be a livestock operator, a ranch manager, a county agent, or to take a position related to livestock raising with various other state and federal agencies.

Suggested Course of Study

<table>
<thead>
<tr>
<th>Course</th>
<th>FRESHMAN</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.H. 2, 50</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Math 24, 25, 26 or 34, 35 and 44 or 46</td>
<td>9 or 11</td>
<td></td>
</tr>
<tr>
<td>M.S. or P.E.</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>English 1, 2, and 3</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Ag. Econ. 71, 72 and 73</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Social Science</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Zoology 3</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Agriculture 1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Electives</td>
<td>4 or 2</td>
<td></td>
</tr>
</tbody>
</table>

Course | SOPHOMORE | Credit |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A.H. 41, 42</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Chemistry 10, 11 and 12 or 3, 4 and 12</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>M.S. or P.E.</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Botany 24, Zoology 4 or Botany 25, 30</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>V.S. 20</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Agronomy 56</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Humanities</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Social Science</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

Course | JUNIOR | Credit |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A.H. 150, 151, 152, 155, 165</td>
<td></td>
<td>17</td>
</tr>
<tr>
<td>Zoology 112</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Dairy or Poultry</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Agronomy 103</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Irrigation and Drainage 10 or 110</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Surveying 81</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Humanities</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Electives</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

Course | SENIOR | Credit |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A.H. 110, 120, 125, 160, 175</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>Entomology 108</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Ag. Educ. 151</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Business 20 or 147, 63</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>V.S. 120, 150</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>Range Management 160</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Electives</td>
<td></td>
<td>4</td>
</tr>
</tbody>
</table>

Applied Science in Animal Husbandry. Majoring in this field students will be prepared for graduate work or technical employment in research. If they have high scholastic standing and marked ability in the fundamental sciences they find excellent employment opportunities in this major.

Applied Science Curriculum

During the freshman and sophomore year, students should complete the following requirements: Exact sciences, a minimum of 45 hours to be selected from Math 35, 44, 46, 97, 98, 99; Physics 17, 18, 19 or 20, 21, 22; Chemistry 3, 4, 5, 12, 115; Biological sciences, a minimum of 15 hours to be selected from Botany 24, 25; Zoology 3, 4;
Bacteriology 70, 71; Language and Arts, eight hours to fill the University group requirement; Social Sciences, eight hours to fill the University group requirement; English 1, 2 and 3, nine hours; P.E. or M.S., three hours.

In addition, the following courses should be completed: Agric. Econ. 163, 180 or the equivalent; Agronomy 56, 103, or Range Management 160; An. Hus. 2 or 165, 50, 41, 42, 150, 151, 152, 155, 160; Chemistry 190; V. S. 20; Zoology 112.

To specialize in nutrition students should also complete either Physiology 121 and 122 or Chemistry 121, 122 in addition to Chemistry 3, 4, 5, and 115.

Two-year Program in Animal Husbandry

A two-year practical course is available to train students for efficient livestock production. If one does not wish to take more than two years of University work, the suggested course of study is as follows:

A.H. 2; 10; 41, 42 and 50 or 120;
110, 125 .................................................. 16
V.S. 120 .................................................. 8
Agronomy 56, 103 or Bге. Mgt. 160 ................... 9
Ag. Econ. 71, 72, 73 ...................................... 9
Ag. Eng. 1, 10, 102, 103 ................................. 9
Welding 91 .................................................. 5
English 1, 2, 3 .............................................. 9
Math 34 ...................................................... 3
P.S. 10, Sociology 10 or 70 .............................. 10
P.E. and Electives .......................................... 13

Graduate Study

Master of Science Degree. The Animal Husbandry Department offers the Master of Science degree in Animal Production, Animal Breeding and Animal Nutrition. In cooperation with other departments a Master of Science degree is offered in Animal Nutrition and Biochemistry. (See Interdepartmental Curriculum in Animal Nutrition and Biochemistry.)

Doctor of Philosophy Degree. The Animal Husbandry Department in cooperation with related departments offers the Doctor of Philosophy degree. (See also Interdepartmental Curriculum in Animal Nutrition and Biochemistry.) Detailed information may be obtained from the department or from the Dean of the School of Graduate Studies.

Animal Husbandry 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) Foote

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

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) Foote

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

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) Staff

110. 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: A.H. 152. (3F) Staff

120. Swine Production. Systems of production, with emphasis on those suited to western con-
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: A.H. 152. (3S) Matthews

150, 151. Animal 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. (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: A.H. 151 (3S) 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. Four lectures, one lab. (5S) Bennett

160. Livestock Production Problems. Attention is given various problems in livestock production, especially in Utah. Prerequisite or concurrent registration: A.H. 152 and 155. (3S) 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: A.H. 2. Three labs. (3F) Matthews

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: A.H. 125. (3W) Madsen

185. Meats. Cutting, selection, and identification of wholesale and retail cuts of beef, pork, and lamb, with references to prices, relative economy, use, nutritive value, chemical composition, and palatability. Preparation of meats for the home freezer is emphasized. (3W) Matthews

201. Problems in Animal Breeding. Readings, discussions and lectures concerning genetic facts and theories as related to animal breeding. Prerequisite: A.H. 155. (3W) Bennett

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: A.H. 150. (2-5F, W or S) Harris


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

220. Problems in Animal Production. Same as A.H. 210, except work is in animal production. Prerequisite: A.H. 160. (2-6F, W, or S) Staff

230. Animal Breeding Research. Students outline a problem, make a critical review of pertinent literature, collect, analyze necessary data, and prepare a report of their research. This work may be the thesis material for the M.S. degree, or may be done for graduate credit apart from the thesis. (2-5F, W or S) Staff

240. Animal Nutrition Research. Same as A.H. 230, except that research is in some phase of animal nutrition. (2-5F, W or S) Staff

250. Animal Production Research. Same as A.H. 230, except that research is in some phase of animal production aside from breeding or nutrition. (2-5F, W or S) Staff

261, 262, 263. Animal Industry Seminar. Topics of current interest and research problems are presented by graduate students, staff members and guest speakers. Subjects discussed relate to nutrition, breeding, and production. (May be repeated.) (1F, 1W, 1S) 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, 1W, 1S) Staff

*Taught 1963-64.
College of Agriculture

Department of Dairy Industry

(Dairy Production and Dairy Manufacturing)


Office in Animal Industry 101

Dairy Industry offers a general curriculum for a bachelor of science degree, and an applied science or biological curriculum if one plans to continue toward a graduate degree. In some instances, students interested in other complimentary subjects plan a course of study to include training in both areas.

All majors in Dairy Industry must have practical experience on a dairy farm or in a dairy manufacturing plant before graduation with a bachelor of science degree.

Graduate Study

The Dairy Industry 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.

Dairy Production

General Curriculum. Designed for a major in Dairy Production to prepare for the management and operation of dairy farms and herds; or to become a county agricultural agent or a fieldman in the dairy industry.

Students must fill the general requirements of the University and College of Agriculture. The following courses are also required: Dairy 6, 110, 111, 112, 120, 121, 122, and at least three quarters of 215; Zoology 3, 4, 112; Botany 24; Math 35; Bacteriology 10 or 70 and 104; Chemistry 10, 11, 12; Veterinary Science 20, 120, 150; Animal Husbandry 150, 151, 152; Agricultural Economics 71, 72, 73; Agronomy 56, 103; Agricultural Engineering 10 or 110.

The following courses are recommended: Physics 6, Agronomy 7, 118; Animal Husbandry 155, Agricultural Engineering 101; Agricultural Economics 102, Entomology 108; Business Administration 20.

Biological Science Curriculum. Designed for a major in Dairy Production to prepare for technical employment in dairy production and for advanced study, teaching and research in this field.

Students must fill the general requirements of the University and the College of Agriculture. The following courses are also required: Dairy 6, 110, 111, 112, 120, 121, 122, and at least three quarters of 215; Zoology 3, 4, 112; Botany 24; Math 35, 44; Bacteriology 70, 104;
Chemistry 3, 4, 5, 190; Physics 6; Veterinary Science 20, 120, 150; Animal Husbandry 150, 151, 152, 155; Agricultural Economics 71, 72, 73; Agronomy 56, 103; Agricultural Engineering 10 or 110.

In preparation for advanced dairy production students may specialize in one of three areas: (1) nutrition, (2) breeding or (3) physiology. To specialize in one of these areas students will be required to take the courses indicated for each in addition to the above courses: (1) nutrition—Chemistry 115, 121, 122, and 190; (2) breeding—Chemistry 12; Applied Statistics 51; Math 44 or 46, 97, 98, 99; (3) physiology—Chemistry 115, 121 and 122; Physiology 121, 122, 141; Zoology 118.

Dairy Manufacturing

*General Curriculum*. This course will prepare students for commercial dairying to be a plant operator, an equipment and supply technician, a grader, or a sanitarian.

In addition to the general University and College of Agriculture requirements they will be required to take: Chemistry 190, 108; Bacteriology 104, 105; Business Administration 20, 63, 156; Dairy Industry 5, 6, 101, 103, 104, 105, 110, 215, 254.

*Business Course in Dairy Manufacturing*. This course will prepare students to be a plant manager, a salesman, or a dairy industry administrator.

In addition to the general University and College of Agriculture requirements, majors will be required to take: Bacteriology 104, 105; Business Administration 20, 63, 100, 156, 171; Dairy Industry 5, 6, 101, 103, 104, 105, 110, 215, 254.

**Applied Science Course in Dairy Manufacturing.** This course is taken in technical preparation for teaching, research and quality control. In addition to the general University and College of Agriculture requirements, majors will be required to take: Chemistry 3, 4, 5, 108, 115, 121, 122, 190; Bacteriology 104, 105, 180; Applied Statistics 51; Physics 6; Math 35, 44, Business Administration 63, 156; Dairy Industry 5, 6, 101, 103, 104, 105, 121, 215, 254.

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, Lamb

5. *Judging Dairy Products*. Methods and practice in judging and grading dairy products for market and show. (2S) 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 ices. Merchandising and selling included. (5S) Morris

**103. Manufacture of Cheese.** Factors involved in making cheddar and other varieties of cheese. Classification, statistics, curing, marketing, and factory organization. (5F) Morris

**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. (5F)

105. *Management and Operation of Dairy Manufacturing Plants*. Personnel problems, advertising, selling, managerial use of rec-
ords, and other principles underlying successful management and operation are considered. All operations of the creamery are conducted by this class. (6F, W, S) Morris and 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 (5S) Larsen

111. 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. (2S) Lamb


*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) Lamb


122. Dairy Herd 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.) (3S) Stoddard

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

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

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

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

*Taught 1963-64.
**Taught 1964-65.

Department of Horticulture

( Floriculture, Food Technology, Pomology, Vegetable Crops)

PROFESSORS Leonard H. Pollard, HEAD, Alvin R. Hamson; ASSOCIATE PROFESSORS D. K. Salunkhe, David R. Walker; ASSISTANT PROFESSORS J. LaMar Anderson, Robert K. Gerber; INSTRUCTOR Otto Reithmann; EXTENSION HORTICULTURIST Anson B. Cull; EXTENSION ORNAMENTAL HORTICULTURE SPECIALIST Arvil L. Stark; SUPERINTENDENT OF HOWELL FIELD STATION Odeal C. Kirk; SUPERINTENDENT OF FARMINGTON FIELD STATION Rulon Draper.

Office in Agricultural Science 204

The field of horticulture includes the production, marketing and utilization of fruits, vegetables, and ornamental crops and the processing of fruits and vegetables. The department offers two curricula, General Horticulture and Horticultural Science with specialization in floriculture, food technology, pomology, or vegetable crops in either the science or general curriculum.

General Horticulture

The general horticulture curriculum prepares the student for a position as an agricultural extension agent, civil service agent, industrial agricultural representative, or agricultural inspector. Other positions depending on the option selected include farm manager, park and gardens supervisor, and
a number of jobs in the nursery, florist, marketing, processing, seed, fertilizer and chemical industries. In addition to the University and College of Agriculture requirements the following courses are required to satisfy department requirements for a BS degree: Agronomy 56; Bacteriology 10 or 70, 71; Botany 24, 25, 120 and 130; Chemistry 10, 11, and 12; Entomology 108; Horticulture 1, 2, 4, 11, 131, 153 and department prescribed courses depending on specialization; Math 35 and 44 or 46; and Zoology 112.

Horticultural Science

The horticultural science curriculum prepares the student for graduate study, research and teaching and the more technical positions in the commercial fields indicated in the general curriculum. For a BS degree in this curriculum the following courses should be taken in addition to University and College of Agriculture requirements: Agronomy 56; Appl. Stat. 131 and 132; Bacteriology 70 and 71; Botany 24, 25, 120 and 130; Chemistry 3, 4, 5, 115, 121 and 122; English 111; Entomology 108; Horticulture 1, 2, 4, 11, 131, 153 and department prescribed courses depending on specialization; Math 35, 44 or 46, 97, 98 and 99; Physics 17, 18, 19 or 20, 21 and 22; and Zoology 112.

Graduate Study

The Department offers work both for the Master of Science and Doctor of Philosophy degree in Horticulture in the areas of food technology, plant breeding and physiology. The outline of studies and the research program are adapted to the objectives of the individual student. The general requirements for these degrees are explained in the School of Graduate Studies. (Also see Catalog, School of Graduate Studies.)

If interested in working toward an advanced degree, candidates should first contact the Head of the Department. He will study their qualifications and interests and recommend an adviser who will assist in course work and the research program.

Horticulture Courses

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

2. General Horticulture Lab. Required for horticulture majors, optional for others. Field trips and laboratory study on operation of horticultural enterprise including: varieties of fruits and vegetables, visits to fruit and vegetable markets, agricultural chemical distributors, commercial fruit and vegetable growers, processing plants and other allied industries. Students will pay moderate cost of travel. (2F) Anderson, Hamson

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

11. Garden Flowers. Principles and practices of selecting, arranging, and growing of garden flowers and other ornamentals. Riethmänn

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. Prerequisite: Taught 1963-64.
50 College of Agriculture

Botany 24, 25 (Botany 120 may be taken concurrently); Chemistry 12 or 121; Agronomy 56; Horticulture 1 or 4. Three lectures, one lab. (4W, 4S) Hamson, Walker


118. Flower Arranging. Basic principles of design associated with techniques of flower arranging including handling, care and conditioning of flowers. Training will be given in vase, basket, table, and dry arrangements and in the construction of corsages. Emphasis is given on modern design. A modest laboratory fee will be required for the purchase of materials for making flower arrangements. Two lectures, one lab. (3F) Riethmann

**119. Systematic Floriculture. Systematic study of garden flowers. Prerequisites: Horticulture 11; Botany 30. Systematic study of plants grown by florists. Two lectures, one lab. (3S) Riethmann

**122. Nursery Management. Propagation and culture of ornamental nursery stock including shrubs, trees, and evergreens. Two lectures, one lab. (3W) Gerber

**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. (3W) 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 Department of Botany and Plant Pathology, Horticulture, and Zoology, Entomology, and Physiology. Prerequisites: Botany 130, Entomology 108 or special permission. Three lectures, two labs. (5S) 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, antibodies, radiation, transportation, and distribution. Prerequisites: Bacteriology 10 or 70 and 71; Chemistry 3, 4, 5, or 10, 11, 12; Botany 24, 26, 130; Horticulture 1, 4; or special permission. Three lectures, one laboratory. (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 radiations, 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 laboratory. (4F) Salunkhe

153. Seminar. Oral and written reports on research papers and original work by students. Required for all seniors. (1F, 1W, 1S) Staff

156. Special Problems. Advanced problems in floriculture, food technology, pomology and vegetable crops for qualified seniors or graduate students. Assigned reading, or research work in library, laboratory, or field presented as term papers. Registration by permission only. (1-3, F, W, or S) Staff

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

**220. Advanced Breeding. A study of special techniques and practices used in the breeding of horticultural crops. Prerequisite: 115. (3W) Pollard, Hamson

*221. Evaluation of Horticultural Research. A critical evaluation of published material and methods of compiling and presenting data. Registration by permission only. Prerequisites: Horticulture 101, 102; Agronomy 107; Botany 120; Applied Stat. 131, 132. (4W) 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. Interpret and integrate published data in the area with basic principles of biochemistry and microbiology. Prerequisites: Food Tech. I, II, Chemistry 190, Bact. 120, Botany 150. Three lectures, one laboratory. (4S) Staff

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

*Taught 1963-64.
**Taught 1964-65.
Department of
Poultry Husbandry

PROFESSORS Carroll I. Draper, HEAD, Jay O. Anderson; ASSOCIATE PROFESSORS J. David Carson, Don W. Thomas; ASSISTANT PROFESSORS C. Elmer Clark, Donald C. Dobson; RESEARCH ASSOCIATE Sherwin Atkinson; RESEARCH ASSISTANT Robert Warnick.

Office in Animal Industry 203

A major in Poultry Husbandry is expected to complete 30 credits of work in Poultry Husbandry. In addition to the courses listed under Poultry Husbandry, courses that will also count toward a Poultry major are Veterinary Science 120, Animal Husbandry 150, 151; Zoology 112 and Chemistry 190.

Graduate Study

The Department offers a Master of Science degree in Poultry Nutrition, in Poultry Breeding and in Poultry Management.

Suggested Course of Study

<table>
<thead>
<tr>
<th>Course</th>
<th>FRESHMAN</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physiology 4</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Poul. Hus. 1</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Poul. Hus. 2</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Math 35</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>M.S. or P.E.</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Bacteriology 70</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Zoology 3</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Vet. Sci. 20</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>English 1, 2, 3</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Rural Soc. 10</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Electives</td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>SOPHOMORE</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zoology 4</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Chemistry 3, 4, 12, or 10, 11, 12</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>Agronomy 56</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Soc. Sci.</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Ag. Econ. 71, 72, 73</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>L.A. 3</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td></td>
<td>11</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>JUNIOR</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry 190 or A.H. 150</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Lib. Sci. 50</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Zoology 112</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Poultry Hus. 126, 107, 105, or 106</td>
<td></td>
<td>7-9</td>
</tr>
<tr>
<td>Vet. Sci. 120</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>A.H. 151</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Electives</td>
<td></td>
<td>20-22</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>SENIOR</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physiology 121, 122</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Entomology 108</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Poultry Hus. 125, 126, 105 or 106</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Ag. Engr. 101</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Appl. Stat. 51, 131, 132</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Electives</td>
<td></td>
<td>8</td>
</tr>
</tbody>
</table>

Selected Electives: Irr. and Dr. 10; Vet. Sci. 140; Animal Husbandry 156; Chemistry 115, 121, 122; English 5, 111.

Poultry Husbandry Courses

1. 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

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

*104. Embryology and Incubation. Emphasis on the embryology of the chick with consideration of problems involved in incubation and hatchery operations. Three lectures and one lab. (arr.) Carson

*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: Poultry 1. (2W) Draper

*Taught 1963-64.
52 College of Agriculture


**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. Prerequisite: A.H. 150. (3S) Anderson

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

125. Special Problems. Selected problems to meet student needs. Registration by permission only. Prerequisite: Poultry 1. Credit arranged. (F, W, S) Staff

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

Poultry Diseases. (See Veterinary Science 120.) (4S) Anderson

Principles of Nutrition. (See Animal Husbandry 150.) (4F) Staff

210. Research Problems in Poultry Husbandry. Credit arranged. (F, W, S) Staff

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

*Taught 1963-64.

**Taught 1964-65.

**Department of Veterinary Science**

PROFESSOR Merthyr L. Miner, Head; ASSOCIATE PROFESSORS Joseph T. Blake, Don W. Thomas, Ross A. Smart; ASSISTANT PROFESSORS Jay W. Call, Johannes Storz, James A. Thomas; RESEARCH ASSOCIATES Robert Davis, Arland E. Olson; COLLABORATORS Wayne Binns, Lynn F. James, J. LeGrande Shupe.

**Office in Veterinary Science Building**

Courses in this department are not designed to train individuals to become veterinarians. Rather, some of the courses help round out training in the animal sciences. The advanced courses are for those in graduate studies in the animal sciences, biochemistry, zoology and bacteriology.

If one desires to study toward a degree in veterinary medicine (D.V.M.), he must have at least two years or preferably three of preveterinary training at some authorized college or university, completing the basic required courses. He should then apply for entrance into a school of veterinary medicine. Enrollment in veterinary schools is limited. If majoring in either bacteriology, zoology, animal husbandry, dairy husbandry, poultry husbandry, or chemistry, he is eligible for entrance into all veterinary schools if the requirements in the basic sciences are fulfilled.

The state of Utah has entered into a compact with the Western Interstate Commission for Higher Education whereby Utah will subsidize the training of five students in each of the four years in veterinary schools operating under the compact. If a student is a Utah resident and has completed the preveterinary requirements, he must apply to the Utah Commission for certification to the three Western veterinary schools cooperating under the compact. He must also make an independent application to the schools of his choice. Acceptance
is dependent on the choice of students by the veterinary schools.

Suggested Pre-Veterinary Courses

The following are basic pre-veterinary requirements of most schools of veterinary medicine: English 1, 2, 3; Mathematics 35, 46; Zoology 3, 4, 112; Botany 24; Chemistry 3, 4, 5, 115, 121, 122; Physics 17, 18, 19; Animal Husbandry 1, 2, 10; Poultry 1; Dairy 2; Humanities 10 hours (literature, world civilization, speech, language, art, music); Social Science, 10 hours (American history or American government, economics, psychology, sociology); Physical Education or Military Science.

In addition, courses in the following subjects are required or recommended by some schools of veterinary medicine: calculus, statistics, biochemistry, embryology, foreign language, marketing, accounting, business, bacteriology.

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

120. Animal and Poultry Hygiene. Principles of animal sanitation in relation to disease control. Federal and state disease control pro-

grams 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. (4S) Smart

**140. 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. (6F) 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 of artificial insemination, 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. (3S) 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, S) 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


*Taught 1963-64.

**Taught 1964-65.
Through an interdepartmental committee, the several colleges of the University are co-operating to provide an integrated program of teaching and research that will meet diversified needs of many industrial 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 to 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. The electives chosen will depend upon the professional goal of the student and must be selected in consultations with the adviser, and the chairman of the curriculum.

The graduate curriculum is prepared to develop students who have excellent background in basic and applied sciences relating to foods and substantially equivalent to that of the BS degree in Food Service and technology who could be trained to hold positions in food industries as well as in universities as a food microbiologist, a food technologist, a nutritionist, a flavor chemist, a dietician, or a quality control supervisor.

MS and PhD degree curricula will be arranged by the committee to meet the students' special interest and the general requirements of the Graduate School. Detailed requirements for the advanced degrees in Food Science and Technology may be obtained upon request from the chairman of the interdepartmental curriculum.

Several lines of specializations are available on the campus:

1. Dairy Manufacturing
2. Animal products (including poultry)
3. Handling and processing of agronomic horticultural products
4. Chemical, nutritional, marketing and microbiological aspects of foods

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, 190, and a course in food toxicology);
- Botany (24, 25, 120, 130);
- Zoology (3, 4, 112);
- Economics and/or Agricultural Economics (Ag. Econ. 163, Economics 170);
- Mathematics (97, 98, 99 especially for those who plan on doing graduate work);
- Physics (17, 18, 19);
- Industrial Education (15);
- Agricultural Entomology (108);
- Physiology (4);
- Horticulture (131, 139, 140);
- Dairy Industry (at least two courses from - 101, 130, 104, 105);
- Business Administration (63);
- Animal Husbandry (185);
- Food and Nutrition (5, 107, 140, 146, 185);
- Poultry Husbandry (108);
- Applied Statistics (51).

Agricultural Engineering (a new course will be created to cover design, construction, and operation of food plants and processing technology).

Agronomy (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 1963-65.
Old Main Tower, a landmark of civilization
College of

Business and Social Sciences

Department of Business Administration, 60
  Accounting, 61
  Finance, 61
  Marketing, 61
  Personnel and Industrial Relations, 61
  Production Management, 62

Department of Business Education and Office Administration, 66
  Business Education, 66
  Office Administration, 70
  Distributive Education, 69
  Combination Major in Office Administration and Family Life, 72

Department of Economics, 73

Department of History and Political Science, 75
  History, 75
  Political Science, 78
  Pre-Law, 80

Department of Sociology and Social Work, 82
  Sociology, 82
  Social Work, 84

Division of Military and Air Sciences, 86
  Joint Army-Air Force Courses and Activity, 87
  Department of Air Science, 89
  Department of Military Science, 94

Degrees Offered:
  Bachelor of Science
  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 forefather’s 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. Special attention is given to social work, crime, population problems, women’s role in society, and the 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 better.

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 five departments in the College offer the following majors:

The Department of Business Administration offers Accounting, Finance, Marketing, Personnel and Industrial Relations, and Production Management. The Department of Business Education and Office Administration offers: Business Education, Distributive Education, and Office Administration. The De-
Department of Economics offers a major in Economics. The Department of History and Political Science offers majors in History, 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, Transportation, 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. A lucrative work-study program is available for outstanding students in this college in cooperation with Thiokol Chemical. 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 C.P.A., 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, financial wizard, college professor, public administrator.

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

Department of

Business Administration

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


Office in Main 181

The basic objective of the first two years' program in the Department of Business Administration is to provide a broad and sound foundation upon which to build in the last two years of study when the more specialized courses will be taken. The following program is recommended for Business majors to provide such a broad basis:
FRESHMAN

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Communications</td>
<td>9</td>
</tr>
<tr>
<td>Natural Science</td>
<td>10</td>
</tr>
<tr>
<td>Math. 30 and 35</td>
<td>10</td>
</tr>
<tr>
<td>Political Science 1 or 10</td>
<td>5</td>
</tr>
<tr>
<td>History, Sociology or Psychology 53</td>
<td>10</td>
</tr>
<tr>
<td>Approved Electives</td>
<td>3</td>
</tr>
<tr>
<td>P.E., M.S., or A.S.</td>
<td>3-6</td>
</tr>
</tbody>
</table>

Total ........................................ 50 to 53

SOPHOMORE

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.A. 1, 2, 3, Introductory Accounting</td>
<td>12</td>
</tr>
<tr>
<td>B.A. 4, 5, 6, Business Law</td>
<td>6</td>
</tr>
<tr>
<td>Economics 51, 52</td>
<td>10</td>
</tr>
<tr>
<td>Language Arts</td>
<td>10</td>
</tr>
<tr>
<td>Approved Electives (Computer science,</td>
<td></td>
</tr>
<tr>
<td>math, English 112, Physics, etc.)</td>
<td>8</td>
</tr>
<tr>
<td>M.S., or A.S., if desired</td>
<td>6</td>
</tr>
</tbody>
</table>

Total ........................................ 48 to 51

This program for the first two years includes few business courses and definitely stresses group requirements and the social sciences. Advisers can counsel students in the specific scheduling of these classes or in alterations of this basic program to fit a particular situation. This basic program will, however, fill all of the group requirements, and lay a solid basis for later specialization in any field of the College.

After a broad foundation during the first two years’ work, specialized majors are available in the following fields in Business Administration:

Accounting

Accounting is part of the ancient and honorable profession of record keeping, but now emphasizes the interpretation and analysis of data. A major in this area should take the following courses, in addition to the general lower division requirements: Junior year: B.A. 101, 102, 103, 111, 131, 132, 133, 134, 151, Economics 165. Senior year: B.A. 121, 122, 127, 143 (or Eng. 112), 149, 171, 181, Economics 107, 108, as well as additional Business Law. Accounting majors customarily take a minor in Economics.

Finance

Finance concentrates upon the management of money in business and investments. If a student is interested in this field, he should take the following courses: Junior year: B.A. 131, 132, 133, 134, 150, Economics 165, 171, 190, English 112. Senior year: B.A. 149, 151, 181, 182, Economics 199, 155.

Marketing

Marketing is concerned with the distribution or “cash-register” phase of business. Without sales and distribution, our entire system would immediately collapse. If interested in Marketing and Selling, take the following courses during the last two years: Junior year: B.A. 131, 132, 133, 134, 151, 152, 153, 171, and Economics 107. Senior year: B.A. 143 (or Eng. 112), 149, 150, 156 or 160 or 161, 181 and Economics 171.

Personnel and Industrial Relations

All business operations depend upon manpower, and its successful coordination is essential. If students are particularly interested in working with people in the recruiting, training, testing, and human relations aspects of management, they should take the following courses: Junior year: B.A. 131, 132, 133, 134, 143 (or Eng. 112), I.E. 104, Economics 125, 126, 127, Psychology 155. Senior year: B.A. 149, 150, 151, 171, 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. The program of study provides opportunities for initial development of managerial skills and attitudes emphasizing application to production work. Typical starting jobs for graduates are in procurement and materials control, production planning and control, quality control, cost control, and first line supervision. Required Courses: Junior year: B.A. 131, 132, 133, 134, 135, 143 or Eng. 112, 151, 171, 181, T.M.E. 56, Speech 21. Senior year: B.A. 136, 137, 138, 149, 150, Economics 107, 125, 171, Sociology 158. Computer science, mathematics, and technology are recommended electives.

Business Oriented Computer Programming

With the rapid acceptance of EDP (electronic data processing) by the business world, a strong minor in computer programming is a valuable opportunity available here. Dr. Rex Hurst in the Computer Center can describe the details more fully but a good introduction in this field can be obtained by completing the following courses as a minor in Computer Science in combination with a business major:

<table>
<thead>
<tr>
<th>COMPUTER SCIENCE</th>
<th>Hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.S. 45 (Computers and Society) .............</td>
<td>1</td>
</tr>
<tr>
<td>Philosophy 161 (Symbolic Logic) .............</td>
<td>5</td>
</tr>
<tr>
<td>C.S. 111 (Data Processing) ..................</td>
<td>3</td>
</tr>
<tr>
<td>or B.A. 14 and 116 ................................</td>
<td>[6]</td>
</tr>
<tr>
<td>C.S. 167 (Problem Oriented Programming) .......</td>
<td>3</td>
</tr>
<tr>
<td>or [C.S. 145 and 146] ..........................</td>
<td>[6]</td>
</tr>
<tr>
<td>A.S. 131 and 132 (Statistical Methods) ......</td>
<td>8</td>
</tr>
</tbody>
</table>

To be recommended by the Department for graduation a business major must have obtained at least 2.1 in both his major and minor.

Graduate Study

The Department of Business Administration offers two graduate programs. These programs provide small classes with intimate contact with the major professors, significant individual flexibility, and an emphasis upon individual research and development.

Financial assistance is available in the form of Graduate Assistantships for outstanding candidates who lead introductory sections of accounting or statistics, or otherwise assist the faculty. USU also offers a limited number of Research Fellowships which are open to all majors, including business and the other social sciences.

Master of Business Administration. The MBA degree is open to qualified graduate students regardless of their previous major. The time necessary for completion will depend, however, on the individual background and preparation. One year should suffice for well-trained business and economics majors, while two years may be required if little or no previous business training has been taken. The emphasis is upon broad training which will integrate the students' knowledge of the business world, and provide a basis for long-range advancement. We attempt to provide development of those attitudes, skills, and character needed in top level management throughout the years ahead. This program can terminate either in a thesis or series of research papers under Plan B. Considerable flexibility is available in terms of specialization in the thesis or independent research, but the heart of this graduate program is a year-long
Business Administration 63

Seminar built upon group discussion of individual reports, case studies, as well as discussion of the broad social responsibilities of business leadership.

Master of Science Degree in Accounting is available for students wishing to concentrate in accounting or pursuing the Certified Public Accounting degree. This program can be completed in one year by students with a strong background in accounting and business but would require considerably more time for students lacking the basic background. This sequence terminates in a CPA review course which is aimed at guiding and advising the student to a successful completion of the CPA examination. Dr. Norman S. Cannon is the Director of Graduate Studies in the Business Administration Department, and should be consulted for additional information on the specific course content required.

Business Administration Courses

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. (B.A. 1: 4F, W; B.A. 2: 4W, S; B.A. 3: 4F, S) Staff

4, 5, 6. Business Law. Course 4 is a general survey. It is also introductory for students who take additional Commercial Law courses. Courses 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, 2S, 2Su) Olson, Matheson

14. Electric Accounting Machines. A survey of the development and contribution of better ways and means of keeping records as factors in the cultural growth of societies. The basic principles involved in record keeping and data processing by means of modern electric accounting machines. (3F, W, S) Bell

15. IBM Machine Practice. A laboratory course in the operation of electric accounting machines such as the key punch, verifier, sorter, interpreter, reproducing punch, collator, and tabulating machine. One hour of demonstration and two hours of individual practice on the machine each week. Prerequisite B.A. 14; or B.A. 14 and 15 may be taken concurrently. (1F, W, S) Bell


30. Business Mathematics. An introduction to the mathematics of business and accounting. Designed to be taken prior to or concurrently with the first quarter of Introductory Accounting. (3F, W) Staff

63. Salesmanship. The history, development, and opportunities in sales work. The principles of preparing for interviews, proper presentation, gaining favorable attention, arousing the desire to buy, meeting objections, and creating acceptance. Special projects are conducted in relation to a particular type of selling. Lectures and cases. (2F) Staff


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 compensation of special work. (4F, 4W, 4S) McIff

104, 105, 106, 107, 108. Business Law. Course 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. Courses 105 and 106 alternate with 107 and 108; 107 and 108 will be given in 1963-64. Prerequisites: B.A. 4, 5, 6 or the consent of the instructor. (3F, 2W, 3S) Olson

111. Industrial Cost Accounting. Job costing, process accounting, and special considerations. (5W) Gardner

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

116. Accounting Machines Wiring. Wiring of control panels for the operation of the accounting machine, the reproducing punch, and the collator in the preparation of assigned reports. Prerequisite: B.A. 15. Two lecture periods and two lab periods of two hours each. (3S) Bell

**117. Introduction to Stored Programming. Basic Computer logic, flow charting, routines,
coding, library programs, and data processing application to business. Prerequisite: B.A. 116 or its equivalent.

**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. Three lectures. Staff

**119. Accounting Systems and Automation.** The application of new methods of processing data to the various types of accounting records and accounting systems. Bell

121, 122. Auditing Theory and Practice. A study of the principles and procedures associated with accounting verification and audit practice. Prerequisite: A good working knowledge of accounting principles and techniques. (3F, 3W) Cannon

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

129. Government Accounting. Basic principles underlying treatment of public and governmental accounts. Typical topics for study are: statutory funds, budgets, trust funds, and preparation of financial reports. (3S) Cannon


133. Management Concepts. The investigation and application of fundamental concepts of management and organization theory. The development of a working knowledge of fundamental managerial techniques of economic analysis and control. Preliminary study of selected management problems: policy, location, and product determination. Prerequisites: B.A. 1, 2, 3, or B.A. 100. (3F, W, Su) Dobler

134. Industrial Management Problems. Provides an integrated view of the production function and an understanding of its problems as they relate to other business activities. Emphasizes control while studying: Procurement, inventory control, cost control, layout, methods improvement, performance standards, production control, and quality control. Prerequisite: B.A. 138. (3W, S, Su) Dickson

135. Industrial Techniques. A foundation course covering: a study of major production processes; basic machine processes and work routing; study and practice in spatial visualization skill and interpretation of engineering drawings. Prerequisite: TME 56 or equivalent. (3S) Dobler

136. Production Management I. 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 activities. Prerequisites: B.A. 133, 134, 135, or equivalent. (4F) Dobler

137. Production Management II. The planning and indirect control of production activities and costs. Topics are studied from a managerial point of view and specifically include: industrial maintenance, industrial safety, plant layout, methods analysis, and performance standards. Prerequisites: B.A. 133, 134, 135, or equivalent. (4W) Dobler

138. Production Management III. The quantitative analysis of selected production problems. Topics covered include: the use of schematic models, applications of statistical quality control, sampling inspection, and an introduction to the use of linear programming in production. Prerequisites: Math 35, B.A. 132, 135, or equivalent. (4S) Dobler

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) Calder

141. Real Estate. Introduction to real estate contracts, forms, principles, and recent Federal housing legislation. (3S) Durscht

143. Business Communications. Fundamental principles of effective business writing and other forms of communication, such as letters, memos, reports, etc. Not open to freshmen. (3F, W, S) Neuberger, Lundstrom

147. Managing Small Business. Application of management principles and techniques to the independent, owner-manager type firm. (3F, W, S) Neuberger

149. Business Policy. A co-ordinating course to develop perspective, judgment, and facility in solving problems in production, distribution, personnel, finance, control, and social aspects of business. Prerequisites: B.A. 131, 132, 150. (4S') Required of all Business Administration majors. (5W, S) Dickson, Gardner

150. Managerial Accounting. Emphasizes the use of accounting as a tool of control for management. Major aspects include budget and managerial control, break-even charts, selection of alternatives. Required of all **Taught 1964-65.**
Business Administration majors. (5F, W, Su) Gardner

151. Marketing Principles. Aims to describe, analyze, and evaluate our present marketing system. Provides basic tools and background for understanding marketing principles. (5F, W, S) Jolton

152. Marketing Problems and Cases. Devoted to the analysis and solution of marketing problems by business firms. Case studies. Prerequisite: Marketing 151 or permission of the instructor. (5W) Jolton

153. Marketing Readings and Research. Provides perspective by studying both the changing market environment and outlook as conditions of our material welfare. Prerequisites: Marketing 151 and 152. (5S) Robinson

154. Purchasing. The significance of purchasing as a major activity in modern business. Consideration given organization, policies, and control of the procurement function. Lectures and problems. (3S) Dobler

155. Management of International Operations. Emphasis on international financial and marketing problems. Deals with U.S. Business doing or planning to do business abroad. Specifically will cover areas of exchange rates, tariffs, European Common Market, marketing products in underdeveloped economies. (3S) Staff

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. Prerequisite: B.A. 151. (5F) Robinson

160. 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: B.A. 151. (3W) Jolton

161. 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: B.A. 151. (5F) Jolton

171. Personnel Administration. Critical analysis of problems of labor management that confront the manager of a business enterprise and of policies and methods of dealing effectively with these problems. Lectures, problems, and selected cases. (5F, S, Su) Neuberger, Marston

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

173. Case Problems in Personnel Management. Application of principles of personnel administration to specific personnel problems commonly found in industry. Case studies will be used. (3S) Marston

181. Corporation Finance. How does the corporation raise its capital? A study of modern financial principles, methods, policies, and institutions. Corporate organization, creation, and reorganization. Prerequisites: Economics 51, 52; B.A. 1, 2, 3. (5F, W, S) Viets

182. Problems in Finance. The application of basic principles of finance to specific cases and problems of a typical nature. Prerequisites: B.A. 181, Economics 165. (3S) Viets

184. 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. (3F) Jolton

185. Managing Personal Finances. Designed to aid in meeting the growing complexity of personal finance: 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) Gardner

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) Cannon

Graduate Courses


207. C.P.A. Review. A course aimed at guiding the student to the successful completion of the Certified Public Accountant examination. The staff will maintain advisory contact with students until this goal is reached. (3S) Cannon

211. Advanced Cost Accounting. Special cases in estimating costing, standard costing, direct costing, and advanced theory in cost accounting. (5S) Cannon


**Taught 1964-65.
Free Enterprise and Public Policy. The problems involved in doing business with the Government. Public policies with regard to: Government Procurement, Research and Development, Production, Personal Practices, Contracting, Renegotiation, Contract Termination, Ownership of Facilities, Marketing and Pricing, etc. (3) Dickson

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

Thesis. For students preparing a master's degree thesis. Credit arranged. (F, W, S, Su) Staff

Graduate Seminar in Business Administration. Discussion and individual reports on various phases of Business Administration. Required of all master's candidates, but may be taken by superior seniors, with the instructor's approval. Nine units of credit may be counted in this sequence. (3F, W, S) Staff

Independent Research and Reading. Credit arranged. (F, W, S, Su) Staff

Accounting Seminar. Credit arranged. (8) Cannon

Department of Business Education and Office Administration

Assistant Professors Robert E. Wiper, Head, Leah Dunford, Ted Ivarie, Calvin Lowe, Helen Lundstrom, Floris S. Olsen; Instructor Annette B. Petersen.

Office in Main 376

The dual Department of Business Education and Office Administration offers three curriculums which provide the 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 curricula 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 toward 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 will lead to a highly respected, top-level office position.

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 will lend itself to a desirable working relationship with major professors and allow 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

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 curriculum is sug-
Business Education and Office Administration 67

Suggested for students preparing to enter the business education profession. It should be recognized that changes in the suggested program may be worked out with advisers. The program of studies for transfer students must be adjusted to meet the minimum professional requirements and allow for acceptance of transfer credit.

Composite major (B.E., O.A., B.A.)
Required Courses (R)
Suggested Courses (S)

FRESHMAN YEAR

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>English 1, Basic Communications</td>
<td>3 R</td>
<td></td>
</tr>
<tr>
<td>Biology</td>
<td>5 R</td>
<td></td>
</tr>
<tr>
<td>B.A. 30 Business Math or Math Course</td>
<td>3 R</td>
<td></td>
</tr>
<tr>
<td>O.A. 65 Records Administration</td>
<td>3 R</td>
<td></td>
</tr>
<tr>
<td>O.A. 41 Elementary Type or equivalent</td>
<td>2 R</td>
<td></td>
</tr>
<tr>
<td>P.E. or M.S.</td>
<td>1 R</td>
<td></td>
</tr>
</tbody>
</table>

Winter

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>English 2, Basic Communications</td>
<td>3 R</td>
<td></td>
</tr>
<tr>
<td>Physiology 4 Physics or Bacteriology 10</td>
<td>5 R</td>
<td></td>
</tr>
<tr>
<td>Math or Exact Science Elect.</td>
<td>5 R</td>
<td></td>
</tr>
<tr>
<td>O.A. 42 Intermediate Type</td>
<td>2 R</td>
<td></td>
</tr>
<tr>
<td>P.E. or M.S.</td>
<td>1 R</td>
<td></td>
</tr>
</tbody>
</table>

Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>English 3, Basic Communications</td>
<td>3 R</td>
<td></td>
</tr>
<tr>
<td>Math or Exact Science Elect.</td>
<td>3 R</td>
<td></td>
</tr>
<tr>
<td>O.A. 43 Advanced Type</td>
<td>2 R</td>
<td></td>
</tr>
<tr>
<td>Psychology 53 Elementary General Psychology</td>
<td>5 R</td>
<td></td>
</tr>
<tr>
<td>P.E. or M.S.</td>
<td>1 R</td>
<td></td>
</tr>
<tr>
<td>Electives</td>
<td>2 S</td>
<td></td>
</tr>
</tbody>
</table>

SOPHOMORE YEAR

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.A. 4 Business Law</td>
<td>2 R</td>
<td></td>
</tr>
<tr>
<td>B.E. 85 Consumer Education</td>
<td>3 R</td>
<td></td>
</tr>
<tr>
<td>O.A. 75 or 141 Shorthand I and Dict.-Tran.</td>
<td>3-5 S</td>
<td></td>
</tr>
<tr>
<td>B.A. 1 Introductory Accounting</td>
<td>4 R</td>
<td></td>
</tr>
<tr>
<td>B.A. 189 Principles of Business Education</td>
<td>3 R</td>
<td></td>
</tr>
</tbody>
</table>

Winter

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.A. 2 Introductory Accounting</td>
<td>4 R</td>
<td></td>
</tr>
<tr>
<td>B.A. 5 Business Law</td>
<td>2 R</td>
<td></td>
</tr>
</tbody>
</table>

JUNIOR YEAR

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economics 52 Economic Problems</td>
<td>5 R</td>
<td></td>
</tr>
<tr>
<td>Psychology 100 Human Growth and Development</td>
<td>3 R</td>
<td></td>
</tr>
<tr>
<td>B.E. 180 Methods of Teach. Shorthand and Transcription</td>
<td>3 R</td>
<td></td>
</tr>
<tr>
<td>O.A. 167 Office Practice</td>
<td>2 R</td>
<td></td>
</tr>
<tr>
<td>Elective or minor</td>
<td>3-4 S</td>
<td></td>
</tr>
</tbody>
</table>

Winter

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.A. 185 Managing Personal Finances</td>
<td>5 R</td>
<td></td>
</tr>
<tr>
<td>Psychology 102 Elementary Psychology</td>
<td>3 R</td>
<td></td>
</tr>
<tr>
<td>B.A. 143 Business Communications</td>
<td>3 R</td>
<td></td>
</tr>
<tr>
<td>B.E. 179 Methods of Teaching—Typewriting and Office Practice</td>
<td>3 R</td>
<td></td>
</tr>
<tr>
<td>O.A. 186 Secretarial Procedures</td>
<td>3 R</td>
<td></td>
</tr>
</tbody>
</table>

Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.E. 178 Methods of Teaching</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business—non skilled</td>
<td>3 R</td>
<td></td>
</tr>
<tr>
<td>Education 111 Principles of Secondary</td>
<td>3 R</td>
<td></td>
</tr>
<tr>
<td>Sociology, History or P.S. elect.</td>
<td>3-5 S</td>
<td></td>
</tr>
<tr>
<td>Education 114 Org. and Adm.</td>
<td>3 R</td>
<td></td>
</tr>
<tr>
<td>O.A. 187 Secretarial Procedures</td>
<td>3 R</td>
<td></td>
</tr>
<tr>
<td>Elective or minor</td>
<td>2 S</td>
<td></td>
</tr>
</tbody>
</table>

SENIOR YEAR

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.E. 189 Principles of Business Education</td>
<td>3 R</td>
<td></td>
</tr>
<tr>
<td>B.A. 140 Insurance or Economics 127</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Security or Upper B.A. elect.</td>
<td>3 R</td>
<td></td>
</tr>
<tr>
<td>P.H. 155 Public Health</td>
<td>3 R</td>
<td></td>
</tr>
<tr>
<td>B.A. 14 Electric Accounting Machines</td>
<td>3 S</td>
<td></td>
</tr>
<tr>
<td>B.A. 15 IBM Machine Practice</td>
<td>1 S</td>
<td></td>
</tr>
<tr>
<td>B.A. 151 Marketing Principles</td>
<td>5 R</td>
<td></td>
</tr>
<tr>
<td>Electives or minor</td>
<td>4 S</td>
<td></td>
</tr>
</tbody>
</table>

Winter

<table>
<thead>
<tr>
<th>Course</th>
<th>Units</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>19</td>
<td></td>
</tr>
</tbody>
</table>
Students who have taken business skill courses such as typewriting and shorthand in high school will be placed in the appropriate level course by means of an evaluation of their proficiency. Courses bypassed in this manner should have elective courses substituted for them.

The three senior quarters should be considered as interchangeable so that student teaching may be taken in any quarter. Perhaps the most desirable time for enrolling in student teaching is the Fall Quarter since students will get the experience of seeing classes start at the first of the school year. Methods courses should be taken in the junior year if student teaching is to be taken in the fall or winter quarters.

Students may count either B.E. 178, 179, or 180 toward the 33-credit professional requirement if needed. Any one of these courses will substitute for Education 115 for certification requirements.

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 by departmental approval.

Business Education Courses

85. Consumer Education. The general problems of earning and spending an income. Aids to the wise buying of a home, transportation, insurance, and other major consumer items. No prerequisites. (3F) Ivarie

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 D.E. and Cooperative B.E. Instructional methods and coordination techniques involved in teaching cooperative business and distributive education. Includes instructional materials, individual instruction kits, finding and maintaining training stations, selection of students, desirability of advisory committees and student club activities. Prerequisite B.E. 150 or by instructor's permission. (3W) Lowe

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. (3S) Texak

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) Wiper

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) Olsen

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

Graduate Courses

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) Wiper

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) Wiper

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) Wiper

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) Wiper

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) Wiper

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) Wiper

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

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

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, S, and Su) Wiper

295. Independent Research and Reading. Credit arranged. (F, W, S, Su) Staff

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.

The program that follows is suggested 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.

### FRESHMAN YEAR

#### Fall

- English 1 Basic Communications ........... 3 R
- Biology 1 ..................................... 6 R
- B.A. 30 Business Math (or mathematics) 3 R
- P.E. .......................................... 1 R
- B.E. 85 Consumer Education ............... 3 R

#### Winter

- English 2 Basic Communications ........... 3 R
- Phy. 4 Bact. 10 or Physics .................. 5 R
- Math or Exact Science ....................... 5 R
- B.A. 20 Introduction to Business .......... 3 R
- P.E. .......................................... 1 R

#### Spring

- English 3 Basic Communications ........... 3 R
- Math or Exact Science ....................... 3 R
- Psychology 53 (elem. Gen. Psy.) .......... 5 R
- P.E. .......................................... 4 R
- Electives .................................... 2 S

#### SOPHOMORE

#### Fall

- B.A. 4 Business Law ......................... 2 R
- B.A. 63 Salesmanship ......................... 2 R
- B.A. 1 Introduction to Accounting .......... 4 R
- B.A. 156 Principles of Advertising ....... 6 R
- 151 Marketing Principles

#### Winter

- B.A. 5 Business Law ......................... 2 R
- B.A. 2 Introduction to Acct. ............... 4 R
- Elective (Language or Art) ................. 5 R
- B.A. 147 Mgt. of Small Business .......... 4 R
- Electives .................................... 2 S

#### Spring

- B.A. 6 Business Law ......................... 2 R
- Electives (Language or Art) ............... 5 S
- B.A. 3 Introduction to Acct. ............... 4 S
- Econ. 51 Economics ........................ 5 R
70 College of Business and Social Sciences

JUNIOR YEAR

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Econ. 52 Economics</td>
<td>5</td>
</tr>
<tr>
<td>Psy. 100 (Human Gr. &amp; Develop.)</td>
<td>9</td>
</tr>
<tr>
<td>B.A. 151 Marketing Principles</td>
<td>5</td>
</tr>
<tr>
<td>B.E. 150 Philosophy of Dist. Ed</td>
<td>3</td>
</tr>
</tbody>
</table>

Winter

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.A. 185 Man. Personal Finance</td>
<td>5</td>
</tr>
<tr>
<td>Psy. 102 (El. Psy. for St. Teach.)</td>
<td>3</td>
</tr>
<tr>
<td>B.A. 143 Business Communications</td>
<td>3</td>
</tr>
<tr>
<td>B.E. 155 Methods in Dist. Ed</td>
<td>3</td>
</tr>
<tr>
<td>and Cooperative Business Ed</td>
<td></td>
</tr>
<tr>
<td>Electives</td>
<td>2.4</td>
</tr>
</tbody>
</table>

Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.A. 133 Management Concepts</td>
<td>3</td>
</tr>
<tr>
<td>Ed. 111 Principles of Sec. Education</td>
<td>3</td>
</tr>
<tr>
<td>Electives (Soc., Hist., or P.S.)</td>
<td>4</td>
</tr>
<tr>
<td>Ed. 114 Org. &amp; Adm.</td>
<td>3</td>
</tr>
<tr>
<td>Electives (Minor)</td>
<td>4</td>
</tr>
</tbody>
</table>

SENIOR YEAR

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.A. 161 Prin. &amp; Prob. of Retailing</td>
<td>5</td>
</tr>
<tr>
<td>B.A. 171 Personnel Adm.</td>
<td>5</td>
</tr>
<tr>
<td>B.A. 140 Insurance</td>
<td>3</td>
</tr>
<tr>
<td>P.H. 155 (Public Health)</td>
<td>4</td>
</tr>
</tbody>
</table>

Winter

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.A. 15 IBM Machine Practice</td>
<td>1</td>
</tr>
<tr>
<td>Ed. 115 Sec. School Curr.</td>
<td>3</td>
</tr>
<tr>
<td>Electives (Minor or upper B.A. elect.)</td>
<td>9</td>
</tr>
</tbody>
</table>

Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ed. 127 Sec. School Methods</td>
<td>3</td>
</tr>
<tr>
<td>Ed. 129 Student Teaching</td>
<td>5</td>
</tr>
<tr>
<td>Ed. 130 Student Teaching</td>
<td>4</td>
</tr>
</tbody>
</table>

with a major in Office Administration may be adjusted by advisers so as to more specifically meet individual needs. Transfer students’ programs will be adjusted to provide for transfer of credits.

FRESHMAN YEAR

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>English 1 (Basic Com.)</td>
<td>3</td>
</tr>
<tr>
<td>Biology 1</td>
<td>5</td>
</tr>
<tr>
<td>O.A. 76 Shorthand II</td>
<td>3</td>
</tr>
<tr>
<td>O.A. 41 Elem. Type or equiv. or B.A.</td>
<td></td>
</tr>
<tr>
<td>20 Introduction to Business</td>
<td>2-3</td>
</tr>
</tbody>
</table>

Winter

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>English 2 (Basic Com.)</td>
<td>3</td>
</tr>
<tr>
<td>Physiology 4 or Bacteriology</td>
<td>5</td>
</tr>
<tr>
<td>O.A. 76 Shorthand II</td>
<td>3</td>
</tr>
<tr>
<td>O.A. 42 Intermediate Type</td>
<td>2</td>
</tr>
<tr>
<td>O.A. 92 Business Machines</td>
<td>2</td>
</tr>
<tr>
<td>P.E.</td>
<td>1</td>
</tr>
</tbody>
</table>

Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>English 3 (Basic Com.)</td>
<td>3</td>
</tr>
<tr>
<td>Math or Exact Science elective</td>
<td>5</td>
</tr>
<tr>
<td>O.A. 77 Shorthand III</td>
<td>3</td>
</tr>
<tr>
<td>O.A. 43 Advanced Type</td>
<td>2</td>
</tr>
<tr>
<td>Speech 21 Intermediate Pub. Speak.</td>
<td>3</td>
</tr>
<tr>
<td>P.E.</td>
<td>1</td>
</tr>
</tbody>
</table>

SOPHOMORE YEAR

Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economics 51</td>
<td>5</td>
</tr>
<tr>
<td>Language Arts elective</td>
<td>5</td>
</tr>
<tr>
<td>O.A. 141 Dictation and Transcription</td>
<td>5</td>
</tr>
<tr>
<td>B.A. 30 Business Math</td>
<td>2</td>
</tr>
</tbody>
</table>

Winter

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economics 52</td>
<td>5</td>
</tr>
<tr>
<td>Language Arts elective</td>
<td>5</td>
</tr>
<tr>
<td>O.A. 142 Dict. and Transcription II</td>
<td>5</td>
</tr>
<tr>
<td>Elective</td>
<td>2</td>
</tr>
</tbody>
</table>

Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exact Science elect.</td>
<td>5</td>
</tr>
<tr>
<td>English 5 or L.A. elect.</td>
<td>3</td>
</tr>
<tr>
<td>O.A. 143 Dict. and Transcription III</td>
<td>5</td>
</tr>
<tr>
<td>O.A. 65 Records Administration</td>
<td>3</td>
</tr>
</tbody>
</table>
have elective courses substituted for them.

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**

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, W, S) Staff

42. **Intermediate Typewriting.** Assumes previous training in typewriting. Emphasis on skill building, typing of letters, envelopes, manuscripts, business forms and tabulation exercises. Prerequisite: O.A. 41 or equivalent.

(2F, W, S) Ivarie, Lundstrom

43. **Advanced Typewriting.** The development of number proficiency, statistical tabulation and typing on business forms, rough drafts, stencils for duplication. Prerequisite: O.A. 42.

(2W, S) Ivarie, Lundstrom

45. **Skill-Building Typewriting.** Remedial typewriting, with emphasis on improvement of accuracy and speed.

(1F, W, S) Dunford

51. **Introduction to Secretarial Training.** Designed to develop secretarial efficiency through study of requirements, duties, and personal qualities of a secretary, with special emphasis on personal appearance, manner, applying for and obtaining a position. Required of all lower-division office administration students.

(2F) Peterson


(3F, W, S) Lundstrom

75. **Fundamentals of Shorthand I.** Assumes no previous training in shorthand. Study of fundamentals of simplified Gregg shorthand.

(3F, W) Peterson, Olsen

76. **Fundamentals of Shorthand II.** Continuation of course 75. Introduction of new-matter dictation. Prerequisite: O.A. 75 or equivalent. (3W, S) Peterson, Olsen

77. **Fundamentals of Shorthand III.** Continuation of course 76. Intensive practice in new-matter dictation. Prerequisite: O.A. 76 or equivalent. (3F, S) Peterson, Olsen
87. IBM Keypunch Speedbuilding. Three one-hour lab periods per week. Prerequisite: One year of typing. (1F, W, S) Bell

92. Business Machines. Basic training in the use of ten-key adding-listing machines, printing calculators, and rotary calculators. (2F, W, S) Peterson

94. Posting and Keydriven Machines. Practice in addition, multiplication, subtraction, and division of key-driven calculators and application of the machines to such business computations as percentages, discounts, decimal equivalents, and constants. Application of the ten-key and full-key bookkeeping machines to business and financial institutions. (2F, W, S) Ivarie

141, 142, 143. Dictation and Transcription I, II, III. A continuation of the study of shorthand fundamentals and a development of shorthand skills. 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: O.A. 77 or equivalent, and O.A. 42. (5F, 5W, 5S) Olsen, Peterson


175. Office Management. Emphasis on principles of office management, duties and responsibilities of the office manager, types of organization, methods of control, office arrangement and equipment, job analysis, selection, employment and training of employees. Prerequisite: B.A. 20, Economics 51, 52. (3F) Neuberger

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

Combination Major

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. The four-year degree program on the previous page may be adjusted to emphasize a clerical type program, if desired. Completion of these requirements, in addition to University and group requirements, leads to a Bachelor of Science degree.

Family Life Courses

Forty-two hours with not fewer than nine in any department:

Household Economics and Management

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEM 65</td>
<td>Housing 3</td>
</tr>
<tr>
<td>HEM 75</td>
<td>Home Furnishings 3</td>
</tr>
<tr>
<td>HEM 100</td>
<td>Household Equipment 3</td>
</tr>
<tr>
<td>HEM 149</td>
<td>Home Management 3</td>
</tr>
<tr>
<td>HEM 150</td>
<td>Home Management House 4</td>
</tr>
<tr>
<td>HEM 155</td>
<td>Family Finances 3</td>
</tr>
</tbody>
</table>

Clothing and Textiles

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT 24</td>
<td>Textiles 3</td>
</tr>
<tr>
<td>CT 25</td>
<td>Intermediate Clothing Construction 3</td>
</tr>
<tr>
<td>CT 195</td>
<td>History of Costume 3</td>
</tr>
<tr>
<td>CT 125</td>
<td>Draping 3</td>
</tr>
<tr>
<td>CT 165</td>
<td>Tailoring 3</td>
</tr>
<tr>
<td>CT 170</td>
<td>Flat Pattern Designing 3</td>
</tr>
<tr>
<td>CT 185</td>
<td>Family Clothing 3</td>
</tr>
</tbody>
</table>

Foods and Nutrition

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FN 22</td>
<td>Principles of Nutrition 3</td>
</tr>
<tr>
<td>FN 23</td>
<td>Principles of Food Preparation 3</td>
</tr>
<tr>
<td>FN 25</td>
<td>Meal Preparation for the Family 3</td>
</tr>
<tr>
<td>FN 167</td>
<td>Experimental Foods 3</td>
</tr>
<tr>
<td>FN 135</td>
<td>Weight Control 2</td>
</tr>
<tr>
<td>FN 140</td>
<td>Nutrition 5</td>
</tr>
<tr>
<td>FN 141</td>
<td>Child Nutrition 2</td>
</tr>
<tr>
<td>FN 146</td>
<td>Food Technology 2</td>
</tr>
</tbody>
</table>

Family and Child Development

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>FCD 20</td>
<td>Preparation for Marriage and Family Relations 3</td>
</tr>
<tr>
<td>FCD 120</td>
<td>Marriage 3</td>
</tr>
<tr>
<td>FCD 67</td>
<td>Early Childhood 3</td>
</tr>
<tr>
<td>FCD 68</td>
<td>Preschool Laboratory 2</td>
</tr>
<tr>
<td>FCD 77</td>
<td>Child from 6-12 3</td>
</tr>
<tr>
<td>FCD 100</td>
<td>Human Growth and Development 3</td>
</tr>
<tr>
<td>FCD 108</td>
<td>Guidance of the Young Child 3</td>
</tr>
<tr>
<td>FCD 115</td>
<td>Growth of the Infant 3</td>
</tr>
<tr>
<td>FCD 130</td>
<td>Play and Play Materials 3</td>
</tr>
<tr>
<td>FCD 155</td>
<td>Family in Middle and Later Years 3</td>
</tr>
</tbody>
</table>

Office Administration Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>O.A. 51</td>
<td>Intro. to Secretarial Training 2</td>
</tr>
<tr>
<td>O.A. 42</td>
<td>Intermediate Type 2</td>
</tr>
<tr>
<td>O.A. 65</td>
<td>Records Administration 3</td>
</tr>
<tr>
<td>O.A. 92</td>
<td>Business Machines 2</td>
</tr>
<tr>
<td>O.A. 167</td>
<td>Office Practice 2</td>
</tr>
<tr>
<td>O.A. 175</td>
<td>Office Management 3</td>
</tr>
<tr>
<td>O.A. 186, 187</td>
<td>Secretarial Procedures 6</td>
</tr>
</tbody>
</table>
Economics 73

A two-year secretarial course is also offered to prepare students for a secretarial or clerical position in the shortest period of time.

Department of Economics


Office in Main 315B

The Department of Economics offers the Bachelor of Science and Master of Science 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 51 and 52 are prerequisites for all of the upper division theory courses.

Economics Courses

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

*It is recommended that B.A. 2 also be completed. 4 hours.
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. (5S) **Isaelsen**

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

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. (3W) **Arrington**

155. **Public Finance and Fiscal Policies.** Principles involved in establishing the general property tax, income tax, death taxes, taxes upon business, social insurance taxes; effects of taxes in the American Economy; war and postwar finance. (3W) **Isaelsen**

156. **Special Problems in State and Local Finance.** A critical examination of the tax structure of Utah and its ability to finance public services. Alternative sources of revenue and the school finance program will receive special consideration. (2W) **Isaelsen**

165. **Money and Banking.** Development of our present monetary and banking system; a critical analysis of central banking. (5F, W) **Isaelsen**

170. **Economic History of the United States.** Development of agriculture, industry, labor, transportation and finance from colonial times to now. (5W) **Arrington**

171. **Economic and Business Fluctuations.** Instability in aggregate economic activity and rate of growth. Business Cycles—their history, nature, and causes. Forecasting and control of instability and cycles. (5F, 5W, 5S) **Collier**

174. **Business and Government.** The role of the giant corporation in modern economic life; public regulations of monopoly and competitive practices; international and domestic cartels; alternative policy toward business. (3F) **Arrington**

180. **Economic Development.** Theories and principles of economic development, characteristics and problems of underdeveloped and developing countries, alternative techniques and policies for the promotion of growth and development. (3S) **Arrington**

190. **Introduction to Econometrics.** Application of mathematics and statistics to the analysis of economic variables. (3F) **Jensen**

191. **Principles of Econometrics.** Continuation of Economics 190. Prerequisite Economics 190. (3W) **Jensen**

192. **Principles of Econometrics.** Continuation of Economics 191. Prerequisite Economics 191. (3S) **Jensen**

200. **Research in Economics.** Investigations by graduate students. Credit granted according to work done. (F, W, S) **Staff**

201. **Readings and Conferences.** Credit arranged. (F, W, S) **Staff**

205. **Prices Theory.** A critical review of a few major topics in price and distribution theory. Open to graduate students and seniors with adequate preparation. (2F) **Durtschi**

206. **Income Theory.** A comprehensive review of the literature and methods of macro-economics, and a study of the public policies based thereon. (2W) **Arrington**

207. **Problems in Economic Theory.** A review of current literature in selected fields of economics. Open to graduates and seniors with adequate preparation. (2S) **Staff**

209. **Problems 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. (2W) **Arrington**

211. **Literature of Economics.** An intensive study of the bibliographical materials and literature of economics. Permission of instructor required. (2W) **Isaelsen**

212. **Seminar in Industrial Relations.** Application 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. (2W) **Murray**
History and Political Science

(History, Political Science, Pre-Law, Social Science)

PROFESSORS M. R. Merrill, HEAD, Joel E. Ricks, EMERITUS, J. Duncan Brite, Claude J. Burttenshaw, Edwin L. Peterson; ASSOCIATE PROFESSORS Wendell B. Anderson, S. George Ellsworth, M. Judd Harmon, Brigham D. Madsen; ASSISTANT PROFESSORS Philip S. Spoerry, Stanford O. Cazier, J oDe n A. E m e n k i s e.

Offices in Main 103, 133, 175, 274, 275, 276, 277, 278, 279 and in University Annex 105, 107, 206C.

History

The Department offers work leading to the Bachelor of Science and the Master of Science degrees in History.

Major in History. For a major in History the student must complete forty 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 13 and 14. 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 or 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 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.

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 twenty hours in a minor. History 4, 5, 13, and 14 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 13 and 14, and 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 Ph.D. degree. Interested students should consult History faculty members.

**Institute of Utah Studies**

By virtue of its Library holdings, its faculty, and its 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, established for the purpose of encouraging and assisting all persons interested in any phase of Utah's development, offers assistance from the faculty, research opportunities, and courses in regional 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.

**Graduate Study**

**Master of Science in History.** The program of studies for the Master of Science degree in History is described in the catalog of the School of Graduate Studies. Those who are interested in this program 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 Department of History and Political Science cooperate in administering the graduate program leading to the Master of Science degree 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, W, S) **Staff**
2. **Man and Civilization II.** Continuation of History 1. From about 1500 to 1850. Not open to those who have had History 5. (3F, W, S) **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. (3F, W, S) **Staff**
4. **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, S) **Ellsworth**
5. **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. (5W) **Brite**
6. **Early American Civilization.** The rise of American civilization from colonization through the Civil War. (5F, W, S) **Cazier, Madsen**
7. **Modern American Civilization.** Continuation of History 13. From the close of the Civil War to the present. (5F, W, S) **Cazier, Madsen**
8. **Latin America to 1800.** Geography, pre-Columbian peoples, conquest and colonization by European powers, international rivalries, political, social, and economic developments. (3W) **Peterson**
9. **Latin America Since 1800.** The Spanish-American revolutions. The growth and development of the Republics of Latin America and their role in the contemporary world. (3S) **Peterson**

**History of Europe and Asia**

105. **Greek History.** Greek civilization to the Roman conquest, 146 B.C. Emphasizes po-
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. (500-1560 A.D.) Political, economic, social, and cultural developments during the Middle Ages. (8S) Brite
124. Renaissance and Reformation. (1250-1600) (5F) Brite
126. French Revolution and Napoleon. (1789-1815) (3F)
127. Nineteenth Century Europe. Political and economic developments between 1815 and 1914. (3W) Brite
128. Twentieth Century World. Political and economic developments in Europe, America, Asia, and Africa since the end of World War I. (3S) Brite
138. History of Russia to 1917. From the earliest times to the Revolution. (3F) Sperry
139. History of the Soviet Union. From the Revolutions of 1917 to the present day. (3W)
161. England to 1603. From the earliest times to the death of Elizabeth. (3F) Brite
162. England since 1603. From King James I to the present day. (3W) Brite, Madsen
163. The British Empire. Rise and decline of the British Empire in the modern world. (3S) Madsen, Brite
166. European Cultural History I. Modern European intellectual history to the nineteenth century, with emphasis on the relations between patterns of thought and society. (2F) Cazier
167. European Cultural History II. European intellectual and social history in the nineteenth century, with emphasis on the development of social institutions and ideas. (2W) Cazier
168. European Cultural History III. European intellectual and social history in the twentieth century. (2S) Cazier
175. East Asia to 1800. Development of the civilizations of East Asia—China, Japan, and Korea—from their origin to the 19th century. (3W) Sperry
176. East Asia Since 1800. Emphasis on China and Japan in the 19th and 20th centuries. (6S) Sperry

History of the United States
135. History of the Far West. Deals with the region from the Rockies to the Pacific Coast, with emphasis upon the Intermountain West. (8F) Ricks
137. History of Utah. Geography and native peoples, early explorations, political, social, and economic developments to the present. (5F, W, S) Ellsworth
143. The Jacksonian Era. Political, economic, and cultural developments, 1815-1850. (2) Ellsworth
144. Civil War and Reconstruction. (3S) Cazier
152. The American Revolution. The background, philosophy, nature, campaigns, and consequences of the American revolution. (3F) Madsen
153. Era of Hamilton and Jefferson. Political, economic, and cultural developments. 1789-1815. (3) Madsen
156. Cultural History of the United States I. A social and intellectual history of colonial America with emphasis on the development of major thought patterns in relation to their social-economic context. (3F) Cazier
158. Cultural History of the United States III. A social and intellectual history of the United States in the twentieth century. (3S) Cazier
159. Recent United States History. Domestic and foreign affairs of the United States since World War I, emphasizing the development of modern America and her role in world affairs. (3W) Madsen
171. Constitutional History of the United States. (5F) Madsen
190. Sources and 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. (3W) Ellsworth

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) Madsen
203. Historiography. The history of historical writing. (3) Staff
205. Philosophy of History. Interpretations, causation and interrelations in history. (3S) Cazier
222. Seminar in European History. (2F) Staff
224. Seminar in American History. (2S) Staff
226. Seminar in Western American History. (2W) Staff
237. Teaching Utah History. Seminar in the sources and literature of Utah History, exercises in the preparation and presentation of materials. (3Su) Ellsworth
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 Government. Students must have grades of "C" or above in all courses counted toward the major. 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.

Master of Science in Political Science. The program of studies for the Master of Science 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, S) Emenhiser, Merrill

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

15. American State and Local Government. The emphasis is on Utah state, municipal and county governments. It follows American government. (3W) Anderson

91, 92, 93. Public Affairs Series. Time and place will vary with events but approximately one-half of the Tuesday assemblies at 11 a.m. will be included in the series. Other campus and community events related to public and international affairs will be included. Passing rather than letter grades will be given to those meeting minimum requirements. Students will be expected to attend twelve scheduled events or meet substitute requirements. This series is conducted in cooperation with the Associated Students and is supervised by the Institute of Public and International Affairs. (½F, ½ W, ½ S.) 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, S) 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 dilemma of our time. (3W) Merrill

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

111. International Government. Examines briefly the attempts to achieve some type of international organization. Major emphasis is on the League of Nations and United Nations, including such organizations as United Nations Educational, Scientific and Cultural Organization, World Health Organization, Food and Agricultural Organization, International Labor Organization, the World Bank, and the World Monetary Fund. (3S) 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. (3S) 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 resource problems. (3S) Anderson

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. Students may register for one, two, or three quarters. (2F, 2W, 2S)

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)

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. (3S)

125. Political Parties and Practical Politics. Organization and practices of political parties. (3F)

127. Constitutional Law. A foundation course in American Constitutional Law. The case method is used extensively. Prerequisite: Political Science 10. (5F)

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. (3S)

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. (3S)

140. American Legislation. 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. The laboratory methods of approach are used as far as is feasible. Parliamentary law is emphasized. (2W)

145, 146, 147. History of Political Thought. Course 146 covers political thought from its beginnings in the Greek period to Machiavelli. Course 146 carries on the study from Jean Bodin to Bentham. Course 147 emphasizes the modern period and gives consideration to democratic, fascist, and communist theories. (3F, 3W, 3S)

150. World Political Geography. A general survey of world geography with special emphasis upon the major political blocs in the current world. Attention will be directed towards the British Commonwealth, the French Community, the Communist (Russian and Chinese) control areas, the Organization of American States, and the “Neutral” states. (4W)

151. Introduction to Public Administration. Defines the subject matter of public administration, concentrates upon analyzing the problems of governmental administrative or-
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. (3F, W, S) **Staff**

**201. Research in Political Science.** Credit arranged. (F, W, S) **Staff**

**203. Readings and Conferences.** Credit arranged. (F, W, S) **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. (3W) **Staff**

**207, 208, 209. Seminar in Political Science.** A two-credit course each quarter with emphasis on one branch of political science each quarter. Only seniors and graduate students with a major in one of the social sciences may register. (2F, 2W, 2S) **Staff**

**211. Thesis.** For graduate students preparing a master's degree thesis. Credit arranged. (F, W, S) **Staff**

**250. Graduate Social Science Seminar.** For graduate students in the social sciences. Programs and procedures devised by social science graduate students and department staffs. (1W) **Staff**

### 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 tremendous number of career opportunities for those who major in the field. These include teaching in the secondary schools, journalism, and business. There is also great opportunity in the field of college teaching. This requires graduate work usually to the Ph.D. level. In addition the department of Political Science offers career-oriented programs in International Relations, Public Administration, and Pre-Law.

### International Relations

The hopes and fears of our civil-
test scores be included in the applications. Applications for the test should be made to the School of Graduate Studies, in Main 182.

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**: P.S. 10 is required. Optional selections from the following: P.S. 15, 125, 140, 151, 180, 181, 182, 207, 208, 209. Total minimum hours—12.

**Comparative Government**: Optional selections from the following: P.S. 170, 171, 172, 173. Total minimum hours—3.

**International Relations**: Optional selection from the following: P.S. 101, 102, 111. Total minimum hours—3.

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

**Public Law**: Optional selections from the following: P.S. 127, 128, 131. 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 student 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.

Social Science Courses

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

2. **General Geography**. Europe, Afro-Asia, 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. Fall quarter, 5 and 6; winter quarter, 6 and 7; spring quarter, 5 and 7. (3F, 3W, 3S) Peterson

5, 6, 7. **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, 3W, 3S) Peterson

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, 3W, 3S) Peterson

150, 160, 170. **Geographic Tension Areas**. An analysis will be made of current areas of the world in which racial, economic, political or religious tensions appear. The geographic location of the areas will be examined and the spatial relationship of the regions concerned studied. Historic, social and linguistic patterns of the areas will be noted to better interpret the causes for current tensions. (3F, 3W, 3S) Peterson
Sociology

A major in Sociology must, in addition to meeting the group requirements for graduation, complete a minimum of 47 credits in Sociology. Specific required courses will be suggested by the adviser at the time of registration.

Either Sociology 10 or 70 is a suggested prerequisite for all upper division courses in Sociology.

Students are required to complete at least four hours of Seminar 190 for graduation.

In addition to the minimum 47 hours mentioned 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 students may obtain practical experience diagnosing social situations and developing programs to resolve problems.

Graduate Study

The Department of Sociology and Social Work offers courses leading to the Master of Science and Doctor of Philosophy degrees. 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. Candidates for a degree are required to spend one year as a student in full time residence at some other university approved for study by the USU Sociology Department.

Institutional requirements for the PhD degree are explained in the Graduate School section. Also see catalog, School of Graduate Studies.

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)


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. (6F, W, S)

75. Effective Community Living. Understanding the community we live in. Practical experience in learning fundamental tools for social action by individuals, organizations, and groups. (3S)

82 College of Business and Social Sciences

Department of Sociology and Social Work

Professor R. Welling Roskelley, Head; Associate Professors Therel R. Black, William A. DeHart, Carmen D. Fredrickson, Gordon N. Keller, Evelyn H. Lewis; Assistant Professor John A. Pennock.

Office in Main 212

Sociology

82 College of Business and Social Sciences
90. Introduction to Cultural Anthropology. Attitudes, ideas, behavior, social organization and material results of selected primitive and contemporary cultures. (3F) Black

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

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

105. Anthropology and Education. Contributions of anthropology to the understanding of the educational development of the child. (3) Keller

110. Utah Social Problems. Analysis and field study of Utah social problems as they affect community living. (3) DeHart

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) Keller

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. (3S) Roskelley

144. Woman Today. The new and challenging roles of women in adjusting to a modern society. (3S) Fredrickson

145. Alcoholism. See HPER 145. (3S) Nelson

153. History of Social Thought. Development of social thought from early periods to August Comte. Important developments in Europe and America after Comte; especially early American thought. (5W) Roskelley

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. (3S) DeHart

160. The Family in Various Cultures. Histori
torical and institutional approaches to family functions; analysis of comparative family systems; family theory and ideological considerations. (3F) Black


166. American Ethnology. Racial distribution in America, their origin and peculiarities that characterize them. (3) Keller

167. New World Prehistory. Analysis of man and cultural evolution in the major culture areas of prehistoric America. Includes archeological laboratory and field methods with investigations of local sites. (3) Keller

170. Intermediate Sociology. Basic principles of sociology are considered in their theoretical and methodological settings, as a body of facts, a method of investigation, 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


173. Treatment of Delinquency. Police methods; juvenile court origin and function; detention, probation, and institutional care of the delinquent child. (3) Pennock


176. Treatment of the Adult-Criminal. Modern philosophies and methods in the treatment of the adult criminal; jails, and prisons, probation, parole, and other community services. (3) Pennock

180. Group Dynamics. Group processes from the point of view of improving individual participation as members and leaders of groups. Social action as a group process. (3W) DeHart

190. Seminar in Sociology. Selected sociological concepts or problems. (1F, W, S) Staff

201. Research in Sociology. A project for original study is organized and field work is carried on under supervision. Prerequisite: Sociology 287. Credit arranged. (F, W, S) Staff

202. Advanced Sociological Theory. Crit-
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 undergraduate 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 includes: 49 credit hours selected from courses in social work, sociology, psychology, economics, and political science. Major professors will aid in their selection. S.W. 173 is a suggested prerequisite to other social work courses.

In addition to the minimum 49 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 counseling, 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

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. (3S) Roskelley

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. (3S) Lewis
173. **The Field of Social Work.** Social casework, social group work, and community organization. Objectives, processes, and personnel work. (Majors should take S. W. 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 SW 173.) (2 cr. each) Lewis

177. **Treatment of Children with Problems.** Analysis and treatment of problems of children with special needs. (3S) 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. (3) Staff

180. **Group Dynamics.** See Sociology 180. DeHart

182. **Children in Institutions.** Principles underlying care and treatment of children in institutions and trends in institutional care. (3S) Lewis

195. **Social Work Seminar I.** Social Work publications and other source material applicable to the field. (1W) Lewis

200. **Social Case Work I.** Principles and methods. Investigation, diagnosis, and treatment. (3F) Lewis

203. **Independent Readings in Social Work.** Readings and conferences on topics selected by the student and adviser. Credit arranged. (F, W, S) Staff

240. **Community Organization.** Processes operating in rural and urban communities and development of means for co-ordinating them. (3W) Staff

250. **Public Welfare Services I.** The operation of a modern public welfare services program, including: public assistance, social security, public services for children. (3S) Lewis

275. **Child Welfare Problems.** Selected problems in the field of child welfare. (3) Lewis

287. **Methods of Social Research.** See Sociology 287. (3F) Roskelley

---

**Sociology and Social Work 85**

ROTC offers military training at its best
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 are four-year programs, each consisting 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 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 is a prerequisite for entrance into the Advanced course unless constructive credit is granted for previous active military service.

Satisfactory completion of both the Basic 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 their academic subjects and 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. ROTC Band students drill separately under the
supervision of the University director of bands.

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) Advanced Course:
(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) Transfer membership in any reserve organization of the Armed Forces to the respective ROTC service. Staff personnel of the department will assist as necessary.

Joint Army-Air Force Courses and Activities

Sponsor Corps. A semi-military organization composed of 75 coeds is chosen for the Corps by Army, Air Force and Sponsor Staff, with final selection being made by a composite 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 Departments in furthering their aims of military interest on campus.

ROTC Band. A military band under the direction of the College band instructor, but governed by the policies of the Departments of Military and Air Science. Students selected for the band will enroll for Military or Air Science classroom work but drill with the band.

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.

**Association of the United States Army.** A national professional organization dedicated to the improvement of military-civilian understanding. It is open to all members of the Cadet Corps. The Association of the United States Army serves as a means whereby Cadets find incentives for increasing their military skills, attend meetings that will add to their general military background, and acquire information about the place of the military in the defense of the nation.

**ROTC Band Courses**

1B, 2B, 3B. ROTC Band. First Year. Staff
4B, 5B, 6B. ROTC Band. Second Year. Staff

**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, 1S) Staff
54, 55, 56. Sponsors Drill, Sophomores. (1F, 1W, 1S) Staff
151, 152, 153. Sponsors Drill, Juniors. (1F, 1W, 1S) Staff
154, 155, 156. Sponsors Drill, Seniors. (1F, 1W, 1S) Staff

**Pershing Rifles Courses**

37, 38, 39. Pershing Rifle Drill, Freshmen.
40, 41, 42. Pershing Rifle Drill, Sophomores. (1F, 1W, 1S) Staff
137, 138, 139. Pershing Rifle Drill, Juniors. (1F, 1W, 1S) Staff
147, 148, 149. Pershing Rifle Drill, Seniors. (1F, 1W, 1S) Staff
Department of

Air Science


Office in Military Science 104

The purpose of Air Force ROTC is to prepare young men to serve as officers in the Reserve and Regular components of the Air Force. 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 of the course develops a background in national and international affairs to help students intelligently interpret and evaluate world events.

Summary of the AFROTC Curriculum. The AFROTC 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.

Study is divided into the basic course, covering the first two years, and the advanced course, covering the Junior and Senior years plus Summer Training. The course of study consists of instruction totaling 420 hours, allocated as follows: Freshman 50 hours and Sophomore 70 hours each; Junior and Senior years, 150 hours each, and summer training, four weeks.

The basic course, Foundations of Aerospace Power, is an introduction to the nature of Air Power with its political, economic, social and psychological influence on modern man. The advanced course, building upon this background, provides instruction designed to further develop leadership potential. This is accomplished through attention to the development of skills in human relations (e.g., problem solving, group leadership techniques, writing, speaking and teaching techniques); and through increased understanding of the economic, political, social and geographical concepts involved in Air Force operations.

In addition, the curriculum includes: experiences designed to stimulate and develop a growing interest in the 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.

Throughout the Air Force ROTC
course of study students are provided a general education complimentary to the academic program of the University and with preparation for living in the Aero-Space age. While this material is specifically intended to serve a student as an Air Force Officer much of it will be useful to him in civilian occupations.

Quotas and Physical Requirements. There is no limitation on the number of young men who can be enrolled in the basic program. For the advanced program, however, a yearly quota is established by the Air Force. This quota is based on estimated Air Force needs for young officers of various skills and the projected officer production of the local AFROTC Detachment.

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 without regard to quota spaces. If he can complete the program prior to reaching age 28 and can meet the physical requirements for general service, he may be commissioned a Second Lieutenant in the Air Force Reserve and compete for a career as a regular Air Force Officer. Veterans are not required to serve on active duty but may volunteer to do so. Parts of the basic program may be waived in lieu of prior military service. He may also compete for pilot and navigator spaces, and if accepted must complete the Flight Instruction program (Pilots) in the Senior year and the active duty requirements.

Special University and AFROTC Requirements. Once a student enters the basic or advanced program, successful completion of that program becomes a requirement for graduation, unless relieved of the requirement by the Professor of Air Science or the President of the University. In addition, when entering the Advanced 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, Air Science classes should be scheduled to complete simultaneously, requirements for a degree and a commission. If an engineer under a five-year program, he should plan his Air Science program in advance with his adviser and the AFROTC Director of Training in order to meet the above requirements.

Because of the differences in the Army and Air Force ROTC programs, no credit is given for High School ROTC, although high school ROTC experiences are beneficial in the Air Science program. To qualify as a pilot or navigator, cadets must be able to finish the Air Science program and graduate from the University before the age of 26½ years. Other cadets must complete the military program and graduate from the University prior to reaching the age of 28.

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 Air Force 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. To an advanced cadet a subsistence allowance of approximately $27 per
month is paid. The maximum amount paid for Junior and Senior years is approximately $600. While at Summer Training cadets will receive approximately $81 plus travel pay for the round trip to and from camp.

Summer Training. One summer training camp of 28 days duration is required of all cadets in the advanced course. Normally attendance to this camp is between the Junior and Senior years at a selected Air Force Base. Cadets living in Utah, and Idaho generally attend camp in California or Washington. Six quarter hours of college credit are granted for summer 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 CAA examination enables him to acquire a private pilot's license and 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 $5,600.

Non-Flying Cadets. To meet the challenge of the Aero-Space 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 areas of study. In many of these fields cadets may be granted a year delay to acquire an advanced degree prior to their call to active duty. After the 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 of 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’s 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 26½ 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 Air Force ROTC curriculum is available.

Air Force ROTC Counseling Service. Air Force ROTC Detachment maintains counseling service for each cadet. Service is offered primarily in areas concerned with the AFROTC curriculum (Education, Study and Leadership).

Air Science Courses

Two hours of Leadership Laboratory are required each week during the fall, winter and spring quarters.
Air Science I—First Year Basic

Leadership Laboratory

10. Air Science: Introduction to the methods of Air Force organization and the requirements of "followership" at the element and flight level. Opportunities provided for the cadet to subject himself to personal and group discipline, to identify himself with a group, and to acquire the training, poise and self-confidence needed to conduct himself in a military manner. (1F, W) Staff

11. Air Science: Designated University Course

12. Air Science: Designated University Course

(Designated University courses are two or three quarter hour courses normally offered by the university and which are approved by the Professor of Air Science as contributing to the professional education of an Air Force Officer. Generally the designated university courses are required subjects in the major field of study being pursued by the student.)

14. Sabre Squadron, Sabre Squadron (Freshman) AS 14a, (1F); AS 14b, (1W); AS 14c, (1S), Sabre Squadron (Sophomore) AS 24a, (1F); AS 24b, (1W); AS 24c, (1S). The Sabre Squadron is an honorary society for Basic AFROTC Cadets. Its purpose is to foster esprit-de-corps among Freshman and Sophomore Cadets; to offer service to Utah State University; to promote American citizenship; to provide leadership experiences; to promote Air Power concepts; to increase cadet knowledge of the mission and scope of the United States Air Force. Sabre drill is required. Staff

Air Science II—Second Year Basic

20. Air Science: Leadership Laboratory. Practice in elementary leadership activities involving small groups and an introduction to leadership methods and Cadet Corps organization at the squadron and group level. The cadet is provided with opportunities to test his leadership skill in situations dealing with small groups and to recognize and accept personal responsibility. (1S) Staff

22. Air Science: Fundamentals of Aerospace Weapon Systems. An introduction to the principles, mechanics, and implications of chemical, biological, and nuclear weapons and warfare; the defensive, strategic, and tactical organizations and operations of the USAF, including modern targeting and electronic warfare. Also introduces problems, mechanics, and military implications of future space operations, and contemporary aerospace military thought. (2W) Staff

23. Air Science: Designated University Course. (For definition of Designated University Course, see Air Science 1 Curriculum.)


Air Science III—First Year Advanced AFROTC Course

131. Air Science. Air Force Officer Development (1A). Taught in three phases: Communicating in the Air Force, the Air Force Commander and His Staff, and Instructing in the Air Force. Communicating in the Air Force is a study of learning techniques, barriers to effective learning, and speaking and writing skills. Instructing in the Air Force is a study of principles of learning, personal and professional qualities of instructors, methods of instructing, instruction planning, and the use of visual aids. Practical experience in instruction is offered. The Air Force Commander and his Staff is a study of the functions and responsibilities of Air Force Commanders, delegation of authority to staff officers, and organization of military units. (3F) Staff

132. Air Science: Air Force Officer Development. Consists of two phases: creative problem solving and the military justice system. The first twenty-five hours are devoted to aspects of creative problem solving, thought processes, logic, imagination, creative thinking, scientific research method and the individual and group brainstorming. Practical application of techniques is provided through realistic problems of Air Force nature. The Military Justice System, involves a study of legal procedures in the Air Force. Rights, duties, and responsibilities under the Military Justice System are stressed. Mock court-martials are utilized in presentation of material. (3S) Staff

133. Air Science: Air Force Officer Development. Leadership and Management Seminar. Study consists of three phases, principles of leadership, the nature of man, and applications in leadership situations. All phases are integrated into the Air Force leadership and management problems. Insight and experience in Air Force leadership and management problems is provided through role playing, group and individual problem solving, group discussion and panel discussion. Translation of knowledge into speaking, writing and listening skills is also emphasized. Course is directed toward full development of the individuals leadership potentialities both as an Air Force Officer and a civilian leader. (3W) Staff
150. Air Science: Air Force ROTC Summer Training Unit. 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 communication, navigation, weather, traffic control, first aid and sanitation, supply, biological and chemical warfare. 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 callis-thenics, 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 Air Science 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. (6Su)

Air Science IV—Second Year Advanced AFROTC Course

141. Air Science: Weather and Navigation. A study of the weather and navigational aspects of airmanship, such as temperature, pressure, air masses, precipitation, weather charts, navigational charts and dead reckoning navigation. (3F) Staff

142. Air Science: Military Aspects of World Political Geography. Students will register for Political Science Course 150, World Political Geography. This is a study of strategic geographical areas of the world and the factors which influence the powers of states. Power is studied in relation to international politics and power alliances. (4W) Petersen

143. Air Science: International Relations and the Air Force Officer. Students will register for Political Science Course 111. International attempts to achieve some type of international Government. This study examines briefly the organization with major emphasis on the League of Nations and United Nations. One quarter hour is devoted to the study of material to help the cadet make a rapid effective adjustment to active duty as an officer in the United States Air Force. (3S) Anderson, Staff

143a. Air Science: Active Duty as an Officer. This course is designed to help the student make a rapid and effective transition to active duty as an officer in the U.S. Air Force. Emphasis is placed upon a further development and application of leadership skills, responsibilities and obligations of the Armed Forces Officer, personal and professional considerations of military service. One hour of lecture and two hours of leadership laboratory per week are required. (1S) Staff (This course taken with Political Science 111 (International Organization) is the desired substitute for AS 143).

145. Flight Instruction Program. This course covers instructions in ground school, Civil Air Regulations, Radio and Airways procedures, navigation, general service and operation of aircraft. Flight instruction includes 36½ hours on light aircraft and includes: pre-flight checks, solos, cross country flights and a FAA flight examination. Subject open only to qualified senior AFROTC Cadets. Instruction arranged to not interfere with regular academic schedule. Prerequisite: 141. Navigation and Weather. (3F, W, S) Staff
Department of

Military Science

PROFESSOR Colonel Chester H. Anderson; ASSISTANT PROFESSORS Captain James D. Smith, Ordnance Corps; Captain Bruce H. Williams, Quartermaster Corps; Captain Joseph T. Mezo, Armor; INSTRUCTORS Sergeants first class Roy L. Cameron, Don Baxter, Archie V. Robertson, Henry M. Sato.

Office in Military Science 101

ROTC’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 is a veteran or has completed flight training he will be required to serve either six months or two years on active duty. If a veteran, he may serve six months or no active duty—or he may request two years active duty, if desired. If he participates in flight training, he must serve three years on active duty.

The Army ROTC offers a four-year program. It 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.
After completion of the two-year Basic course 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 deferment agreement as a Basic course student obligates him to elect enrollment in the Advanced course if selected for it.

**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. Strictly military courses have been reduced in scope and credit. In offsetting this reduction, during 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 IV and summer camp, and be scheduled to graduate from the University within the same academic year. 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 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.

**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.

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 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 Students. Upon enrollment in the Advanced course, students are paid a "Subsistence Allowance" amounting to approximately $27 per month. These payments normally continue from time of enrollment until completion of the course and include normal vacation periods. Veterans receive this in addition to any payments under the GI Bill.

Delay of Entry on Active Duty. When students have completed the Army ROTC program and are commissioned they may delay entry upon active duty, if they wish to continue studies in certain fields. Information regarding specific fields of study and procedure may be obtained upon request.

Basic Military Science
MS I—First Year Basic
DIRECTOR: Capt. Bruce H. Williams

Courses
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) Smith
12. Military Science I. Continuation of Military Science II. U. S. Army and National Security; Leadership, Drill and Command. One class period and one leadership laboratory per week. (2S) Williams
13. Military Science I. Continuation of Military Science II. American Military Science; Operations and Tactics; Leadership, Drill and Command. Two class periods and one leadership laboratory period per week. (2W) Robertson

MS II—Second Year Basic
DIRECTOR: Captain Joseph T. Mezo
21. Military Science II. American Military History, Leadership, Drill and Command. Prerequisites: Military Science 11, 12 and 13 or 24. Two class periods and one leadership laboratory period per week. (3F) Mezo
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. (3S) Mezo
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, 3S) Mezo

Advanced Military Science MS III—First Year Advanced

DIRECTOR: Captain J. D. Smith

131. Military Science III. Leadership; Military Teaching Methods; Leadership, Drill and Command. Two class periods per week and one leadership drill period per week. (3F) Smith

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) Smith

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. (3S) Smith

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) Smith

MS IV—Second Year Advanced

DIRECTOR: Captain B. H. Williams

141. Military Science IV. Operations; Military Law; Leadership, Drill and Command. Two class periods and one leadership laboratory period per week. (3F) Williams

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) Williams

143. Military Science IV. Continuation of Military Science 142. Logistics; Service Orientation; Leadership, Drill and Command. Two class periods and one leadership laboratory period per week. (3S) Williams

145. Military Science IV Flight. An FAA-approved standardized flight program of instruction consisting of 35 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, S) Smith

Seminars

174. Advanced Military Science Seminar Problems. Prerequisite: Enrollment in or completion of Advanced Military Science. Credits arranged. (F, W, S) Staff

201. Advanced Military Science Seminar Problems. Prerequisite: Graduate standing. Credits arranged. (F, W, S) Anderson
Edith Bowen Elementary Laboratory School
College of

Education

Department of Agricultural Education, 103

Department of Education, 104
  Teacher Education, 104
  Graduate Study, 107

Department of Health, Physical Education and Recreation, 113

Library Science, 121

Department of Psychology, 122

Degrees Offered:
  Bachelor of Science
  Master of Education
  Master of Science
  Doctor of Education
  Also: Diploma in School Administration
The College of Education has as its primary function the preparation of teachers, administrators, supervisors and other professional personnel for the public schools. The College consists of the Departments of Agricultural Education; Education; Health, Physical Education and Recreation; Psychology; and a program in 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 Departments of Psychology and Health, Physical Education and Recreation also prepare individuals for professional careers other than in education.

The College of Education is a member of the American Association of Colleges for Teacher Education and is fully accredited through the Master's Degree by the National Council for Accreditation of Teacher Education. The Doctoral program in Education will be evaluated by the National Council in the Spring of 1963.

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 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 attention. 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 functioning 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 pre-
paring to teach Kindergarten and grades one through six. Here child understanding and behavior are studied and desirable school practices are developed.

The University Council on Teacher 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 its official representative 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 nearby 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 curriculum as heretofore described.

On the graduate level, programs are offered for students who desire to meet requirements for administrative, supervisory, teaching or other advanced professional certificates. The MEd, MS, and EdD degrees are offered also the diploma in school administration requiring a two-year sequence in graduate work. 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 Service. The University is interested in placing its graduates in professional positions. To accomplish this purpose in the College of Education, the Teacher Placement Service has been organized. If students qualify for teaching or other professional certificate they should register with the Service as a help in compiling the proper credentials to be used in placement. Registration should be completed in the winter quarter or early part of the spring quarter.
Department of
Agricultural Education

Professor Stanley S. Richardson, Head.

Office in Agricultural Science 15

A student preparing to teach vocational agriculture will register in the Department of Agricultural Education. In the curriculum planned for preparing teachers of vocational agriculture, emphasis is given to practical farm experience, a broad background in the major fields of human knowledge, general training in agriculture, and a program of teacher education for youth and adults in the vocation of farming. This curriculum meets minimum requirements for the general secondary and vocational agriculture certificates as set by the Utah State Board of Education. Counseling service is available to assist students in selecting courses throughout four years of College work.

Graduate Study

Opportunity is offered for research and graduate study in Agricultural Education. In graduate work, select a coordinated program of study in the Colleges of Agriculture and Education.

Prescribed Courses for Majors in Agricultural Education

Biological Science: Cr. Total
Botany 24t ........................................ 5
Zoology 3t ........................................ 5
Zoology 112 (Genetics) ......................... 5
Bacteriology 10 or 70, and 71t ............... 5 20

Humanities: Cr. Total
Environmental Planningt or 
Horticulture 18 .................................. 3
Speech, or Music, or Language or 
Art or Literaturet ............................... 10 15

English Cr. Total
Basic Communications 1, 2, 3 ............... 9

Social and Behavioral Sciences: Cr. Total
Psychology 53, Ag .Econ. 71, 72, 73 ... 3
Sociology 10 or 701 or Econ 51, 52 
or Political Science 102 or 
Political Science 101 t ........................ 10 15

Exact Science: Cr. Total
Chemistry 10, 11, 12t ......................... 15
Mathematics 34t ................................ 3
Physics 6 or 7, 
Geology 3 or Math 35 ........................ 4 22

Total ............................................ 76

Basic and Minimum Requirements in Agriculture, Agricultural Engineering, and Education

Animal Industry: Cr. Total
An. Hus. 10 .................................... 5
Elective ........................................ 15 20

Plant Industry:
Agron. 56 or 58 Soils .......................... 4
Elective ........................................ 16 20

Agricultural Economics:
Agr. Econ. 71, 72, 73 ......................... 9
Elective ........................................ 3 12

Agriculture:
Elective ........................................ 8 8

Agricultural Engineering:
Irrig. 10 ....................................... 4
Ag. Eng. 1, 101, 102, 103 .................... 20 24

Total ............................................ 84

Education: Cr. Total
Education 112, 124, 125, 126, 150 ....... 22
Education 126, 150: Ag. Ed. 124, 125 .... 23
Psychology 100, 102 .......................... 6
Public Health 155 (or 154—3 cr.) ......... 4
Elective ........................................ 3 35

Total Minimum Requirements 
For BS Degree
Institutional and General .......................... 69
Agriculture ..................................... 84
Education ...................................... 35
Military Science or P.E. ........................ 3

Total ............................................ 199

1Courses which meet lower division group requirements.
Ag Education Courses


124. Methods of Teaching Farm Mechanics. Scope of mechanics in agriculture, lesson planning, course of study preparation, shop equipment and management, skill requirements, and supervised practice. (3F) Richardson

125. Methods of Teaching Agriculture. Fundamental principles and practices of teaching. Special attention is given to selection, organization, and teaching agriculture and supervision of agricultural activities on the farm. (5W, S) Richardson

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

151. Extension Methods. For prospective home demonstration and county agricultural agents. (3S) Extension Staff

205. Reading and Conference. See Education 206. (1-2F, W, S, Su) Staff

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

271. Research and Thesis Writing. See Education 271. Credit arranged (F, W, S) Staff

290. Special Problems for Agriculture Teachers. For teachers of vocational agriculture who desire to develop a more practical program for future, young and adult farmers. (2Su) Staff

291. Special Problems. For teachers who participate in the Annual Summer Conference for Teachers of Vocational Agriculture. (2-5Su) Richardson

Department of Education


Office in Education 203

The Department of Education is organized into two main areas: Teacher Education and Graduate Programs, in Elementary Education, Secondary Education and Education Administration.

Teacher Education

Teacher Education offers programs of study leading to the Bachelor of Science degree in Elementary Education and in Secondary Education, and to completion of certification requirements for teaching in the elementary and secondary schools of Utah.

Introduction to Education (Education 50) helps the student explore the teaching profession, and is designed mainly for the person who is not sure he wants to become a teacher and would like further in-
formation and guidance before making his decision. Those wanting the course should take it during the freshman or sophomore year.

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 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 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:

1. Courses designed to provide a liberal background: See University lower division requirements.

2. Special certification requirement: Six quarter hours of fine arts.

3. Areas of academic concentration. Thirty-six credit hours in one field of concentration or eighteen hours in each of two fields.

4. A major of 45 hours in professional education as follows:

**Required Courses**

**GROUP I Understanding the Child** (minimum of 9 credits)
- Psychology 100 or C.D. 100........ 3
- Public Health 155 (or 154, 3 cr.) 4
- Two additional hours selected from Psychology 108, 181, 182, 183, 123, 145, Speech 167, Child Development 67, 68.

**GROUP II Understanding the School** (minimum of 7 hours)
- Education 100 ...................... 4
- Education 150 ...................... 3

**GROUP III Curriculum and Methods and Student Teaching** (minimum of 23 hours)
- Education 104 ...................... 5
- Education 105 ...................... 3
- Education 106 ...................... 12
- Education 107 ...................... 3
- Psychology 108 .................... 3

**Elective Courses** (Minimum of six hours)
- Education 102 ...................... 3
- Education 108 ...................... 3
- Education 109 ...................... 3
- Education 186 ...................... 3
- Education 116 ...................... 3
- Education 112 ...................... 3
- Education 161 ...................... 3
- Education 154 ...................... 3
- Psychology 127 .................... 3
- Psychology 161 .................... 3
- English 122 ....................... 3
- Music 150 ......................... 3
- Art 151 ........................... 3
- Phys. Ed. 177 ..................... 3
- Phys. Ed. 182 ..................... 3

**Suggested Sequence of Courses First and Second Years**

Concentrate on filling lower division requirements, and beginning work in the major or minor fields.

**Education 50**

**Third Year**
- Psychology 100
- Public Health 154 or 155
- Education 100
- Education 150

Courses to fill 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 133 and 106a. Application for 106a must be made at least one quarter 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.

The Program in Secondary Education. 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) Courses designed to provide a liberal background: See University lower division requirements.
(2) Teaching Major and Minor. A teaching major of not fewer than 36 credits, of which 15 must be Upper Division, and a teaching minor of not fewer than 24 credits, must be completed. In lieu of a teaching major and minor, a composite teaching major consisting of not fewer than 60 credits in two or more related subjects may be selected. The teaching major and minor or courses in the composite teaching major must be in specific subjects taught in Utah secondary schools. Courses required or recommended are agreed upon by the various subject departments, the Department of Education, and the Council on Teacher Education. Lists of these major and minor requirements may be obtained in room 102, Ed. Bldg.

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. 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. It is advisable for the student to make this application as early as possible in his college program because he will not be admitted to any course in the professional curriculum without first having been approved by the admissions committee.

(3) 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 of 9 credits)
Public Health 154 (or 155—4 cr.) 3
Psychology 100 3
Psychology 102 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
Special Methods

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.

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.

Elective Courses

Additional courses may be elected in each of the three 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 Education.

To qualify for a secondary certificate, in addition to meeting requirements in elementary, 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 Psychology 102, Education 127, and a special methods course in either the teaching major or minor, and 130.

Homemaking, Industrial Arts, Business Education, Agriculture. Students desiring to major in Homemaking Education, Industrial Arts Education, or Agricultural Education should consult the professional education requirements listed under these departments.

Graduate Study

See statement of the Graduate School in this catalog.

The College of Education provides programs leading to the graduate degrees of Doctor of Education, Master of Science, and Master of Education and the diploma in school administration (a two-year graduate program). The graduate programs are designed for teachers, supervisors and administrators who demonstrate by aptitude and experience the capacity to benefit from graduate study. Special courses are set up for teachers who wish to improve their competence and deepen their understanding of the subject they teach. Specialized training in various fields is offered to those who wish to prepare for administrative and supervisory positions.

Prospective graduate students are invited to write or consult the Coordinator of Graduate Programs in Education for guidance in initiating a program of studies, information on details of procedure and records, or referral to faculty members who serve as advisers in specific academic areas. Additional information may also be found in the Catalog, School of Graduate Studies, and in the handbook issued by the Graduate School.

Education Courses

50. Introduction to Education. A study of the requirements for becoming a teacher and of the values of teaching as a profession. Experience in the course will assist each student to evaluate his potentialities for teaching and will assist the department in selective admission of candidates for the teacher education program (2F, W, S) — Williams

100. Principles of Elementary Education. Formerly 103. 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, S, Su) — Alldred, Jacobsen, Jackson

102. Teaching the Language Arts. A study of language development in children and its implication for classroom practice: listening, speaking, writing and reading. (3S, Su) — Shaw, Wiggins

104. Elementary School Curriculum. Familiarizes prospective teachers with the nature and content of the elementary curriculum and factors that influence its development. In-
cludes 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, S, Su) Pugmire, 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 should 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. (12F, W, S) Staff

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. 136 must be taken or audited concurrently. (5F, W, S) Staff

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, S, Su) Shaw, Wiggins, Allred

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, Wiggins

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. (5W, S, Su) Braswell, Taylor

110. Arithmetic in the Elementary School. Formerly 159. The place of arithmetic in the elementary school curriculum and methods of teaching it in the several grades. (3F, W, S, Su) Jackson, Taylor

111. Curriculum and Methods for Kindergarten. Formerly 133. 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, 3Su) Pugmire


113. 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, S) Budge, Taylor, Drake, Braswell

114. Principles of Guidance. Formerly 113. Emphasis given to organization of guidance as a service, including individual and occupational differences, tests, measurements, and counseling. (3F, W, Su) Noble, Himes

115. 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 and Ed. 126. (5F, W, S) Staff

116. 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
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, S) Staff

132. The Teaching of English in Secondary School. Formerly 124. Considers what research says about methods of teaching English and what the content of the language arts program should be. Also a review of some fundamentals. (4W, Su) Shaver

145. Teaching Science in Secondary Schools. Formerly 151. 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 sciences taught in the secondary school. (3F, S, Su) Braswell

146. Utilizing Community Resources in Science Education. Formerly 152. Ways of utilizing community resources, natural, industrial, resource persons in providing science experiences. The organization of science clubs, seminars, honor groups, fairs, science talent searches, contests and similar special activities. (3Su) Braswell

147. Improvement of Reading in Secondary Schools. Formerly 179. 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. (4F, W, S, Su) Stone

151. History of Education. Formerly 182. 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. (3F, W, S, Su) Hansen, Noble

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, S, 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, Su) Bell

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. (3W) Himes

165. Diagnosis and Treatment of Learning Difficulties. Formerly 110. 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, W, S, Su) Hansen, Noble

150. The American School System. Formerly 114. Fundamental principles of operating public schools with emphasis on Utah conditions. An analysis of the public school system as it has developed in the United States. (3F, W, S, Su) Hansen, Noble

153. Social Foundation of Education. Formerly 141. The social significance of current educational theories and practices. (3W) Hansen

188. Remedial Reading. Formerly 142. A course designed for teachers, remedial teachers, supervisors and others interested in the reading process. It emphasizes the developmental sequence in reading, with study of evaluative devices to determine the place of the student in the sequence, and gives suggestions for remedial work. Ed. 107 is recommended prerequisite. (3Su) Allred, Stone

190. Practicum in Remedial Reading. Formerly 143. 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) Allred, Stone
191. Student Teaching in Special Education. Formerly 156. Designed to help the teacher apply methods and techniques found to be successful with slow-learning children. 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 Education 106. Students must have completed or be concurrently taking the course in Psy. 123 and Ed. 187. Credit arranged with successful learning. The former 156. Designed to help the teacher 191. Student Teaching in Special Education.

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, W, Su) Alired

207. Elementary School Administration. Operation and management of the elementary school. (3F, Su) Jackson, Jacobsen

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. (2W, Su) Jackson, Jacobsen

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. Formerly 139. 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. (3) Alired, Shaw

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) Braswell


228. Improvement of Social Studies in the Elementary School. For experienced teacher. 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. (3F, W, Su) Alired

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. (3S) Wiggins

230. Secondary School Curriculum. Formerly 215. A study of the secondary school curriculum, junior and senior high school, as it now exists in typical schools, together with proposals for improvement. (3W, S) Shaver

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, organisation and curriculum, together with recommendations for improvement. (3Su) Taylor, Hatch

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. (3S, Su) Hatch

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. (2F, Su) Carlisle

239. 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. (3S, Su) Shaver

240. The Improvement of Language Arts in the Secondary School. An advanced course for experienced teachers. Deals with the newer concepts in curriculum and method of instruction in English and Language Arts in the Secondary Schools. (3S, Su) Budge


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. (3S, Su) Braswell

243. The Improvement of Mathematics in the Secondary School. For experienced teachers. Deals with newer concepts in curriculum and
methods of instruction in mathematics in the secondary school. (3S, Su) Hammond

254. Organization and Administration of Education. Formerly 221. 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, S, Su) Hansen, Drury

256. Issues in Social Studies. Recurring philosophical problems in social studies education, their relationship to curriculum choices in a democracy, and problems of content selection and methodology in the light of desired objectives. Prerequisite: Ed. 134. (3) Shaver

257. Research in Social Studies Education. Analysis of research in social studies curriculum and related fields. Consideration of potentially significant research problems and ways of subjected these to empirical investigation. Prerequisite: 256. (3) Shaver

259. Supervising Student Teaching. Formerly 209. 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) Taylor, Budge, Shaw

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, S, Su) Hansen

262. Organization and Administration of Guidance. Formerly 213. 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. (3W, Su) Himes

264. Instructional Leadership in Education. Formerly 268. 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) Hofmann, Taylor

266. Applied 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. (3F, S, Su) Carlisle, Shaver, Borg

267. Introduction to Research in Education and Psychology. Deals with identifying a problem for the thesis or seminar report, 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, S, Su) Shaver, Borg

269. Comparative Education. Formerly 205. 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. Formerly 218. Objectives, guiding principles, techniques and media for an improved school public relations program. (3S, Su) Drake, Blaser

274. Legal Aspects of School Administration. Formerly 223. Emphasizes responsibilities and functions of local and district school administrators. Interpretation of legal status, form and procedure, as established by statutes, legal opinions, and court decisions. (2W, Su) Hatch

276. Field Experience in School Administration. Formerly 298. 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, W, Su, arranged) Hatch, Allred, Jacobsen

278. Seminar in Administration of Education. Formerly 246. Has two purposes: 1. To assist students with the completion of graduate research problems in school administration; and 2. To serve as a seminar in school administration in which current problems in the field are analyzed. (2S) Bell

279. General Seminar in Education. Formerly 247. Opportunity for investigation and report of individual problems and for group discussion and criticism on these reports. Minimum of one quarter required of all Education majors. (1F, W, S, Su) Hatch, Hansen

283. Reading and Conference. Formerly 205. Provides for individually directed study in subjects of special interest and preparation. Credit arranged. (F, W, S, Su) Staff

112 College of Education

286. Curriculum and Methods for Gifted Children. Formerly 277. This course will deal with methods and techniques of diagnoses and with practical application to applying and enriching the curriculum for the gifted child in the elementary and secondary schools. Techniques and methods to facilitate learning situations of gifted children in the regular classroom will be explored. (3W, Su) Hofmann

287. Basic Problems in Teaching the Mentally Handicapped. Formerly 239. 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. (3S, Su) Staff

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 becoming. (5S) Hofmann

291. Identification and Education of the Emotionally Handicapped. A study of the characteristics, means of identifying, guidance, and education of the emotionally handicapped child, with particular emphasis upon the school program for such children. (3S) Staff

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. (3S) Staff


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. (2 or 3S) Hofmann


367. Administration of School Personnel. Formerly 322. Principles and practices in management of teachers, other school employees, and pupils. (3S, Su) Bell

368. Higher Education. Formerly 342. A study of the development and current status of education beyond the high school in America. (3F) Staff

374. Practicum in Public School Surveys. Formerly 296. 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. (3S) Staff

381. School Finance. Formerly 281. Historical background of school finance; principles and practices involved in collecting and distributing school revenues, with special reference to conditions in Utah. (3F) Staff

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. (3W, Su) Staff

383. Inter Disciplinary Seminar in School Administration. Specialists in the social sciences will discuss current problems in their respective areas, particularly as they are related to public education and the role of the school administrator. Class members will be expected to have had some advanced courses in the social sciences. Enrollment with the consent of the instructor. (2S) Staff

399. Internship in School Administration. Provides extensive experience for the advanced student working on the Doctor of Education Degree in School Administration. You work a minimum of one quarter full time under the direction of an administrator in the public schools. Credit arranged. (F) Staff

385. Field Studies and Thesis. Formerly 375. Individual work on research problems in the EdD program. Credit arranged. (F, W, S, Su) Staff
Health, Physical Education
and Recreation


Office in Smart Gym

Intercollegiate Athletics Staff

DIRECTOR H. B. Hunsaker; HEAD BASKETBALL COACH LaDell Anderson; HEAD FOOTBALL COACH Tony Knap; COACHES Clayne R. Jensen, Ralph Maughan, Lincoln H. McClellan, Evan J. Sorenson, Everett C. Thorpe, Calvin K. Woodworth; ADMINISTRATIVE ASSISTANT Dale Gardner; TRAINER Nolan K. Burnett.

Office in Fieldhouse

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 are required to complete by the sixth quarter of residence work, a minimum of three quarters of Physical Education. (It is recommended that requirements (a) and (b) below are completed during the first year.)

This requirement may be met by taking (a) P.E. 1, Basic Physical Education, (b) P.E. 16 or 52, Elementary Swimming, and (c) choices of specific courses designated by the Department, (Group A).

Substitutions for meeting the Physical Education requirements include: (1) Military or Air Science, (2) Credit for military service. (On the same basis that other credit is granted by the University.)

Waivers for P.E. 1, Basic Physical Education, and for P.E. 16 or 52, Elementary Swimming, may be granted students who take and pass proficiency tests administered by the Department of Health, Physical Education and Recreation. Passing any one or all of the tests, however, does not meet requirements; but, rather allows students to elect courses from the specified group (Group A) as referred to in (c) above. Complete requirement waiver may be granted those students thirty-one (31) or more years of age.

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. Clubs are organized in hiking, water sports, winter sports, dancing, archery and badminton. The physical education facilities are available to students at certain times of the day, and the intramural sports program is open to the whole student body.

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, 84, 85 or 92, 106, 107, 108, 183; six credits in Sports Techniques and ten credits from approved electives.

If specializing in Elementary Physical Education you should complete Physical Education 24, 55, 75, 81, 83, 84, 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 Theater Arts: 50, 52, 55, 57, 59, 152 and 154. P.E. 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, 160, 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.

For Secondary Physical Education majors the following four year programs are suggested.
**Physical Education 115**

### Men

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
<th>Freshman</th>
<th>F W S</th>
</tr>
</thead>
<tbody>
<tr>
<td>P.E. 20, 21, 22</td>
<td>1 1 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P.E. 75</td>
<td>2 ...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P.E. 17A</td>
<td>Any Quarter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group Req.</td>
<td>All Quarters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minor</td>
<td>Any Quarter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>English 1, 2, 3</td>
<td>3 3 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electives</td>
<td>All Quarters</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Sophomore

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
<th>Freshman</th>
<th>F W S</th>
</tr>
</thead>
<tbody>
<tr>
<td>P.E. 30, 31, 32</td>
<td>1 1 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P.E. 74</td>
<td>Any Quarter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P.E. 83</td>
<td>3 ...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P.E. 84</td>
<td>3 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P.E. 85</td>
<td>3 ...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education 127, 129, 130</td>
<td>Any Quarter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minor</td>
<td>Any Quarter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group Req.</td>
<td>All Quarters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electives (include Physiology 20- Human Anatomy)</td>
<td>3 ...</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Junior

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
<th>Freshman</th>
<th>F W S</th>
</tr>
</thead>
<tbody>
<tr>
<td>P.E. 120, 121, 122</td>
<td>2 2 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P.E. 106, 107, 108</td>
<td>3 3 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P.E. 189, 188, 190</td>
<td>2 2 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P.E. 132</td>
<td>Any Quarter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education 126-150</td>
<td>Any Quarter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychology 100 and 102</td>
<td>Any Quarter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P.H. 154 or 155</td>
<td>Any Quarter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minor</td>
<td>Any Quarter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td>All Quarters</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Senior

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
<th>Freshman</th>
<th>F W S</th>
</tr>
</thead>
<tbody>
<tr>
<td>P.E. 130, 131</td>
<td>2 2 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P.E. 185, 192, 184</td>
<td>3 3 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education 50</td>
<td>Any Quarter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P.E. 132</td>
<td>Any Quarter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minor</td>
<td>Any Quarter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td>All Quarters</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Women

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
<th>Freshman</th>
<th>F W S</th>
</tr>
</thead>
<tbody>
<tr>
<td>P.E. 75</td>
<td>2 ...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P.E. 20, 21, 22</td>
<td>1 1 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P.E. 24, 26</td>
<td>1 ...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P.E. 98</td>
<td>1 ...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>P.E. 17A</td>
<td>Any Quarter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic Communications</td>
<td>3 3 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group Req.</td>
<td>All Quarters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td>All Quarters</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---


2. Courses taught more than one quarter each year.

---

**Professional Preparation in Health Education**

The following foundation science courses are recommended for a Teaching Major or Minor in Health Education: Biology 1, Physiology 4, Psychology 53, Sociology 70, Chemistry, and Physics.

Health Education Major: For completion of a Bachelor of Science degree with a Teaching Major in Health Education, a student shall complete a minimum of 45 hours of approved courses selected from the following groups: (A) Required Courses: Bacteriology 10, P.H. 15, P.H. 150, H.E. 135, H.E. 145, Foods 5, F&CD 20, and Psy. 145 or S.W. 162. (B) Recommended Courses (A minimum of 10 hours must be selected from this group): Zoology 102, P.E.
116 College of Education

84, P.E. 106, P.H. 50, Psychology 140, and Psychology 202. (C) The following courses will also count toward completion of a Health Education major: P.H. 152, F&CD 120 or F&CD 125, Psy. 123, and Phys. 20.

Health Education Minor: For a minor in Health Education a student must complete 20 hours of approved courses including the following: P.H. 15, P.H. 150, H.E. 55, H.E. 145, Foods 5, and Psy. 145 or S.W. 165.

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: P.E. 74, R.E. 83, P.E. 85, P.E. 106, P.E. 153, R.E. 157, R.E. 179, P.E. 183, R.E. 196, Theater Arts 158, Speech 118, Ind. Arts 180, Landscape Arch. 130, Pol. Science 15; plus 4 credits from the following: P.E. 177 or 182, P.E. 175, P.E. Sports Fund. Courses, P.E. Tech. Technique Courses, Forestry 137, 138 or 139, Soc. 141, C.D. 100 or P.E. 84, Bus. Admin. 100.

For a minor in Recreation Education a student must complete: R.E. 83, R.E. 179, P.E. 183, R.E. 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: P.E. 250 or 294, 271, 295, 299. Education 267, English 211, Psychology 112.

If entering the department for graduate study, a student should select supporting fields from two other areas of the University, closely allied to Physical Education and Recreation.

Graduate courses should be elected from such areas as Education, Public Health, Sociology, Psychology, Biological Science or others acceptable to the graduate committee.

Health, Physical Education and Recreation Activity Courses

Activity Courses for Men

2. Freshman Football (1F) Staff
4. Boxing (Beginning) (1F, 1W, 1S) G. Nelson
5. Boxing (Advanced) (1F, 1W, 1S) G. Nelson
6. Football (Non-Varsity) (1W) Knap
7. Wrestling (Beginning) (1F, 1W, 1S) G. Nelson
8. Wrestling (Advanced) (1F, 1W, 1S) Staff
10. Indoor Track and Field (1W) Maughan
11. Baseball (1S) Dahme
12. Track (1S) Staff
15. Softball (1S) Staff
16. Swimming (Beginning) (1F, 1W, 1S) Staff
17. Swimming (Intermediate) (1F, 1W, 1S) Staff
23. Basketball (1F, 1W, 1S) Baker
27. Weight Training (1F, 1W, 1S) Staff
29. Varsity Football (1F) Knap
34. Soccer (1F) Staff
35. Volleyball (1W) Staff
36. Self Defense (1W) Staff
37. Trampoline (1F, 1S) Staff
38. Tumbling and Gymnastics (1W) Staff
64. Cross Country (1F) Maughan

Activity Courses for Women

14. Track and Field (1F, 1S) Staff
29. Soccer-Speedball (1F) Staff
40. Volleyball (1F, 1W) Staff
41. Basketball (1W) Staff
42. Softball (1S) Staff
43. Field Hockey (1S) Staff
44. Tumbling and Stunts (1W, 1S) Staff
52. Swimming (Beginning) (1F, 1W, 1S) Staff
Activity Courses for Men & Women

3. Skiing (Beginning) (1W) Staff
9. Fencing (1F, 1W, 1S) Downs
13. Bowling (1F, 1W, 1S) Staff
18. Swimming (Advanced) (1F, 1W, 1S) Staff
19. Skiing (Intermediate) (1W) Staff
28. Diving. Prerequisite: PE MW 18. (1S) Staff
33. Skiing (Advanced) (1W) Staff
45, 46, 47. 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, 1S) Staff

D. Nelson

48. Modern Dance (Beginning) (1F, 1W) Fuller
49. Modern Dance (Intermediate) (1W, 1S) Fuller
51. Modern Dance (Advanced) (1W, 1S) Fuller
53. Square Dancing (1F, 1W, 1S) Jensen
61. Archery (Beginning) (1F, 1W, 1S) Staff
62. Archery (Advanced) (1W, 1S) Staff
66. Badminton (Beginning) (1F, 1W, 1S) Staff
67. Tennis (Beginning) (1F, 1S) Staff
68. Folk Dance (Beginning) (1F, 1W) Fuller
69. Badminton (Advanced) (1F, 1W, 1S) Downs
70. Tap Dancing (Beginning) (1F, 1W, 1S) Fuller
71. Tap Dancing (Intermediate) (1F, 1W) Fuller
72. Social Dancing (Beginning) (1F, 1W, 1S) Staff
75. Golf (Beginning) (1F, 1S) Staff
74. Life Saving. Prerequisites: Red Cross Swimmers Card or permission of instructor. American Red Cross Certification is given to students who pass the examination. (2F, 2W) Rasmussen
76. Social Dance (Advanced) (1F, 1S) Staff
88. Golf (Advanced) (1S) Staff
82. Tennis (2nd quarter) (1S) Staff
90. Tennis (Intermediate) (1S) Staff

Professional Courses in Phys. Ed.
17A. Swimming. For freshmen and transfer students majoring in Physical Education. (1F, 1W) Rasmussen

**20. Fundamentals of Sports.** Designed to develop the fundamental skills of tennis and archery. (1F) Staff
**21. Fundamentals of Sports.** Designed to develop the fundamental skills of social and square dancing. (1W) Staff
**22. Fundamentals of Sports.** Designed to develop the fundamental skills of badminton and golf. (1W) Staff
**24. Dance Laboratory.** Folk dancing for freshman and sophomore women majoring or minoring in Physical Education. (1F) Fuller
**25. Dance Laboratory.** Tap dancing for freshman and sophomore women majoring or minoring in Physical Education. (1S) Staff
**30. Fundamentals of Sports.** Designed to develop the fundamental skills of boxing, weight training and wrestling. (1F) Staff
**31. Fundamentals of Sports.** Designed to develop fundamental skills of gymnastics and trampoline. (1W) Staff
**32. Fundamentals of Sports.** Designed to develop the fundamental skills of volleyball and speedball. (1S) Staff

73. Introduction to Physical Education. An introduction to the history, philosophy, theory and practice of Physical Education. (2F) Staff

77. Dance Laboratory. Techniques of Elementary modern dance for freshman and sophomore women majoring or minoring in Physical Education. (1F) Staff

78. Dance Laboratory. Techniques of intermediate modern dance for freshman and sophomore women majoring or minoring in Physical Education. (1W) Staff

79. Dance Laboratory. Techniques of advanced modern dance for freshman and sophomore women majoring or minoring in Physical Education. (1S) Staff

81. Rhythms and Dramatic Games. Rhythms for young children; its use in creative movement. Methods of presenting and developing rhythms are studied. (2F) Fuller

84. Problems in Physical Growth. The individual is traced through the various stages of development, with emphasis on the physical aspects of growth. Principles and functions of activity are applied. (3W, 3S) D. Nelson


86. Sports Officiating for Men. Knowledge of the rules and mechanics of officiating foot-

*Taught 1963-64.
**Taught 1964-65.
ball, 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

87. Sports Officiating for Men. 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. (2W) Mendini

92. Organization of Intramural Programs for Women. Organization of sports days, playdays, 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) Downs

*96. Physical Education Laboratory. A professional course for lower division women designed to develop the fundamental skills of softball and field hockey. (18) Downs

**98. Physical Education Laboratory. Fundamentals of individual sports for lower division women majoring or minoring in Physical Education. (1S) Downs

102. Dance Composition. Composition based upon the elements of direction, level, and dimension. Experience in individual and group composing. (2F) Staff

103. Dance Composition. Composition based upon the following musical forms: AB, rondo, theme and variation, canon and round, dance suite. (2S) Staff

104. Dance Production. Composition done independently. Participation in a performance required. Lighting, staging, costume and make-up applied to a dance concert. (2W) Staff

106. Scientific Foundations of Physical Education. Basically a study of 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. (3F) D. Nelson

107. Scientific Foundations of Physical Education. Basically a study of the physiological functions of the human body in various types of activity. The course includes a detailed study of the physiological changes that occur during all kinds of activity. Physiological principles are then applied to Physical Education. (3W) D. Nelson

108. Scientific Foundations of Physical Education. Basically a study of the adapted Physical Education program. Includes the administration of an adapted Physical Education program. Also a study of abnormal problems in body mechanics, athletic injuries and their treatment, athletic training procedures, and principles dealing with abnormal conditions found in the physical education program. (3S) 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. (3S) 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. (2F, W) Staff

**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. (2S) Staff

*130. Techniques in Physical Education. Designed to develop teaching techniques in volleyball, speedball and wrestling. (2F) Staff

*131. Techniques in Physical Education. Designed to develop teaching techniques in gymnastics, tumbling, and trampoline. (2S) 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 crafts. American Red Cross certification is given students who pass the exam. (2W, 2S) Rasmussen

*Taught 1963-64.
**Taught 1964-65.
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. (2S) Fuller

151. Techniques of Dance. Techniques of a variety of dance types, with emphasis on ballet and modern. (2S) 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. (2S) Staff

*160. Techniques in Physical Education for Women. Designed to develop teaching techniques in soccer, speedball and volleyball. (2F) Staff

*161. Techniques in Physical Education for Women. Designed to develop teaching techniques for officiating basketball and pep club activities. (2W) Staff

*162. Techniques in Physical Education for Women. Designed to develop teaching techniques in softball and field hockey. (2S) Staff

**165. Techniques in Physical Education for Women. Designed to develop teaching techniques in stunts and tumbling. (2S) 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, 3S) 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, 3S) Downs

183. Interpretation of Physical Education Objectives. Results and values of Physical Education activities in terms of development, adjustment and standards. (3S) Hunsaker-McClellan

184. Administration of Physical Education. Administration procedures in Physical Education in the high school: curriculum and program planning. (3S) Hunsaker-McClellan

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) Staff

189. Methods in Basketball. Coaching and training of basketball teams; emphasis on the psychology of the game; methods of defense and offense. (2F) Staff

190. Methods in Track and Baseball. Fundamentals in track and field training, and the conduct of athletic meets. Fundamentals of baseball, team play, training and strategy. (3S) Maughan

191. Tests and Measurements in Physical Education. Practical studies of tests and technique of test construction. (3W) Hunsaker-McClellan

194. Problems of Athletics. Discussion problems in athletics relative to public relations, athletic management, administration of athletics, purchases of equipment, schedules, plant layout, etc. (3S) Gardner

Professional Courses in Recreation Education

83. Playground and Community Recreation Leadership. Lectures and practical work. Lectures on selection of suitable material and methods of handling various groups. (3F, 8S) Jensen-McClellan

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. (2S) Mendini

157. Field Work in Recreation. Practical experience in conducting social recreational activities, such as for church, school and civic groups. Prerequisite: P.E. 83. Credit arranged. (F. W, or S) Jensen

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 out-door, winter sports. Students must provide adequate clothing for field trips. (3W) Jensen

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

*Taught 1963-64.
**Taught 1964-65.
120 College of Education

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. (3W) Mendini

179. Camping and Camp Craft. Training in camp techniques and camp leadership. Different visions, equipment and safety. During the course. (2S) Mendini

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 unified recreational program. (3S) Jensen

Professional Courses in Health Education

H.E. 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, 3W) Mendini

H.E. 109. 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, W, S) D. Nelson

H.E. 135. 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. (3S) Hunsaker

H.E. 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. (3S) D. Nelson

H.E. 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. (2S) Staff

H.E. 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) Staff

H.E. 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) Staff

H.E. 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. (3S) Staff

Graduate Courses in Physical Education

250. Reading and Conference. Provides for individually directed study. Credit arranged. Hunsaker

271. Research and Thesis Writing. Credit arranged. Hunsaker

275. Philosophy of Physical Education. 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. (3) Hunsaker

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, 3S) Nelson, D.

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, 3S) Nelson, D.

297. Analysis of Athletic Performance. A mechanical analysis of all types of athletic 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 and actual performance for employing the analysis. (3) Nelson, D.

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) Nelson, D.
Library Science

CHAIRMAN, LIBRARY SCIENCE AND INSTRUCTOR R. Kent Wood, ASSOCIATE PROFESSOR AND UNIVERSITY LIBRARIAN Milton C. Abrams, ASSOCIATE PROFESSOR Ida Marie Logan, INSTRUCTOR AND ASSISTANT LIBRARIAN D. LaMont Chappell, INSTRUCTOR Anna Marie Smith.

Office on Library Mezzanine

Library Science may be used as a teaching minor in connection with a teaching major in any subject. This minor qualifies you for a Library Certificate, issued by the State Department of Public Instruction, and prepares you for a position as school librarian on the elementary or secondary level. A teaching minor of not fewer than 18 credits may be selected from the Library Science courses.


Recommended courses from other departments for students of Library Science are: Education 107 and English 122, 123. See departmental listings for course descriptions.

Library Science Courses

50. Reference Materials. A study of the essential reference work sources in general subject areas. Includes the uses of dictionaries, encyclopedia, yearbooks, handbooks, periodical indexes, and the more important subject and trade bibliographies. (3F, S, Su) Logan

100. Advanced Reference and Bibliography. A survey of the bibliographic organization and retrieval of information in the scientific and technical literature in each of the major disciplines. (3W, Su) Logan

120. Technical Library Processes. Fundamentals of cataloging and the basic techniques necessary for organizing a library collection. Includes Dewey Decimal Classification and steps necessary to place books in circulation. (3F, S, Su) Chappell

150. Library Administration. Techniques of administration including: How to meet standards of library accreditation, work with teachers, reading guidance, story hours, library displays, methods of teaching the use of the library, and planning library quarters. (3W, Su) Wood

151. Library Practice. Observation and supervised practice in libraries under the direction of library personnel. Designed as the practice teaching experience for librarians. Prerequisite: Library Science 50, 120 and 150. (3F, W, S, Su) Smith


170. Readings and Conference. Limited to Library Science minors. Prerequisite: Instructor's Consent. Credit arranged. (F, W, S, Su) Staff
Psychology is a scientific approach to understanding the behavior of man and other animals. While its major applications are related to those of other social sciences, in the development of basic scientific concepts it is allied with the biological, social, and physical sciences. 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 both to professional training and personal development.

A major, and preferably a Master’s degree, in psychology should prepare students professionally (1) for guidance and psychological counseling in high schools as a certified counselor or school psychologist; (2) for teaching psychology, study habits, mental health, and personality development in high schools; (3) for diagnostic and remedial teaching, and for dealing with personality and conduct problems of children in elementary schools and in child guidance clinics; (4) (with additional courses in Education) as a teacher of exceptional children; (5) as a clinical psychologist (with additional graduate training) in mental hygiene clinics and hospitals; (6) for personnel work (at the junior professional level) in industry, U.S. Employment offices, various Civil Service positions, and in the military services; (7) (with additional graduate training) for college teaching and for research in government, industry, or universities, and (8) for further graduate study in psychology, education, child development or social work. Psychology is also a suitable major if 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, and the state industrial school, by which graduate students and some seniors can have practical experience in counseling psychology. The counseling experiences include: educational and vocational counseling; diagnosis and guidance of gifted, subnormal, and delinquent children; diagnosis and treatment of conduct and personality problems; diagnosis and remedial instruction for achievement difficulties in school subjects; teaching psychology in high school or college; teaching exceptional children; and various kinds of psychometric work.
Lower Division Preparation for Psychology. The best preparation for psychology is basic training in biological science, social science, literature, mathematics and physical science. In completing the group requirements, it is recommended that the following courses be included: Physiology 4; Sociology 70; English literature (novel and biography) courses; Physics 6, 17, 19 or 31; Mathematics 34, 35, and additional mathematics courses if interested in this subject. The minimum of 40 hours in the “group requirements” might well be exceeded. Psychology courses 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 40 credits of approved courses from the following: Psychology 53, 71, 100 or 202 or 205, 112, 127, 140 or 145, 161, and 181; and approved courses from Psychology 102, 108, 114, 115, 123, 155, 171, 175, 202, 205. Recommended upper division electives: Sociology 130, 153 or 170; Education 110; Speech 167; Zoology 102; Physiology 104 or 121, 122 and 261; the Education courses for teacher certification; S.W. 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 or 171, 100 or 202 or 205, 112, 127, 140 or 145, 161, and 181.

Graduate Study

Master of Science Degree in Psychology. Providing for a moderate degree of specialization at the masters degree level the Utah State University Department of Psychology (and Guidance) offers the master of science degree in five areas: (1) experimental, (2) child, (3) educational, (4) school psychologist, and (5) counseling. In addition to these five areas in Psychology, a course of study leading to the master of science degree in Guidance is outlined below.

Committee approval for entrance into any one of these programs is based upon appraisal of (1) the students undergraduate transcript, including 30 credits in Psychology courses (General, Experimental, Developmental, Social, Abnormal, Learning, Statistics, Psychometrics, and either Counseling, Educational or Industrial); (2) scores on the departmental Comprehensive Test in Psychology, and (3) scores on the Graduate Record Examination or Miller Analogies Test.

The following core of courses is required in each area: 171 (experimental) or Education 267 (research methods), 212 (statistics), 215 (seminar), 280 (personality) or 291 (history and systems, 202 or 205 (advanced developmental), and 217 (thesis, 9 credits). In addition to these core courses, the following courses (totalling a minimum of 45 credits) are recommended in the respective areas of specialization:

(1) Experimental: 175 (physiological), 221 (individual differences), 270 (perception), 276 (animal), and 291 (history and systems).

(2) Development Child and Adolescent Psychology: 123 (exceptional children), 200 (principles of learning in teaching), 221 (individual differences), 224 (mentally retarded children), 225 (gifted children), and 235 (play therapy).

(3) Educational: 123 (exceptional children), 200 (principles of
learning in teaching), 221 (individual differences), 224 or 225 (retarded or gifted children), and 262 (social psychology of teaching).

(4) School Psychologist: 123 (exceptional children), 200 (principles of learning in teaching), Education 213 (organization and administration of guidance), 224 or 225 (retarded or gifted children), 235 (play therapy), 282 (individual testing), 283 (counseling), 284 (advanced counseling), 285 (projective methods), 287 (occupational information), 288 (practicum in counseling) and 289 (practicum in testing), and Education 110 (diagnostic and remedial teaching).

(5) Counseling: 200 (principles of learning in teaching), Education 213 (organization and administration of guidance), 224 or 225 (retarded or gifted children), 282 (individual testing), 283 (counseling), 284 (advanced counseling), 287 (occupational information), 288 (practicum in counseling) and 289 (practicum in testing).

Modifications: The courses of study outlined above are recommended as guides to both the student and his committee. However, each student—with the approval of his graduate committee—will find it possible to make some adaptations of the outlines to meet his special interests and needs. For the student interested in a master of science degree in Guidance, the 30 credits of prerequisite courses in psychology, while desirable, are not required. The student is eligible to begin study for this degree with a teaching certificate and a total of 30 acceptable credits in Education and Psychology.

Master of Science Degree in Guidance. A teaching certificate and a total of 30 credits in Educa-

tion or/and in Psychology, makes one eligible to begin study for this degree. Included in the required courses are: Education 186, 128, 213; and Psychology 123 or 140, 181, 200, 202 or 205, 212, 280, 282, 283, 284, 287, 288, and, 289; and a thesis in the field of guidance. These are also the courses required for a Professional Counselor's Certificate.

Master of Science Degree in Psychology-Speech Pathology. The Department of Speech in cooperation with the Department of Psychology offers a composite Master of Science Degree in Psychology-Speech Pathology. The course of study includes courses jointly approved by the two departments.

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, and educational psychology that leads to the Ed.D. degree in Educational Psychology. The program requires two years of graduate study, including supervision of individual study, beyond the M.S. degree, and an internship in school, mental hygiene clinic, or social agency. If interested, confer with Dean John C. Carlisle or Professor Arden Frandsen.

Psychology Courses

33. Mental Hygiene for College Students. Deals with the common personal and social problems of normal people. (3F, W, S) Sharp

53. Elementary General Psychology. Principles of human behavior and experience, including: nature of personality; factors determining development; how we learn, observe, and think; motive of human conduct; interpersonal relations; personal efficiency and mental health. For any lower division student. (3F, W, S) Staff
71. Experimental Psychology. A study of the scientific methods and experimental procedures used in the study of behavior. Prerequisites: Psychology 53, 112. (3F, S) Tschudy

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, S) 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, S) Staff

102. Educational Psychology for Secondary Teachers. A professional course for prospective high school teachers. Designed to develop insight into conditions necessary to effective learning of junior and senior high school students. Prerequisite: Psychology 53. (3F, W, S) Stone

105. Educational Psychology for Elementary School Teachers. A study from the point of psychological theory and research of how children learn and of the conditions of effective learning in the elementary school. Prerequisite: Psychology 53. (3F, W, S) Frandsen

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. (3F, W, S) Frandsen

116. Research in Psychology. Gives any able and interested student in psychology the opportunities to conduct an exploratory, experimental study of a psychological problem in some field in which he is especially interested. Prerequisite: approval of the sponsoring instructor. (2F, W, S) Staff

120. Psychology of Adult Reading Improvement. 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. (3S) Stone

123. 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, Su) Sharp

127. Psychology of Learning. A comprehensive study of descriptions and explanations of learning. Prerequisites: Psychology 53 and 112. (3F) Tschudy

140. 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. (3S) Sharp

145. Mental Hygiene. For teachers and other workers in social occupations. Designed to promote understanding of emotional and social adjustment, and as a basis for guiding children, adolescents and adults toward improved mental health. Prerequisite: Psychology 53. (3W) Sharp

155. 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) White

161. 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. Prerequisites: Psychology 53. (3W) Langer

171. Advanced Experimental Psychology. A laboratory course emphasizing experimental methods and techniques and requiring experiments and reports on selected problems in psychology. Prerequisite: Psychology 53, 112. (3W) Tschudy

175. Physiological Psychology. Physiological mechanisms underlying behavior. Prerequisites: Psychology 53 and 71. (3W) Sharp

181. Psychometrics Applied to Guidance. A study of the evaluation, interpretation, and uses of tests of intelligence, aptitudes, interests, personality, and quality of personal and social adjustment. Prerequisite: Psychology 53 and 112. (3F) Frandsen

200. 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 102 or 108. (3W) Stone

202. 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. Prerequisites: Psychology 53. (3S, Su) White

205. Child Psychology and Development. The roles of maturation, learning, and environmental conditions in the motor, mental, social,
126 College of Education

emotional and personality development in children from birth to adolescence. Prerequisite: Psychology 53. (3F) Frandsen

212. 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) Borg

214. Independent Readings in Psychology. For students who cannot participate in the discussions 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, S) Staff

215. Seminar Discussions 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, 2S) Staff

217. Research for Master's Thesis in Psychology. Credit arranged. (F, W, S) Staff

221. Individual Differences. The nature, extent, and causes of human differences, and the implications and applications of a recognition of these differences in several major life activities. (3S) Sharp

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. (3S) Hofmann


235. Theory and Practice of Play Therapy. Exploration of theories and potentialities of specialized play therapy experience. Concepts and principles in the interpersonal process are examined and developed. (3F) Tschudy

238. Practicum in Play Therapy. Direct experience with children in the play therapy situation. Prerequisite: Psychology 236. (2S) Tschudy

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. (3S, Su) Hofmann

270. Perception. The development, structure, role in behavior, and factors affecting perceptual processes: a study of the theories and experiments. (3F) Tschudy

276. Comparative Psychology. A phylogenetic study of animal behavior, including perception, motivation, learning, distinctive behavior characteristics, and the factors affecting development. (3W) Tschudy

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. (3S) Sharp

282. 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 adjustment. Prerequisites: Psychology 53, 102 and Education 113. (3F) 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) Wright

285. Introduction to Projective Methods for the Study of Personality. The dynamics of human adjustment and the common projective methods (other than the Rorschach) for revealing motives, attitudes, and adjustment mechanisms of children and adults. Prerequisite: Psychology 181. (3S) Frandsen

287. Occupational Information. Collection, classification, and uses of occupational information in counseling. (3W) Peterson

288. Practicum in Counseling. Supervised practice in counseling in elementary or secondary schools, in the University, or in clinical or guidance agencies. (2F, W, S) Wright

289. Practicum in Psychological Testing. Supervised practice in psychological testing in elementary or secondary schools, in the University, or in clinical or guidance agencies. (2S) Frandsen

291. History and Systems of Psychology. History of psychology and a critical comparison of the several systematic points of view on major problems in psychology. (3S) Staff
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, S) Staff

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) 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. (3S) Stone

314. Advanced Independent Study in Psychology. Credit arranged. (F, W, S) Staff

317. Research for the Doctorate Thesis in Psychology. (F, W, S) Staff

318. Problems in Counseling. Individual case studies of children and adolescents presenting problems of diagnosis, guidance, remedial teaching, and psychotherapy. (3F) Wright

318. Internship in School Psychology. Supervised practice in providing psychological services in a school setting. (3F, W, S) Staff
College of Engineering is housed in this modernistic building
College of Engineering
College of Engineering

Department of Civil and Irrigation Engineering, 135
  Civil and Irrigation Engineering, 136
  Agricultural Engineering, 142

Department of Electrical Engineering, 144

Department of Mechanical Engineering, 148

Department of Tool and Manufacturing Engineering, 152

Department of Industrial and Technical Education, 154
  Industrial Education, 156
  Industrial Arts Education, 156
  Trade and Industrial Education, 156
  Technical Education, 161
  Industrial Technology, 162
    Aeronautical Technology, 162
    Automotive Technology, 164
    Welding Technology, 166

Degrees Offered:
  Bachelor of Science
  Master of Science
  Civil Engineer
  Irrigation Engineer
  Doctor of Philosophy
The College of Engineering is comprised of the Departments of Civil and Irrigation Engineering, Electrical Engineering, Mechanical Engineering, Tool and Manufacturing Engineering, Industrial and Technical Education, and the Engineering Experiment Station.

Undergraduate and graduate degrees. The Engineering departments offer the Bachelor of Science degree in Agricultural, Civil, Electrical, Mechanical, and Tool and Manufacturing 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 undergraduate majors, in Irrigation Engineering and Water Resources Engineering.

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 and graduate degrees in Industrial Arts and Trade and Industrial Education. Undergraduate degrees are also offered in Industrial Technology, with majors in Aeronautical, Automotive, and Welding Technology. Certificates are awarded for completion of two-year technical courses in Aeronautical, Automotive, Drafting, Machine Tool, and Welding Technology. The Department of Industrial and Technical Education has the primary mission of educating teachers in the industrial fields and of providing high-level technical education necessary for employment in industry.

Nuclear Engineering. A senior sequence of courses in Nuclear Engineering may be elected by any Engineering major. See course offerings under Department of Mechanical Engineering.

Admission. For general requirements see introductory section of this catalog.

For Engineering, the following high school units are required for admission without deficiencies:
English, 3; Plane Geometry, 1; Algebra, 2; Trigonometry, $\frac{1}{2}$; Physics or Chemistry, 1. One unit each of Physics and of Chemistry and $\frac{1}{2}$ 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, except that minor deficiencies may be removed by attendance at Summer School. If attended prior to Freshman Fall Quarter, Math 46 should be taken to satisfy a deficiency in Trigonometry; Math 34, to satisfy one in Algebra. If attended prior to the Sophomore year, Math 98 may be taken if deficiency was in Trigonometry only. In any event, students must complete Math 98 prior to entrance to the Sophomore year. Students having minor deficiencies not made up during Summer School, will be admitted conditionally until these are satisfied. Such students deficient in high school Algebra B, register for Math 34, Fall Quarter. 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.

Based on the entrance examination and high school record, the Dean may waive Math 35 for outstanding students regularly admitted. He may also waive Math 34 for otherwise well qualified students having only one and a half units of Algebra.

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. The faculty reserves the right to accept toward graduation only credits with a grade of "C" or higher. Prior to continuing the sequence, students must repeat Mathematics or professional sequence courses in which a grade below "C" is received. It is strongly recommended that Physics courses with "D" grades be repeated.

The general University scholastic policy governs the College of Engineering. See "Low Scholarship and Probation" 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 general University requirements listed in "Academic Regulations." In addition, they must satisfy the requirements of the prescribed curriculum of their major.

Socio-Humanities Requirement. Graduates in the professional engineering programs (agricultural, civil, electrical, mechanical, tool and manufacturing) are expected to complete the university group requirements, p. 25. They also must meet the requirements of the Engineers' Council for Professional Development in the socio-humanistic field; they can do this by selecting courses from each of the following lists, A and B.

A. Social Sciences (select from two areas)

1. Sociology 70, 90
2. Economics 51, 52
3. Psychology 53
4. Political Science 1 or 10, 101, 102
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; Visual Arts 1, 2, 3, 4 and 10.

(4) Non-Sectarian Religion—Consult Adviser.

Computer Center. The University Computer Center maintains a modern electronic digital computer (IBM 1620). The services of this computer are available for classroom instruction as well as for research. Engineering students are introduced to computer programming during their Freshman year and program and compute a number of exercises in their regular professional courses using this machine.

Opportunity for Graduates. Rapidly increasing industrial development, the need for development of natural resources, and rapid advances in transportation, manufacturing and communication assures a continuing strong demand for graduates in Engineering and the Industrial and Technical Arts and Sciences, and for teachers in these fields. Graduates of the Engineering College may expect ample opportunity for satisfying and remunerative professional employment.

Thiokol Co-operative Program. In this program engineering students are employed one or two quarters as engineering technicians by Thiokol Chemical Corporation and then go to school one or two quarters in rotation. Students must have completed at least one year of academic work and must be recommended by the dean. The program provides an opportunity to work in industry as well as a means to earn funds to meet educational expenses.

Engineering College Honors. An Engineering College Honors program provides an opportunity for outstanding students to participate in advanced study or creative investigation beyond the prescribed curricula, thus providing increased competence and a sense of personal responsibility for intellectual development. See course No. 197 in the departmental listings.

Professional Societies. The College holds institutional membership in the American Society for Engineering Education, American Society for Testing Materials, American Concrete Institute, Highway Research Board and others. Official student chapters of the American Society of Civil Engineers, the American Institute of Electrical Engineers, The Institute of Radio Engineers, The American Society of Tool and Manufacturing Engineers, American Society of Mechanical Engineers, Sigma Tau (honorary Engineering society) and Theta Tau (professional Engineering fraternity) are on campus. Other student organizations include Industrial Arts Club and Society of Automotive Engineers. Other professional organizations represented by faculty members include, among others, American Association for Advancement of Science, American Geophysical Union, American Road Builders Association, American Society of Agricultural Engineers, American So-
ciety of Mechanical Engineers, National Society of Professional Engineers, American Vocational Association, American Industrial Arts Association, American Welding Society, and others. The university is a member of the Universities’ Council on Hydrology.

Students are encouraged to affiliate with the appropriate student societies and participate in their activities.

*Engineering Council*. The Engineering Council is the over-all student professional Engineering organization. Representatives to the Council are elected from each student professional organization and a chairman is selected from the group. This organization is associated with the Utah Engineering Council and has the responsibility of coordinating all Engineering student activities. It, along with other student chapters, maintains an office in Room 263, Engineering and Physical Science Building.

*Honor Societies and Scholarships*. The Alpha Delta Chapter of Sigma Tau was installed at Utah State University in 1951. Membership is elected from junior and senior Engineering students whose scholarship is in the upper third of their class.

Graduating seniors in the upper ten percent of the class are eligible for membership in Phi Kappa Phi. Graduate students may be elected to Sigma Xi, honorary scientific society.

A number of scholarships are available to Engineering students, including freshmen. Outstanding high school scholars should write directly to the Dean of the College of Engineering early in the senior year regarding these scholarships. (See “Scholarships, Fellowships, Awards” section in this catalog.)

*Common Freshman Curriculum in Engineering*. The curriculum for all Engineering majors, except for Tool and Manufacturing, Engineering is the same for the Freshman year and nearly the same for the Sophomore year. A student may thus readily delay choice of his Engineering major until completion of his Freshman year; serious loss of credit does not result by such a change as late as the end of the Sophomore year.

*ROTC*. Many Engineering College graduates have effectively served as reserve officers in the armed forces of the United States and the College is proud of this tradition. Participation in ROTC not only provides an opportunity to meet military obligations, but Junior and Senior ROTC students draw pay and allowances equivalent to a fine scholarship as well. Inactive reserve service after graduation may profitably be combined with a professional career. On active duty ROTC-trained officers can effectively serve their country in peace or war.

To assist and encourage Engineering students who desire to consider ROTC, the faculty has designated a faculty adviser who will help with schedules and advise regarding other ROTC matters. This adviser is Assistant Professor Arnold Finchum, Department of Electrical Engineering. Students in Industrial and Technical Education should contact the Head of the Department regarding ROTC.

*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.
Civil and Irrigation Engineering Research and Graduate Work. The College of Engineering maintains an extensive program of research through the Engineering Experiment station and the various departments. This effort assures that faculty members have ample opportunity for intellectual achievement and that curricula are up-to-date. There are outstanding opportunities for graduate students to participate in research and many undergraduates find interesting employment in research programs.

Concord, Massachusetts, Radiation Laboratory. A branch of the USU Electrodynamics Laboratory is maintained and operated at Concord, Massachusetts, under an arrangement with the Air Force Cambridge Research Center. This Center is operated by staff members of the Department of Electrical Engineering and Engineering Experiment Station.

Department of Civil and Irrigation Engineering


Office in E&PS 150

This department offers the Bachelor of Science degree in Civil Engineering and in Agricultural Engineering, and collaborates with the Agronomy Department in giving the Bachelor of Science degree in Irrigation and Soils.

Major in Irrigation and Soils. This joint major between the Departments of Agronomy and Civil and Irrigation Engineering is designed for students who wish to specialize in the management of land and water, in irrigation agriculture, without specializing in all of the technical engineering phases of irrigation. Extension specialists, certain civil service positions, and farm managers represent some types of employment available to graduates in this field.

An outline of courses with details concerning course requirements can be obtained from the Department of Agronomy or the Civil and Irrigation Engineering Department.

Research Assistantships. This department conducts engineering research through the Engineering and Agricultural Experiment Stations, and collaborates with the Agricultural Research Service, U.S. Department of Agriculture, in soil-water research. These research projects provide opportunities for qualified students to act as part-

*On leave
time research assistants and thereby obtain experience and compensation for their services. These projects also provide research opportunities for graduate students working on their theses.

Civil and Irrigation Engineering

Civil Engineering consists of the economic application of the laws, forces, and materials of nature to the design, construction, and operation of engineering structures and projects, including irrigation and drainage systems, highways, railways, bridges, buildings, dams, water supply systems, hydroelectric plants, and many other works which are a part of the requirements of civilization today.

With properly selected elective courses Civil and Agricultural Engineering students may obtain special training in Irrigation and Drainage Engineering in this department.

Civil Engineering Curriculum

The Civil Engineering curriculum has been accredited by the Engineers Council for Professional Development.

<table>
<thead>
<tr>
<th>FRESHMAN</th>
<th>F W S</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.E. 1, 2, CS. 1</td>
<td>1 1 2</td>
</tr>
<tr>
<td>M.E. 21, 22</td>
<td>3 3</td>
</tr>
<tr>
<td>Math 35, 97, 98</td>
<td>5 5 5</td>
</tr>
<tr>
<td>Chemistry 10, 11, Economics 51</td>
<td>5 5 5</td>
</tr>
<tr>
<td>English 1, 2, 3</td>
<td>3 3 3</td>
</tr>
<tr>
<td>Humanities</td>
<td>3</td>
</tr>
<tr>
<td>M.S., A.S., or P.E.</td>
<td>1 1 1</td>
</tr>
</tbody>
</table>

F W S 18 18 19

<table>
<thead>
<tr>
<th>SOPHOMORE</th>
<th>F W S</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.E. 84, 91, 92</td>
<td>4 4 4</td>
</tr>
<tr>
<td>Math 99, 110, C.E. 65</td>
<td>5 5 5</td>
</tr>
<tr>
<td>Physics 20, 21, 22</td>
<td>5 5 5</td>
</tr>
<tr>
<td>C.E. 85</td>
<td>4 4 4</td>
</tr>
</tbody>
</table>

F W S 18 18 18

1See introductory section on College of Engineering for details of Mathematics and Humanities requirements.

2Two credits are given for M.S. or A.S.

Suggested Five-Year Curriculum in Civil Engineering. This curriculum is suggested for students who wish to broaden their education, who wish to take advanced military science or air science, or for those deficient in entrance requirements, or who wish to obtain a better foundation in Mathematics, Physics, or other branches of education. Some students may of necessity have to work a considerable amount of time to stay in school, or they may wish to participate in athletics or other extra-curricular activities. The five-year curriculum is designed to meet these special needs. Those who desire the five-year curriculum should consult their advisor to work out a satisfactory program.
Civil and Irrigation Engineering 137

Civil Engineering and in Irrigation and Drainage Engineering. The Doctor of Philosophy degree is offered in Agricultural Engineering (soil and water field), Civil Engineering, Irrigation and Drainage Engineering, and in collaboration with related departments the Doctor's degree in Irrigation Science is offered.

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.

Inasmuch as students enter with different backgrounds and with different objectives, no rigid curricula are suggested for advanced degrees. However, some typical programs of study are included for information. By an appropriate selection of courses from the Agricultural Engineering, Civil Engineering and Agronomy fields a strong and rich program in Irrigation and Drainage may be developed both on an undergraduate and graduate level. These curricula must contain certain basic courses in mathematics and fundamental engineering subjects. Graduate students, particularly at the doctorate level, may obtain part of their work at other accredited universities upon approval of the Graduate Committee.

### SECOND YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.E. 2, C.S. 1, C.E. 65</td>
<td>1 2 2</td>
</tr>
<tr>
<td>Math 97, 98, 99</td>
<td>5 5 5</td>
</tr>
<tr>
<td>M.E. 21, 22</td>
<td>3 3</td>
</tr>
<tr>
<td>C.E. 84, 85</td>
<td>4 3</td>
</tr>
<tr>
<td>Economics 51, Elective</td>
<td>5 5</td>
</tr>
<tr>
<td>Humanities</td>
<td>3</td>
</tr>
<tr>
<td>M.S., A.S., or P.E.</td>
<td>1 1 1</td>
</tr>
</tbody>
</table>

### THIRD YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course</td>
<td>F W S</td>
</tr>
<tr>
<td>Physics 20, 21, 22</td>
<td>5 5 5</td>
</tr>
<tr>
<td>Math 110</td>
<td>5</td>
</tr>
<tr>
<td>C.E. 91, 92</td>
<td>4 4</td>
</tr>
<tr>
<td>Humanities or C.E. 173</td>
<td>5 5 5</td>
</tr>
<tr>
<td>Humanities, Electives or Adv.</td>
<td>3 3</td>
</tr>
<tr>
<td>Military</td>
<td></td>
</tr>
</tbody>
</table>

### FOURTH YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course</td>
<td>F W S</td>
</tr>
<tr>
<td>C.E. 103, 104, 105</td>
<td>4 4 4</td>
</tr>
<tr>
<td>C.E. 140, 141, 142</td>
<td>3 3 3</td>
</tr>
<tr>
<td>E.E. 104, 105, 106</td>
<td>3 3 3</td>
</tr>
<tr>
<td>M.E. 114, 115, English 111</td>
<td>3 3 3</td>
</tr>
<tr>
<td>Humanities or Adv. Military</td>
<td>3 3</td>
</tr>
</tbody>
</table>

### FIFTH YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course</td>
<td>F W S</td>
</tr>
<tr>
<td>C.E. 106, 107, 108</td>
<td>4 4 4</td>
</tr>
<tr>
<td>C.E. 150, 151, A.E. 145 or C.E. 194</td>
<td>4 4 4</td>
</tr>
<tr>
<td>C.E. 190, 146 or 193, 195</td>
<td>3 3 3</td>
</tr>
<tr>
<td>C.E. 181, 128, 129</td>
<td>3 3 3</td>
</tr>
<tr>
<td>C.E. 198</td>
<td>1 1 1</td>
</tr>
<tr>
<td>Technical Electives</td>
<td>3 3 3</td>
</tr>
</tbody>
</table>

### Graduate Study

This department offers the Master of Science degree in Civil Engineering, Water Resources Engineering, Agricultural Engineering, and in Irrigation and Drainage Engineering. It also offers the professional engineering degree in

---

3Technical electives may be selected from the following: C.E. 120, 121, 122, 127, 130, 131, 132, 147, 181, 182; A.E. 145, 145, 148, 149, and 160; English 111; Geology 115 and 117; advanced Mathematics or graduate courses with approval of instructor. (Courses will be taught only for classes of ten or more students.)
### Typical Programs of Study and Research

#### M.S. in Irrigation and Drainage

<table>
<thead>
<tr>
<th>Course</th>
<th>F</th>
<th>W</th>
<th>S</th>
<th>Su</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 140, 141, 142</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>C.E. 260, 241, 242</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>A.E. 143, 147, 148</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>C.E. 299</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.E. 298</td>
<td>2</td>
<td>2</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

#### M.S. in Civil Engineering

(Fluid Mechanics)

<table>
<thead>
<tr>
<th>Course</th>
<th>F</th>
<th>W</th>
<th>S</th>
<th>Su</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 130, 131, 132</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>C.E. 260, 241, 242</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>A.E. 149, C.E. 210, A.E. 148</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>A.E. 231, 232</td>
<td>1</td>
<td>3</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>C.E. 299</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.E. 230</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

#### M.S. in Agricultural Engineering

(Soil and Water field)

<table>
<thead>
<tr>
<th>Course</th>
<th>F</th>
<th>W</th>
<th>S</th>
<th>Su</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 140, 141, 142</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Agronomy 107, 165</td>
<td>5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A.E. 149, C.E. 210, A.E. 148</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>A.E. 298</td>
<td>1</td>
<td>3</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>C.E. 299</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### PhD in Agricultural Engineering

(Soil and Water)

1st Year

<table>
<thead>
<tr>
<th>Course</th>
<th>F</th>
<th>W</th>
<th>S</th>
<th>Su</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 130, 131, 132</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>C.E. 260, 241, 242</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Applied Statistics 130, 131, 215</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>A.E. 143, 147, 148</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>C.E. 299</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2nd Year

<table>
<thead>
<tr>
<th>Course</th>
<th>F</th>
<th>W</th>
<th>S</th>
<th>Su</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 140, 141, 142</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Agronomy 107, 165, 214</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Agronomy 106</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A.E. 149, 160, 145</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>A.E. 231, 232</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>A.E. 298</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

3rd Year

<table>
<thead>
<tr>
<th>Course</th>
<th>F</th>
<th>W</th>
<th>S</th>
<th>Su</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agronomy 155</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Agronomy 219, 224</td>
<td>2</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.E. 245, 250</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>English 211, C.E. 210, 273</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>C.E. 298</td>
<td>10</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>C.E. 299</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Candidates for an advanced degree are given oral and/or written examinations to determine the adequacy of preparation. Additional course work may be required where deficiencies are indicated.

No guarantees can be made as to the time required to obtain any advanced degree. Ordinarily, however, a properly prepared student may obtain the Master's degree in one year and the Doctor's degree in three full years of study after the BS degree. Longer times are required if students lack background preparation or if the student must have other employment.

Additional information may be obtained from the Civil and Irrigation Department or the Dean, School of Graduate Studies.

#### MS Degree in Water Resources Engineering

<table>
<thead>
<tr>
<th>Course</th>
<th>F</th>
<th>W</th>
<th>S</th>
<th>Su</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 140, 141, 142</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>C.E. 260, 241, 242</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>C.E. 262, 263, 264</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>A.E. 149, Geology 117</td>
<td>3</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.E. 298</td>
<td>2</td>
<td>2</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>C.E. 299</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

#### PhD in Civil Engineering

(Hydraulics and Fluid Mechanics)

1st Year

<table>
<thead>
<tr>
<th>Course</th>
<th>F</th>
<th>W</th>
<th>S</th>
<th>Su</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 130, 131, 132</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>C.E. 260, 241, 242</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Applied Statistics 130, 131, 215</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Math 145, C.E. 273</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

xLanguages, Research and C.E. 298-6

---

1Programs showing summer credit list only about 12 credits or less per quarter based on the assumption that the student holds a teaching or research assistantship.
Civil and Irrigation Engineering 139

2nd Year

<table>
<thead>
<tr>
<th>F</th>
<th>W</th>
<th>S</th>
<th>Su</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 254, 255, 256</td>
<td>3</td>
<td>3</td>
<td>3 x</td>
</tr>
<tr>
<td>C.E. 201, 202, 203</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>C.E. 270, 271, 272</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Physics 153, 154, 155 (Vector Mech.)</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>C.E. 298</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

15 15 15 ...

xLanguages, Research, Comprehensive Exams and C.E. 298-6

3rd Year

<table>
<thead>
<tr>
<th>F</th>
<th>W</th>
<th>S</th>
<th>Su</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 257, 258, 259</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>C.E. 211, 216, 250</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Approved Electives</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>C.E. 298</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

12 12 12 ...

Civil and Irrigation Engineering Courses

1. Engineering Orientation. A preview of engineering; what engineering is, what engineers do, what aptitudes are essential to success, and philosophy of engineering education. (1F, W) Peterson

2. Slide Rule Instruction. Practice in the use of the Log-Log slide rule. Prerequisite or concurrently: Math 46. (1F, W, S) Staff

3. Engineering Problems. How to approach the solution of an engineering problem. Application of mathematics to the solution of elementary engineering problems. Prerequisite: Math 110. One lecture and one lab. (2S) Staff


84. Elements of Surveying. Theory of surveying. Terminology, computations, areas, volumes, field astronomy, and general surveying. Prerequisites: Math 35, 46. Two lectures, two labs. (4F) Daines

85. Advanced Surveying. Problems in leveling, curves, spirals, stadia, plane table, and city surveying. Prerequisite: C.E. 84. One lecture and two labs. (3S) Daines

91, 92, 103, 104. Engineering Mechanics and Strength of Materials. Includes statics, dynamics, and strength of materials. The following subjects are studied: resultants and equilibrium of force systems, friction, center of gravity, moments of inertia, kinematics and kinetics, stress and strain in tension and compression members, shafts, beams, columns, impact, energy loads, etc. Prerequisites: C.E. 2, Math 99 and Physics 20. Three lectures and one lab (4F, 4W, 4S) Rich, V. Christiansen

105. Elementary Structural Analysis. Analysis of stresses and deflections in statically indeterminate structures. Prerequisite: C.E. 104 or equivalent. Three lectures and one lab. (4S) V. Christiansen

106. Elements of Structures. Principles and practices of reinforced concrete analysis and design. Prerequisite: C.E. 105 or equivalent. Three lectures and one lab. (4F) V. Christiansen

107. Elements of Structures. Principles and practices of analysis and design of steel structures. Prerequisite: C.E. 105 or equivalent. Three lectures and one lab. (4W) V. Christiansen

108. Structural Theory and Design. Design of Steel and Reinforced Concrete Structures. Prerequisite: C.E. 107 or equivalent. Three lectures and one lab. (4S) V. Christiansen

120, 121, 122. Highway Engineering. Fall quarter is devoted to general highway engineering, including current aspects of the federal highway engineering program, economics, financing, surveys and plans, geometric design of rural highways, and highway drainage. Winter quarter deals with the sub-grade structure, stabilized roads, materials of highway construction, and the design of flexible and rigid pavements. Spring quarter traffic problems, including the vehicle and the driver, traffic surveys, accidents, planning and design, traffic control and regulations. Three lectures. (3F, 3W, 3S) Cordon, Jones

127. City Planning. Master plans, civic units, parks and playgrounds, utilities, housing, subdivisions, zoning, civic centers and airports. Three lectures. Prerequisite: C.E. 120. Two lectures, one lab. (3S) Cordon


129. Engineering Materials. The nature and properties of metallic and non-metallic engineering materials. Includes some testing of engineering materials according to ASTM standards. Prerequisite: C.E. 128 or equivalent. Three lectures. (3S) Cordon


131, 132. Structural Design Problems. Problems in deflection of beams and trusses, analysis and design of statically indeterminate trusses and rigid frames. Open to seniors and
to graduate students in C.E. C.E. 103 is prerequisite for C.E. 131 and C.E. 105 and 106 are prerequisites for C.E. 132. Three lectures. (3W, SS) V. Christiansen

140. 141. 142. 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 water lines and pumps. Prerequisites: C.E. 140, 150; concurrently, C.E. 106. Three lectures. (3W) Bishop

144. Applied Hydraulics and Pneumatics. Theory and practice in hydraulics and pneumatics as they apply to machine tools and controls. Prerequisite: C.E. 140. Two lectures, one lab. (3W) Keller, Hansen

147. Design of Water Conveyance Structures. Fluid, and soil mechanics are applied to the solution of engineering designs for earth canals, lined canals, flumes, transitions, and pipe lines. Prerequisites: C.E. 140, 150; concurrently, C.E. 106. Three lectures. (3) Bishop

150. 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: C.E. 108, 141. Three lectures, one lab. (4F) 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: C.E. 150 or equivalent. Three lectures, one lab. (4W) Kiefer

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: C.E. 141, or instructor's consent. Four lectures, one lab. (6W, SS) Bagley

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 uses. Prerequisites: E.D. 63, C.E. 81 or 85, or senior standing in Forestry, Range or Wildlife Management, Geology, Landscape Architecture, Aeronautics, or Advanced Military Science. Two lectures, one lab. (3F) Tingey

182. Route Surveying. Theory and practice in highway curves and earth work, including methods used in highway, street, canal, pipe line and general project surveys. One lecture, one lab. (2S) Tingey


191. Senior Project. Research or testing project in some phase of engineering. Students conduct minor research project under direction of faculty. Conducted cooperatively with C.E. 198 and English 111. (1W, 1S) Staff


194. Sewerage. Principles of design, construction and maintenance of sewer systems. Treatment of sewage by physical, chemical and biological action and methods of final disposal. Prerequisite: C.E. 142. Three lectures, one lab. (4S) 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. (F, W, S) 1-3 credits, arranged. 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, S) Milligan

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.

201, 202, 203: Advanced Structural Theory and Design. Advanced topics in structural theory including analysis of indeterminate frame works; model analysis; individual problems in the design of modern structures. Prerequisites: C.E. 192, 201. Three lectures. (3W, SS) 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: C.E. 150. (3W) 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: C.E. 103. (3F) Bishop

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: C.E. 142. (3W) Staff


220, 221, 222. Advanced Highway Engineering. Economics of location and design, selection, improvement and maintenance, traffic control, administration and finance, and jurisdiction as applied to highways. Prerequisite: C.E. 122. (3W) Staff

225. 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: C.E. 128 or equivalent. (3W or 3S) Cordon

230. Special Problems in Civil, Irrigation or Drainage 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 typewritten reports required. Credit arranged. (F, W, S) Staff

241. Intermediate Fluid Mechanics. Effects of pressure, inertia, gravity, viscosity, compressibility, and surface tension on the motion of fluids. Surface resistance, form resistance, lift, and propulsion. Prerequisites: C.E. 142 or equivalent. (4W) Hansen


243. Advanced Hydraulic Design. Design of pipe lines, special flumes, spillways, water control structures, and hydraulic machinery. Prerequisites: C.E. 142, 147. (3S) Staff

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

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: C.E. 150 or its equivalent. (3S) Peterson

251. Advanced Soil Mechanics Laboratory. Advanced laboratory work in soil mechanics to be arranged with instructor. Prerequisites: C.E. 150 and 250 (may be taken concurrently). (1S) Peterson

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, 263, 264. Water Resources Engineering. In CE 262 the historical and institutional aspects of water resource development as they relate to engineering project development are covered. The development of other related resources associated with water development projects are also treated. In CE 263 current problems and policies in water resource administration including water laws, compacts, and authorities discussed. In CE 264 general principles and procedures of multiple purpose project planning are covered, including project formulation and evaluation. Prerequisite: Consent of instructor. (3F, 3W, 3S) Bagley

265. Directed Reading and Special Studies in Water Resources. Investigation into problems of special interest in water resources engineering. Given appropriate direction by staff. Discussion periods are arranged. A final report is required. Prerequisites: Consent of instructor. Credit arranged. (F, W, S) Staff


273. Advanced Hydrology. Application of basic hydrologic principles to engineering investigations. Application of the unit hydrograph, infiltration analysis, hydrograph analysis, streamflow routing for reservoir operation and control, use and storage of
Agricultural Engineering

Agricultural Engineering applies engineering science to the solution of agricultural problems in the areas of soil and water, farm buildings, farm power and machinery, electrification, and processing of agricultural products. The Agricultural Engineering curriculum at USU emphasizes irrigation and drainage and water supply and utilization.

Service courses are offered in farm mechanics, farm machinery, farm power, farm structures, modern farm and home equipment, and irrigation and drainage. These service courses are open to all university students with the proper prerequisites. They are particularly designed for students in Agriculture and Agriculture Education.

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 curriculum in Agricultural Engineering places special emphasis on irrigation and drainage and water supply and utilization. It is administered by the Civil and Irrigation Engineering Department, and qualified staff members listed in that department teach the courses in the curriculum.

Agricultural Engineering Curriculum

<table>
<thead>
<tr>
<th>Course</th>
<th>Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshman</td>
<td></td>
</tr>
<tr>
<td>C.E. 1, 2, C.S. 1</td>
<td>1 1 2</td>
</tr>
<tr>
<td>Math 35, 97, 98</td>
<td>5 5 5</td>
</tr>
<tr>
<td>Chemistry 10, 11, Economics 51</td>
<td>5 5 5</td>
</tr>
<tr>
<td>M.E. 21, 22, Humanities</td>
<td>3 3 3</td>
</tr>
<tr>
<td>English 1, 2, 3</td>
<td>3 3 3</td>
</tr>
<tr>
<td>P.E., M.S., or A.S.</td>
<td>1 1 1</td>
</tr>
<tr>
<td>Sophomore</td>
<td></td>
</tr>
<tr>
<td>C.E. 84, C.E. 91, 92</td>
<td>4 4 4</td>
</tr>
<tr>
<td>Math 99, 110</td>
<td>5 5 5</td>
</tr>
<tr>
<td>Physics 20, 21, 22</td>
<td>5 5 5</td>
</tr>
<tr>
<td>C.E. 65</td>
<td>2 2 2</td>
</tr>
<tr>
<td>C.E. 85</td>
<td>3 3 3</td>
</tr>
<tr>
<td>Humanities</td>
<td>4 4 4</td>
</tr>
<tr>
<td>Junior</td>
<td></td>
</tr>
<tr>
<td>C.E. 103, 104, 105</td>
<td>4 4 4</td>
</tr>
<tr>
<td>C.E. 140, 141, 142</td>
<td>3 3 3</td>
</tr>
<tr>
<td>E.E. 104, 105, 106</td>
<td>3 3 3</td>
</tr>
<tr>
<td>M.E. 114, 115, English 111</td>
<td>3 3 3</td>
</tr>
<tr>
<td>Humanities, C.E. 173</td>
<td>5 5 5</td>
</tr>
<tr>
<td>Senior</td>
<td></td>
</tr>
<tr>
<td>C.E. 143, 147, 148</td>
<td>3 3 3</td>
</tr>
<tr>
<td>A.E. 149, A.E. 145</td>
<td>3 3 3</td>
</tr>
<tr>
<td>Agronomy 106, 107, 155</td>
<td>4 5 3</td>
</tr>
<tr>
<td>C.E. 150, 128, 129</td>
<td>4 3 3</td>
</tr>
<tr>
<td>C.E. 198</td>
<td>1 1 1</td>
</tr>
<tr>
<td>C.E. 190, A.E. 102, C.E. 195</td>
<td>3 3 3</td>
</tr>
</tbody>
</table>

Agricultural Engineering Courses

1. Farm Mechanics. Use of hand and power tools, sharpening, care, and selection of tools and shop supplies. Sheet metal work; cold metal; forge work; practical farm drawing; home farm shop; and shop safety. Three lectures, two labs. (SF, W) Jarrett
2. Irrigation Practice. Primarily for agricultural students. Principles and practices of
efficient use of water, water measurement, farm surveying. Three lectures, one lab. (4S)  


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, S)  

103. Farm Machinery. Selection, operation, maintenance, and repair of farm machinery, including materials of construction, mechanics, transmission of power, adjustment of tillage, planting, spraying, dusting, forage, and harvesting equipment, brazing cast iron, welding, hard facing, and use of the carbon arc torch. Three lectures, two labs. (5F)  

104. Senior Project. Involves scaled drawing, cost estimating, construction and formal report on student-selected project. Credit arranged. (S)  


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)  

113. Irrigation Principles. For advanced engineering students. Soil, water, plant relationships; water requirements; efficiency of water use; flow of water in soil. Prerequisite: C.E. 142. Two lectures, one lab. (3F)  

145. Design of Drainage Systems. Drainage design in relation to soil properties, location of drains, flow of water, properties of tile, drainage construction, salinity of soil, and quality of water. Prerequisite: C.E. 142. Three lectures, one lab. (4S)  

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 A.E. 143. (3W)  

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 and sprinkling methods. Prerequisites: 143 and C.E. 142. (3S)  

149. Irrigation Institutions. Laws governing acquisition, adjudication, and administration of water rights; state water codes, mutual companies, commercial companies, irrigation and drainage districts; federal legislation; project planning. Three lectures. (3F)  

160. Management of Irrigation Systems. Details of staff organization for irrigation systems. Distribution of water to irrigators; financing for construction and operation; maintenance of canals, flumes, pipelines, dams, weirs, and other irrigation structures. Three lectures. (5W)  

230. Special Problems in Agricultural Engineering. Independent study of selected problems in Agricultural Engineering. Students are expected to develop initiative in pursuing these problems. Standard, formal typewritten reports required. Credit arranged. (F, W, S)  

231, 232. 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. (3W, S)  

298. Graduate Thesis. Credit arranged. (F, W, S)
Department of Electrical Engineering


Office in Engineering and Physical Science 130

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 B. S. program qualifies the student for entrance into the electrical engineering field with professional status.

### Electrical Engineering Curriculum

<table>
<thead>
<tr>
<th>Course</th>
<th>Freshman</th>
<th>F</th>
<th>W</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.E. 1, 2</td>
<td></td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>C.S. 1</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Math 35, 97, 98</td>
<td></td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>M.E. 21, 22</td>
<td></td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>English 1, 2, 3</td>
<td></td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Chemistry 10, 11</td>
<td></td>
<td></td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Physics 20</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Humanities²</td>
<td></td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>M.S., A.S., or P.E.³</td>
<td></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Sophomore</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course</td>
<td>F</td>
<td>W</td>
<td>S</td>
<td></td>
</tr>
<tr>
<td>E.E. 79, 80, 81</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Math 99, 110</td>
<td></td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Physics 21, 22</td>
<td>5</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td></td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physics 122</td>
<td></td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Humanities²</td>
<td></td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>M.S., A.S., or P.E.³</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Junior</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course</td>
<td>F</td>
<td>W</td>
<td>S</td>
<td></td>
</tr>
<tr>
<td>E.E. 124, 125, 126</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>E.E. 111, 112, 110</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>C.E. 91, 92, 103</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>M.E. 114, 115</td>
<td></td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>English 111</td>
<td></td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Humanities²</td>
<td></td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E.E. 150⁴</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>16</td>
<td>18</td>
<td></td>
</tr>
</tbody>
</table>

²See College of Engineering pages for details of mathematics and humanities requirements.  
³Two credits are given for M.S. or A.S.  
⁴May be taken any quarter, omitting a humanities course.
Electrical Engineering Courses


101. Electronics. A special course for senior or graduate science majors and non-electrical engineers. Fundamentals of electric and electronic circuits; applications to the electrical measurement of physical quantities. Prerequisite: Physics 21 or equivalent. Three lectures, one lab. (4F) Jones


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: E.E. 81. Three lectures, one lab. (4F) Embry

108. Electrical Machinery II. A continuation of E.E. 107, with special emphasis on AC machines. Transformers; single and polyphase

Graduate Study

The graduate program in Electrical Engineering is basically general, covering circuits, waves, and fields, with supporting mathematics and physics. Specialization is available in the fields of antennas and propagation, servo-mechanisms, microwave measurements, transistor circuitry and semiconductor physics, communication theory and radiometry.

A typical course of study is listed below which will lead to the Master of Science degree. Modification may be made, depending on the student's preparation and objectives.

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.

<table>
<thead>
<tr>
<th>Course</th>
<th>F</th>
<th>W</th>
<th>S</th>
<th>Su</th>
</tr>
</thead>
<tbody>
<tr>
<td>E.E. 211, 212</td>
<td>4</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E.E. 231, 232, 233</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>E.E. 222, 223</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E.E. 298 (thesis)</td>
<td></td>
<td>3</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Math 130, 131, 132 or 140, 141, 142</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Approved Elective</td>
<td></td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

| 13 | 13 | 12 | 10 |

1Recommended electives include modern physics, physical chemistry, nuclear science or other E.E. courses.

2Electives must be approved by department head.
systems and machines; control equipment. Prerequisite: E.E. 107. Three lectures, one lab. (4W)

Emby

110. Lines and Filters. Principles and characteristics of transmission lines, networks, matching sections and filters. Prerequisite: E.E. 111. Three lectures, one lab. (4S) Cole

111. Network Analysis I. Basic network conventions and topology; formulation of network equations; solutions via differential equation, LaPlace transform and operational methods. Prerequisites: E.E. 81 and Math 110. Three lectures. (3F)

Cole

112. Network Analysis II. A continuation of E.E. 111; impedance and admittance functions; network functions, driving point and transfer impedances; steady state analysis from pole-zero configurations; amplifier networks. Prerequisite: E.E. 111. Three lectures. (3W)

Cole

119. Applied Engineering Statistics. Application of principles of statistical analysis and probability to engineering problems. Industrial experimentation, quality control, reliability, and operating studies. Prerequisite: Upper division or graduate standing. (3W, S) Staff

120. Antennas. Fundamentals of antennas, radiation and wave propagation; directional arrays; feed lines and matching and phasing networks; antenna and field strength measurements. Prerequisites: E.E. 110, 119. Three lectures, one lab. (4S) Clark

124, Fundamentals of Electronics. Analysis of the principles, characteristics and operation of electronic devices utilizing basic physical laws and concepts of modern physics. Includes study of thermionic emission, vacuum and gas tubes, photoelectricity, semi-conductors and transistors. Prerequisite: E.E. 81, Math 110; concurrent registration in Physics 122 is desirable. Three lectures, one lab. (4F)

Chadwick

125. Electronic Circuits I. Principles, analysis and design of tube and transistor voltage amplifiers; feedback principles and feedback amplifiers. Prerequisite: E.E. 124. Three lectures, one lab. (4W)

Chadwick

126. Electronic Circuits II. Principles, analysis and design of tube and transistor power amplifiers; RF power amplifiers and oscillator; modulation and detection systems. Prerequisite: E.E. 125. Three lectures, one lab. (4S)

Chadwick

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 acoustical and electro-mechanical systems. Prerequisites: E.E. 111, 125. Three lectures, one lab. (4S)

Cole

139. Fundamentals of Electric Waves. Introduction to vector analysis; elementary electromagnetic field theory; Maxwell's equations; radiation and wave guides. Prerequisites: E.E. 110 and Math 110. (3F)

Clark

141. Microwaves. Fundamental principles of microwaves, generators, cavity resonators; transmission lines, wave guides, parabolic and horn radiators; microwave propagation; measurements in the microwave region. Prerequisite: E.E. 119. Three lectures, one lab. (4W)

Clark

150. Instruments and Measurements. The principles and application of electrical and electronic instruments; methods and techniques of measurements. Prerequisite or concurrent registration in E.E. 124. One lecture, one lab. (2F)

Heyborne, Chadwick

151, 152, 153. E.E. 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, 2S)

Staff


Watkins

165. Analog Computers. Application of analog methods to the solution of engineering problems; principles of integrators, multipliers, function generators; time and amplitude scale factors. Prerequisites: E.E. 111, Math 110. One lecture, one lab. (2F, 2W, 2S)

Watkins

167. Digital Computer Programming. 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 and solve problems in their own field using a computer. Two lectures, one lab. Prerequisites: Math 35. Also listed as Computer Science 167. (3F, W, S)

Watkins

175, 176, 177. Electrical Engineering Seminar. A weekly meeting of staff and senior E.E. majors. Reports and discussions on recent developments in electronics and communications. Each student prepares and presents technical papers on suitable topics. (1F, 1W, 1S)

Staff

180. Transistors. An introduction to the theory, principles and characteristics of transistors. Fundamental applications of transistors; circuitry, analysis and design. Prerequisite: E.E. 112, 125. Three lectures, one lab. (4F)

Finchum
181. Pulse Circuits. Analysis and design of tube and transistor static and regenerative circuits, including pulse shaping circuits, multivibrators, and blocking oscillator circuits. Prerequisite: E.E. 180. Three lectures, one lab. (4W) Finchum

182. Digital Circuits. An introduction to counters, shift registers, logic circuits, and information storage devices used in digital systems. Prerequisite: E.E. 181. Three lectures, one lab. (4S) Finchum

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. (F, W, S) 1-3 credits, arranged.

200. Special Studies in Electrical Engineering. Preparation of professional papers and reports, research, and special problems. Credit arranged. (F, W, S) Staff

211, 212. Advanced Electronic Circuits. Designed for graduate students who have completed a series of courses on pulse circuits using both tubes and transistors, such as E.E. 181, 182. The coverage is somewhat similar except that in this graduate series the emphasis is on analytical methods and development of more advanced pulse and digital techniques. Prerequisites: E.E. 180, 181, 182 or equivalent. Three lectures, one lab. (4F, 4W) Jones


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: E.E. 139 or Physics 175. Three lectures. (3F, 3W, 3S) Baker

235. Radio Propagation. Radio wave transmission through dielectric and ionized media. 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 magnetotelluric theory. Prerequisite: E.E. 139 or equivalent. (3S) 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: E.E. 139, 141 or equivalent. One lecture, one lab. (2Su) Staff

245. Introduction to Semiconductor Device Theory. Basic principles of semiconductor theory: p-n junction and transistor theory; survey of new devices. Three lectures, one lab. (4S, 4Su) Staff


261. Space Science and Engineering. A survey course covering aero-space environment; vehicles and propulsion systems; trajectories, control, and guidance; instrumentation and communication systems; power sources; detection and tracking; weapons; satellites; space exploration. Prerequisites: Physics 22, Math 99, 2 credits. (W) Baker

275, 276, 277. Graduate E.E. Seminar. A weekly meeting of staff and graduate E.E. students. Each student prepares and presents technical papers on suitable topics. One lecture. (1F, 1W, 1S) Staff

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. (3S) Wyatt

291, 292. Statistical Communication Theory. Statistical nature of the communication process. Random processes, time and statistical averages, Fourier analysis, spectral theory, sampling. The effects of linear and non-linear data processing on the statistical properties of signals. Wiener filters, matched filters, applied statistical decision theory. Introduction to classical information theory—quantitative definition of information, coding, Shannon's theorem. Prerequisites: EE 119 or equivalent. Three lectures. (3W, 3S) Staff

298. Graduate Thesis. Credit arranged. (F, W, S) Staff
Mechanical Engineering

(Mechanical Engineering, Chemical Engineering)


Office in Engineering and Physical Science 168

Mechanical engineering is the development of energy and its application through machines to the tasks of mankind. A machine may be anything from a crowbar to an aerospaceplane. The technical staffs of most industries, utilities, government agencies, and research foundations require mechanical engineers who specialize in many 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, air conditioning, etc.

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 in the undergraduate as well as graduate programs.

Mechanical Engineering Curriculum

The mechanical engineering curriculum is accredited by Engineers Council for Professional Development.

**Freshman**

<table>
<thead>
<tr>
<th>Course</th>
<th>F</th>
<th>W</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry 10, 11</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Physics 20</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M.E. 21, 22</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Math 35, 97, 98</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>English 1, 2, 3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>C.E. 1, 2</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>C.S. 1</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Humanities1</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>M.S.,* A.S., or P.E.</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

**Sophomore**

<table>
<thead>
<tr>
<th>Courses</th>
<th>F</th>
<th>W</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physics 21, 22</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Math 99, 110</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>TME 148, 150</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>C.E. 91, 92</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>M.E. 120</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>M.E. 3</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Humanities1</td>
<td>3</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>M.S.,* A.S., or P.E.</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

*On leave.
Junior

Courses
M.E. 114, 115 ........................................... 3 3
M.E. 103, 104 ........................................... 4 4
E.E. 104, 105, 106 ....................................... 3 3 3
C.E. 140, 141 ........................................... 3 3
M.E. 150 .................................................. 4
M.E. 143 .................................................. 4
M.E. 130 .................................................. 4
M.E. 160 .................................................. 4
M.E. 161 .................................................. 4

Technical Electives* .................................... 3

Humanities* ............................................ 3

Senior

Courses
M.E. 131, 132, 133 ....................................... 4 4 4
M.E. 116, 117, 119 ....................................... 4 4
M.E. 198 .................................................. 2 2 2
Technical Electives* .................................... 4 4 4
Humanities* ............................................ 4 3 3

Graduate Study

This department offers a graduate program leading to the Master of Science degree in Mechanical Engineering. The program is designed for specialization in applied mechanics, materials, nuclear engineering, energy conversion or propulsion and, it is understood that: (1) an acceptable course of study will be worked out by the student with a graduate committee which will be appointed by the Dean of the School of Graduate Studies; (2) the study and research program will satisfy all of the requirements listed in this catalog under the School of Graduate Studies. In addition to the prescribed requirements, a minimum of 9 credit hours

of mathematics beyond that required for the B.S. is required. Thesis may be replaced by approved courses by graduate practicing engineers who have had project experience.

Following is a typical course of study leading to the degree of Master of Science in Mechanical Engineering:

<table>
<thead>
<tr>
<th>Course</th>
<th>F</th>
<th>W</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 130, 131, 132</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>M.E. 201, 210, 214</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>M.E. 240, 241, 242</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>M.E. 261</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>M.E. 230</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>C.E. 260</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>M.E. 298</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
</tbody>
</table>

Depending on the student’s specialization some of the above courses may be replaced by such courses as: M.E. 202, 203; C.E. 201, 202, 203; C.E. 270, 271, 272, and C.E. 241.

Mechanical Engineering Courses


Watkins

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


105. Special Problems in Drawing. This course is intended to give upper division students an opportunity to work in special areas of architectural drawing, perspective drawing, production illustration, machine and sheet metal drawing, and other areas as approved

*See College of Engineering for details of mathematics and humanities requirements.
*Credits for M.S. I and II are (2F, 2W, 2S) and credits for A.S. I are (1F, 1W, 2S) and for A.S. II are (2F, 2W, 1S).
*Technical electives may be selected from the following sequences: Math 180, 131, 132; Math 140, 141, 142; M.E. 190, 191, 192; or from the following courses after consultation with your adviser: M.E. 106, 135, 162, 165, 172, 183, 185, 187; Physics 122; Speech 106.
by the head of the department. Prerequisite: M.E. 23. Credit arranged. (F, W, S)

Nyman, Smith

106. Machine Frame Analysis. An introduction to methods of design of statically indeterminate machine frames. Prerequisite: C.E. 104. Three lectures. (SF)

110. Heat Engines. Introduction to elementary thermodynamics and basic heat power cycles. Prerequisite: Physics 19. Three lectures, one lab. (4W)

Watt-Smith


Moser, Vendell

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: M.E. 115, 160 and C.E. 141. Classes must be taken in sequence. Three lectures, one lab. (4F, 4W)

Staff

119. Thermodynamic Systems. Application of the laws, concepts, and procedures of thermodynamics, heat transfer, and gas dynamics to turbo-machinery, propulsion, combustion, gas and vapor turbine cycles, expanders and compressors, and other apparatus. Both analytical and experimental approaches. Prerequisites: M.E. 117 and 143 concurrently. Three lectures and one lab. (4S)

Staff

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 99. Three lectures, one lab. (4S)

Shupe

130. Kinematics of Machines. Analysis of displacement, velocity, and acceleration in mechanisms by graphical and analytical methods. Velocity and acceleration polygons. Kinematic design of cams, belts, toothed gearing, gear trains, computing mechanisms, etc. Introduction to synthesis. Complex numbers in kinematics. Calculation of velocities and accelerations by complex numbers. Prerequisite: C.E. 92. Two lectures, two labs. (4F, 4S)

Eisenstein

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: C.E. 104, M.E. 130. Three lectures, one lab. (4F)

Eisenstein

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: M.E. 131. Two lectures, two labs. (4W)

Eisenstein

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: M.E. 132. Two lectures, two labs. (4S)

Eisenstein

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. Prerequisite: M.E. 130 and C.E. 109. Three lectures, one lab. (4W)

Eisenstein

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. (3S)

Eisenstein

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: M.E. 114, C.E. 92, and C.E. 141. Three lectures, one lab. (4S)

Vendell

150. 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 cryogenics. Prerequisite: Physics 22. Three lectures, one lab. (4S)

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) Vendell


162. Mechanical Vibrations. Free, damped, and forced vibration of systems with n degrees of freedom, matrix iteration technique, the method of Holzer, vibration of elastic bodies. Prerequisite: M.E. 161. Four lectures. (4S) Vendell

165. Advanced 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 119 and C.E. 104. Four lectures. (4S) Moser


185. Rocket Engines. Basic principles of rocket engines including control mechanisms for both solid and liquid propellant engines. Prerequisite: Chemistry 12, and M.E. 160 or concurrent registration for M.E. 160. M.E. 143 and M.E. 116. Three lectures, one lab. (4F) Staff

187. Internal Combustion Engines. Thermo-dynamic analysis of cycles in internal combustion engines. Combustion, fuel systems, and auxiliaries for both piston and turbine type engines. Prerequisite: M.E. 116. Three lectures. (3S) 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 aspects of reactors; types of reactors. Three lectures, one lab. (4W, 4S, 4F) 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, S) 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. (2F, 2W, 2S) Watkins

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, 3W, 3S) Staff

201. Theory of Elasticity. The inter-relationship of stresses and/or strains, properties of the material, and the configuration of an elastic media under a given load. Prerequisites: C.E. 104, M.E. 160. Five lectures. (5W) Moser, Vendell


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: M.E. 117, 214. Five lectures. (6S) Staff

214. Intermediate Thermodynamics. Advanced First and Second Law Topics. Complex Equations of State, Property Determination, and Mathematics of Thermodynamics. Prerequisite: M.E. 143 and M.E. 117. (Note: may be taken as undergraduate elective with instructor's approval.) Five lectures. (5F) Staff

230. Advanced Kinematics. Review of vector analysis; Analytical methods; complex numbers and their application in kinematic anal-
152 College of Engineering

ysis 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: M.E. 130. Three lectures. (3S) Eisenstein


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

261. Advanced Vibrations. Analysis of mechanical vibrations in elastic media by numerical methods, models and analogies. Five lectures. (5W) Vendell

290, 291, 292. Nuclear Reactor Engineering Principles. Transport theory and neutron diffusion; homogeneous reactors with and without reflector; heterogeneous reactors; reactor materials; design, operation, and control of nuclear reactors; reactor kinetics. Three lectures. (3F, 3W, 3S) Shupe

293, 294, 295. Nuclear Reactor Laboratory. One laboratory. (1F, 1W, 1S) Shupe

298. Graduate Thesis. Credit arranged. (F, W, S) Staff

Department of

Tool and Manufacturing Engineering


Office in Mechanical Arts 101

The Tool and Manufacturing Engineering Department offers a four-year course leading to the degree of Bachelor of Science in Tool and Manufacturing Engineering.

This branch of engineering is devoted primarily to planning the processes of economic manufacture; the art and science of analyzing, planning, designing, construction, and producing manufacturing facilities. The Manufacturing Engineer works closely with research and development, product engineering, methods engineering, machine design, tool design, plant layout engineering, gage engineering and manufacturing cost estimating.

National surveys indicate that increasing numbers of engineers are needed in manufacturing engineering. As industrial production expands in our own state and across the nation, increasing opportunities are available. The demand for Tool and Manufacturing Engineers is greater than the supply.

Facilities. The Manufacturing Engineering Laboratories, the Heat Treatment, Inspection and Senior Students’ Design room are all equipped with modern facilities for teaching, for engineering experimentation, and for student development in Manufacturing Engineering.

A program of cooperative training with Utah industries has been worked out for students, which recognizes their summer work done in industry. Field trips to industrial plants are conducted each year for junior and senior students.

Student Chapter No. 2 of the American Society of Tool and Manufacturing Engineers promotes the professional and social interests of its engineering majors. Members of the teaching staff are members of the National Society.
Tool and Manufacturing Engineering Curriculum

Freshman

<table>
<thead>
<tr>
<th>Course</th>
<th>F</th>
<th>W</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.E. 1, 2, C.S. 1</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>English 1, 2, 3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Math 35, 97, 98</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Chemistry 10, 11</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>M.E. 21, 22</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>TME 56</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Humanities¹</td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>P.E., M.S., or A.S.²</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Sophomore

<table>
<thead>
<tr>
<th>Course</th>
<th>F</th>
<th>W</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 99, 110</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Physics 20, 21, 22</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>English 11</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TME 57, 52, 53</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Welding 97</td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Humanities¹</td>
<td></td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>P.E., M.S., or A.S.²</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Junior

<table>
<thead>
<tr>
<th>Course</th>
<th>F</th>
<th>W</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>TME 151, 152, 153</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>TME 150, 148</td>
<td>4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>C.E. 91, 92, 103</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>E.E. 104, 105, 106</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>App. Stat. 131</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Humanities¹</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

Senior

<table>
<thead>
<tr>
<th>Course</th>
<th>F</th>
<th>W</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>TME 158, 180, 183</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>TME 184, 181, 182</td>
<td>2</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>TME 187, 188</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>M.E. 114</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M.E. 130, 134</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>C.E. 140, 144</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Humanities¹</td>
<td>3</td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>

50. Orientation. Lectures, and films to acquaint the student with the work of the Tool and Manufacturing Engineer. (15) Staff

52. 53. Production Processes. Shaper, milling, and grinding operations. Prerequisite: TME 56. Two lectures, one lab. (3W, S) Staff

56. Machine Lab for Engineers. Acquaints the student with basic machine tool operations. Two lectures, one lab. (3F, W, S) Staff


148. Manufacturing Processes. Fundamentals of manufacturing processes; shows possibilities and limitation of these processes and their application to fabrication of industrial products. (3F, S) 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, W, S) Preator

151. Tooling Systems—Operations. Develops an understanding of the capacity and versatile usefulness of the fundamental machines and equipment used in manufacturing engineering. Prerequisite: TME 63. Two lectures, two labs. (4F) Child

152. Tooling Systems—Planning. Deals with the analysis of the product design, planning procedures, routing methods, and the organization of the operational sequence. Prerequisite: TME 151. Two lectures, two labs. (4W) Child

153. Tooling Systems—Standards. Studies the utilization of standard equipment, standard tooling and standard gaging methods adapted to the manufacturing process. Prerequisite: TME 152. Two lectures, two labs. (4S) Child

157. Quality Control. Non-destructive and destructive tests. Total inspection by sampling, frequency distributions, statistical analysis and control charts. Prerequisite: TME 57. (3S) Shaw

158. Manufacturing Analysis. Economics of tooling operations: the productivity of machines, tool maintenance, tool costs, and job estimating. Prerequisite: TME 55, 148. (3F) Preator

168. Manufacturing Processes and Materials. Emphasis is placed on materials composition and structures, and their adaptability to manufacturing processes and maximum production. Prerequisites: TME 148. (3S) Preator

188. Motion and Time Study. An analysis of motion and time study as a management tool. Studies job simplification and motion economy, time standards and performance ratings. (3W, S) Child
154 College of Engineering

181. Tool Design. The study and design of production tools such as gages, jigs, and fixtures. Includes tool design standards, tolerances, springs, cam layout, and techniques of preparing tooling for production. Three lectures, two labs. Prerequisite: TME 153. (3W)

Somers

182. Die Design. Emphasizes design and application of tooling to materials and products fabricated by press working production methods. Prerequisite: TME 181. Three lectures, two labs. (5S)

Preator

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. Prerequisite: TME 148. Two lectures, one lab. (3S)

Shaw


Staff

185, 186. Co-operative in Plant Training. A co-operative training course conducted by the university and industry to supplement academic work with tool and manufacturing experiences. A satisfactory report from industry is required. Credit arranged. Staff

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. Prerequisite: Senior classification in Tool and Manufacturing Engineering. (2W, S)

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. (F, W, S) 1-3 credits, arranged.

Department of

Industrial and Technical Education


Office in Mechanical Arts 105

Beginning as the Department of Mechanical Arts in 1888, this department has developed and expanded its offerings to provide for the "liberal and practical education of the industrial classes" as outlined in the original charter for land-grant colleges and universities. Through the years, USU has recognized its obligation in this respect and has endeavored earnestly to keep its training programs abreast of the times.

The Department of Industrial and Technical Education offers two types of training programs: The first one is a program in Industrial Teacher Education. Majors in Industrial Arts Education and Trade and Industrial Education are offered in this program. The second one is the Industrial
Technology program which offers majors in Aeronautical Technology, Automotive Technology, and Welding Technology. The department also has a two-year program in Technical Education.

(I) Programs for Industrial Teacher Education. These programs give professional training for teachers, supervisors, and administrators in Industrial Education positions. Courses are offered during the regular school year and Summer School. The completion of the undergraduate curricula lead to the degree of Bachelor of Science in Industrial Education with a major in Industrial Arts Education for junior and senior high school positions, and Trade and Industrial Education for junior college, vocational, and technical school positions.

With the emphasis now being given to the training of technicians for industry, USU is giving additional emphasis to the training of teachers in this rapidly expanding field. There is great need for them in vocational schools, junior colleges, and in senior colleges which have technician training programs of the technical institute type. The various teacher training curricula are described under the Industrial Education section.

(II) Programs of University Grade for Industrial Technicians. Present-day industry requires the services of scientists, engineers, technicians, and skilled craftsmen. These programs are planned for the higher level industrial technicians where a four-year program leading to a Bachelor's degree is essential to meet the demands of industry. The training provided combines technical knowledge and manual skills with a broad University education. The programs prepare students as technicians for technical, supervisory, or managerial positions in modern industry, and provide an excellent foundation for entrance into Civil Service industrial positions or for private business. Curricula in these programs are available with majors in Aeronautics, Automotive, and Welding Technology. They are described later under the sections carrying these headings.

(III) Two-year Technical Education program. A third kind of program of a non-degree nature is also offered by the department. This is usually a two year program designed to prepare Industrial Technicians for modern industry. Completion of any one of the two-year-curricula leads to a certificate of completion. The industrial technician program offers many distinct advantages to students.

Upon completing this program students are well prepared with the technical skills and knowledge in the field of their choice and through their association and activities on a university campus they are prepared to assume their role as worthy citizens. Many industrial leaders of today have completed programs of this kind and have shown that the basic foundation they acquired through such programs gave them many opportunities for further progress and advancement. By returning to this institution for further training, as a qualified student one may apply most of the credit earned under this program toward a degree, and thus better prepare himself for supervisory and managerial positions.
Graduate Study

The Master of Science degree in Industrial Education is offered with majors in Industrial Arts Education or Trade and Industrial Education. Also, the Master of Industrial Education degree is offered. For information on the programs for these degrees see the Graduate School Catalog.

Programs in Industrial Education

Curricula are offered for the professional training of teachers, supervisors, and administrative staff in Industrial Education. In addition, courses in woodwork, metal work, drawing, leather, electricity and electronics, and plastics are offered. Upon completing undergraduate courses students receive a Bachelor of Science degree in Industrial Education with a major in Industrial Arts Education, or Trade and Industrial Education.

Industrial Arts Education

The curriculum in Industrial Arts Education is designed to meet state certification requirements for the General Secondary and Industrial Arts Certificates, and is composed of courses in arts, sciences, education, technical and professional industrial arts, and basic shop skills.

Industrial Arts Education Curriculum

Course FRESHMAN F W S
English 1, 2, 3 3 3 3
Math 34, 35, 44 3 5 3
I.E. 1 1
F.A. Art 3
Language and Arts Group 3
I.E. 15, 16, 17 3 3 3
I.E. 61, 62, 63 3 3 3
M.S., A.S., or P.E. 3 1 1 1

SOPHOMORE F W S
Exact Science Group 5 5 5
Social Science Group 5 5
Biological Science Group 5 5
TME 56, Welding 97, I.E. 59 3 3 3
I.E. 71, 72, 73 3 3 3
M.S., A.S., or P.E. 3 1 1 1

JUNIOR F W S
I.E. 140, 141, 142 3 3 3
I.E. 149 5
Speech 21 3
Psychology 100 3
Psychology 102 3
Public Health 154 (or 155-4 cr.) 3
Education 111, 114 3 3
I.E. 101 1
Depth Sequence 5 5
Elective (minor) 3 3 3

SENIOR F W S
I.E. 102 3
I.E. 107 3
I.E. 110 3
I.E. 112 9
I.E. 121 3
I.E. 129 3
Depth Sequence 5 5
Elective (minor) 8 8

Trade and Industrial Education

The trade and industrial program is designed primarily for instructors and supervisors in Vocational Technical Education and/or Vocational Industrial programs. As a candidate for the degree of Bachelor of Science in Industrial Education the student must show evidence of successful trade and teaching experience, together with the general education requirements necessary for state certification in his chosen field. Observation and directed teaching in the major and minor subjects may be substituted for teaching experience. The trade and teaching experience must be approved by a committee consisting of members of the Industrial Education staff.

1,2See following page for footnotes.
Trade and Industrial Education Curriculum

<table>
<thead>
<tr>
<th>Class</th>
<th>Course</th>
<th>F</th>
<th>W</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshman</td>
<td>Trade Training</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>English 1, 2, 3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>I.E. 6, Math 34,1 35</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>I.E. 15, 16, 17</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>I.E. 1, Art 1</td>
<td>1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M.S., A.S., or P.E.2</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Sophomore</td>
<td>Trade Training</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Physics 17, 18, 19</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Biological Science Group</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sociology 70</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Approved Electives</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>M.S., A.S., or P.E.2</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Junior</td>
<td>Course</td>
<td>F</td>
<td>W</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td>Adv. Trade or Tech.</td>
<td>5</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Language and Arts Group</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Speech 21</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Economics 51</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Psychology 100, 102</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I.E. 101, Ed. 118</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I.E. 118, 120</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Education 114</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Public Health 154 (or 155—4 cr.)</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Electives</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senior</td>
<td>Course</td>
<td>F</td>
<td>W</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td>Adv. Trade or Tech.</td>
<td>3</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I.E. 167, 110</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I.E. 121, 129</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I.E. 112</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>I.E. 102</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>English 111</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Economics 125</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Electives</td>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Industrial Education 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. If a student has completed high school Algebra B and makes a satisfactory grade on the mathematics entrance examination, he may omit Math 34 and begin with Math 35 in the Fall quarter.

3. Two credits are given for M.S. or A.S.

6. Applied Shop Mathematics. Simple mathematical formulas are used in solving problems in mechanical work. These include speed ratios, gear ratios, micrometer reading, and area and volume problems. (3F, S) **Mortimer**

13. Driver Training. 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. (OF, S, Su) **Willey**

15, 16, 17. Technical Drawing. Lettering, use of instruments, geometric construction, sketching; multiview drawings, dimensioning theory and practice, sectional views, auxiliary views, screw threads and threaded fasteners, keys, working drawings and specifications, intersections, developments, and pictorials. View relationships, spatial visualization, and problems relating to points, lines, and planes. One lecture, and two labs. (3F, 3W, 3S) **Walls**

19. Aircraft Drawing. Aircraft drafting techniques, numbering systems, change methods, and technical specifications. Prerequisite: I.E. 17 or M.E. 22. One lecture, two labs. (3S) **Staff**

30. 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, S) **Wadsworth**

50. General Metals. Development of the skills of general metalworking. Experience in bench metal, sheetmetal, and foundry. A study of finishing, maintenance, shop safety and industrial practices of metal fabrication. Prerequisites: TME 55, Welding 97. (3S) **Staff**

61, 62, 63. Technical Woods. Study and practice in fundamental hand tool processes; the use of common woodworking machines; the study of woods and other materials related to wood construction; and the design and construction of furniture and other advanced projects. One lecture, two labs. (3F, 3W, 3S) **Staff**

68. Practical Electric Wiring. Covers the national electrical code and local codes in Utah communities. Includes choice of materials, design of circuits and inspection for electrical heat, light and power installation in homes and small public buildings. Two lectures, one lab. (3W) **Staff**

71. Technical Electricity-Electronics. A study of the fundamentals of electricity and the various sources of electrical energy. Ohms law principles governing the behavior of direct current circuits are thoroughly covered. **Staff**
Practical applications of direct current circuits are included. (3F, W, S) France

72. Technical Electricity-Electronics. A study of the fundamentals of alternating current theory including inductance, capacitance and reactance. Sources of alternating current energy are covered together with practical applications of alternating current circuits. Prerequisite: I. E. 71. (3W) France

73. Technical Electricity-Electronics. An introduction to radio communication principles including antenna systems, tuning systems, detectors, amplifiers, power supplies and control circuits. A superheterodyne receiver is built and miscellaneous applications of electronics are covered. Prerequisite: I. E. 72. (3S) France

74. 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 woodwork 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. Emphasis is given to wood turning. Instruction is also given in furniture repair and in the basic principles of wood finishing and re-finishing. (2 to 5F, W, S) Staff

101. Observations 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 Arts or Trade and Industrial Education. (1F, W, S) Hailes

102. Instructional Aids. Instruction in the purpose, types, sources, preparation and proper use of audio and visual aids, including samples, models, charts, graphs, slides, still film, movie film, sound film and other aids suitable for classroom and auditorium use. Prerequisite: I. E. 129 (3W) 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

107. 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. (3S) Hailes, Loveless

110. 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. Prerequisite: I. E. 107. (3W, Su) Hailes


112. Student Teaching in Industrial Education. Students observe and teach in Industrial Arts shops throughout the state. Under close supervision, they do practice teaching in various Industrial Arts courses recommended by the state in junior and senior high schools. (3W) Hailes

113. Driver Education and Traffic Safety. To acquaint prospective teachers and others with available instructional materials for driver education and the latest methods of presenting these materials in the classroom and on the student. Credit arranged. (F, S, Su) Slaugh, Willey

114. Problems in Driver and Safety Education. For teachers, school administrators, and others responsible for directing or supervising safe living programs in the school or community. The course includes traffic and liability law, insurance, stimulants and depressants, public relations, safety research, and applied psychology. (4W, Su) Slaugh, Willey

115. Industrial Drafting. Fundamentals and conventional drafting practices in architectural, sheet metal, electrical, machine, pictorial and technical illustration. Prerequisite: I. E. 17. (5F) Staff

**116. Industrial Drafting. Techniques in basic drawing, sketching, reproductions, visual aids, chalkboard, evaluation, tests, and designs for secondary school teachers. Prerequisite: I. E. 115. (5S) Staff

118. 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, administration, and coordination of safety education programs. (3W, S, Su) Staff

120. 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, S) Hailes

121. Methods in Industrial Education. Latest techniques of teaching applied to individual and group instruction in Industrial Education. **Taught 1964-65
Trade and Industrial Education 159

Students have opportunity to use these different methods in presenting lessons before the class. Prerequisite: I.E. 107. (3W) Hailes

129. Organization and Development of Instruction Materials. Selection and arrangement of teaching materials to be used in industrial arts and trade and industrial shop work. (3F) Mortimer

140. Industrial Crafts—Leather. The history and manufacturing processes of leather and leather articles. Study of different leathers and their application in craft work. Instruction in fundamental operation and in surface decoration of leather including modeling, stamping, and carving. Basic design principles as applied to leatherscraft will be emphasized. Prerequisite: Completion of lower division I.E. sequence courses. (3W, S) Wallis

141. 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 fundamentals of lapidary processes will be stressed. Prerequisite: Completion of lower division I.E. sequence courses. (3S) Hailes

142. Industrial Crafts—Plastics. Acquaints students with the new and important group of plastic materials now produced and the fundamental operations used in working these materials. Emphasis is given to the place of plastics in modern industrial arts programs. Prerequisite: Completion of lower division I.E. sequence courses. One lecture, two labs. (3F, S, Su) Hailes

144. 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) Hailes

149. Power Mechanics. A study of the operation and maintenance of internal combustion engines such as the automobile, diesel, scooter, and lawn mower. Emphasis placed on factors and procedures involved in setting up and conducting a power unit in an industrial arts laboratory. (Not open to Auto. Tech. majors.) (5W) Slaugh

150. 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 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 train-

ing courses are of longer duration. Regular university fees must be paid, and registration procedures followed. Credit arranged. Staff

154. Industrial Metals. Machine shop practice and metalwork. Precision measuring and layout in metalwork. The study and operation of the engine lathe, shaper, milling machine, grinder, and power hacksaw. Prerequisite: I.E. 50. (5F) Staff

155. Industrial Metals. This course fills the needs of advanced shop theory and technical information about tools, materials, and operations that are common to the metal occupations. This includes machine shop, foundry work, sheet metal, ornamental metals, and industrial manufacturing. Methods of teaching metalwork and the development, construction, and uses of metal projects designed for high school teaching purposes will be stressed. Prerequisite: I.E. 154. (5S) Staff

161. Industrial Wood. This is a course in advanced cabinet and furniture making and includes work in upholstery. Construction design is studied and opportunity for application of original designs is provided. Additional work in cabinet and furniture finishing is included. Prerequisite: I.E. 63. (5F) Staff

162. Industrial Wood. 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 high school shops is included. Mass production techniques are discussed and put into practice. Prerequisite: I.E. 161. (5S) Staff

167. 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, S, Su) Mortimer

171. Industrial Electricity-Electronics. This course deals with electronics in industry and covers electron tube analysis and applications together with an introduction to semi-conductors and transistor applications. Frequency modulation and television fundamentals are also covered. Prerequisite: I.E. 73. (5F) France

172. Industrial Electricity-Electronics. This course is devoted to project planning and methods of instructing electronics for students preparing to teach in the secondary schools. Opportunity is provided for original ideas to be worked out on an experimental basis. Prerequisite: I.E. 171. (5S) France

190. Industrial Arts for Elementary Schools. Objectives and theory of Industrial Arts in the

*Taught 1963-64
*Taught 1964-65
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, Su)  

181. 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. (3Su)  

182. General Shop Laboratory. Comprehensive laboratory course covering the manipulation areas of the General Shop. Emphasis will be given in all areas of metal work, woodworking, and crafts. Designed especially for teachers needing special work in one or more areas. (5Su)  

185. 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, S, Su)  

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, S, Su)  

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, S) 1-3 credits arranged.  

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. Prerequisite: I.E. 107 or equivalent. (3F, W, S, Su)  

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: I.E. 104. Three lectures. (3F, W, S, Su)  

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. (3F, W, S)  

234. 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. (3W, S, Su)  

247. 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, S) 1-3 credits arranged.  

270. Seminar in Industrial Education. Gives opportunity for investigation and reporting of individual problems. (1 to 2F, W, S, Su)  

Two-Year Programs in Technical Education

Any one of the two-year technical education programs prepares the student for immediate employment in any of the technical service occupations appropriate to the training received. New and expanding industries have created many new job opportunities for technically trained men. The two-year program provides a broad educational experience for those who do not plan to obtain a Bachelor's Degree, yet it fulfills some of the requirements for the degree where students decide later to continue their studies.

The completion of any program entitles the student to a Certificate of Completion. In Aeronautics the Certificate would be in Airframe and Powerplant Mechanics and is based upon the satisfactory completion of the Federal Aviation Agency written and practical examination in Airframe and Powerplant Mechanics.

At present the University offers technician training programs in Aeronautics, Automotive, Welding, and Drafting. The programs of training are built around a core curriculum which provides for areas of specialization in the fields just mentioned. The student selects his particular area of specialization and then registers for the courses outlined below.

### Core Curriculum

<table>
<thead>
<tr>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Year</strong></td>
</tr>
<tr>
<td>English 1, 2, 3</td>
</tr>
<tr>
<td>I.E. 6</td>
</tr>
<tr>
<td>Math 34</td>
</tr>
<tr>
<td>L.E. 15, 16, 17</td>
</tr>
<tr>
<td>TME 56</td>
</tr>
<tr>
<td>L.E. (Orientation)</td>
</tr>
<tr>
<td>P.E.</td>
</tr>
<tr>
<td>Specialization (See lists that follow)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Second Year</strong></td>
</tr>
<tr>
<td>English 1, 2, 3</td>
</tr>
<tr>
<td>I.E. 6</td>
</tr>
<tr>
<td>Math 34</td>
</tr>
<tr>
<td>L.E. 15, 16, 17</td>
</tr>
<tr>
<td>TME 56</td>
</tr>
<tr>
<td>L.E. (Orientation)</td>
</tr>
<tr>
<td>P.E.</td>
</tr>
<tr>
<td>Specialization (See lists that follow)</td>
</tr>
</tbody>
</table>

### SPECIALIZATION

#### AERONAUTICS

<table>
<thead>
<tr>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Year</strong></td>
</tr>
<tr>
<td>Math 34, 35, 46</td>
</tr>
<tr>
<td>Elective</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Second Year</strong></td>
</tr>
<tr>
<td>L.E. 115, 50</td>
</tr>
<tr>
<td>LAEP 3, 20</td>
</tr>
<tr>
<td>L.E. 167</td>
</tr>
<tr>
<td>Elective</td>
</tr>
</tbody>
</table>

#### AUTOMOTIVE

<table>
<thead>
<tr>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Year</strong></td>
</tr>
<tr>
<td>Electronics 21, 22, 23</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Second Year</strong></td>
</tr>
<tr>
<td>Electronics 4, 5, 6</td>
</tr>
</tbody>
</table>

#### DIESEL CURRICULUM

<table>
<thead>
<tr>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Year</strong></td>
</tr>
<tr>
<td>Math 34, 35, 46</td>
</tr>
<tr>
<td>Elective</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Second Year</strong></td>
</tr>
<tr>
<td>L.E. 115, 50</td>
</tr>
<tr>
<td>LAEP 3, 20</td>
</tr>
<tr>
<td>L.E. 167</td>
</tr>
<tr>
<td>Elective</td>
</tr>
</tbody>
</table>

#### DRAFTING

<table>
<thead>
<tr>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Year</strong></td>
</tr>
<tr>
<td>Math 34, 35, 46</td>
</tr>
<tr>
<td>Elective</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Second Year</strong></td>
</tr>
<tr>
<td>L.E. 115, 50</td>
</tr>
<tr>
<td>LAEP 3, 20</td>
</tr>
<tr>
<td>L.E. 167</td>
</tr>
<tr>
<td>Elective</td>
</tr>
</tbody>
</table>

#### WELDING

<table>
<thead>
<tr>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First Year</strong></td>
</tr>
<tr>
<td>Math 34, 35, 46</td>
</tr>
<tr>
<td>Elective</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Second Year</strong></td>
</tr>
<tr>
<td>L.E. 115, 50</td>
</tr>
<tr>
<td>LAEP 3, 20</td>
</tr>
<tr>
<td>L.E. 167</td>
</tr>
<tr>
<td>Elective</td>
</tr>
</tbody>
</table>
Programs in Industrial Technology

Four - year Degree Program. There are three different majors offered in the Industrial Technology program, namely, Aeronautics, Automotive, and Welding. The curriculum for Aeronautics and the basic courses for the major are listed in the Aeronautics section. Students registering with majors in Automotive Technology or Welding Technology register in the General Curriculum below. The basic courses constituting the major area in Automotive are listed in the Automotive Section; those constituting the Welding major area are listed in the Welding Section.

Industrial Technology Degree Curriculum

Course  FRESHMAN  F  W  S
Major Area ........................................ 5  5  5
English 1, 2, 3 ................................ 3  3  3
Math 34, 35, 44 ................................. 3  5  3
I.E. 1 (Orientation) ............................. 1 ....
I.E. 15, 16, TME 56 ............................ 3  3  3
M.S., A.S., or P.E. .............................. 1  1  1
Approved Elective ............................. 2  2 ....

Course  SOPHOMORE  F  W  S
Major Area ........................................ 5  5  5
Chemistry 10, 11 ............................... 5  5  ...
I.E. 71, TME 56 ................................. 3  3  ...
Biology 1 ........................................ 5 ....
C.E. 2 ........................................... 1 ....
Speech 105, Lang. & Arts Elect. ............ 3  3 ...
M.S., A.S., or P.E. .............................. 1  1  1
Approved Electives ........................... 5 ....

Course  JUNIOR  F  W  S
Major Area ........................................ 3  3  3
Physics 17, 18, 19 ............................. 5  5  5
Economics 51, TME 66 ........................ 5  5  ...
Physiology 4 ................................... 5 ...
I.E. 118, 120 .................................... 3  3 ...
Upper Div. Electives ......................... 3  2  3

Approved upper division electives are as follows: Econ. 106, 126, 127, 170, 180; Bus. Admin. 140, 171, 172, 185; Soc. 158; I.E. 102, 104, 144; Speech 109; Pol. Sci. 117, 118, 119; Psych. 155; C.E. 130; TME 148, 180; Pub. Health 150; Chem. 121; Eng. 147.

Aeronautical Technology

This program offers instruction for thorough training of skilled airframe and powerplant mechanics and aeronautical technicians. USU's Aeronautical Technology is fully certified with Air Agency, complying with Federal Aviation Agency regulations, and holds Certificate No. 1175 covering training of combined airframe and powerplant mechanics. Satisfactory completion of the two-year curriculum qualifies students to apply for FAA airframe and powerplant mechanic ratings. As a graduate in the four-year curriculum students are required to have successfully accomplished the written and practical FAA examinations for these ratings. This training prepares technicians for both airframe and powerplant maintenance, and manufacturing employment. The degree curriculum combines a thorough technical training in aeronautics with a general university education. Training is based upon the objective of scientifically and systematically developing the student to a point.

1Two credits are given for M.S. or A.S. each quarter.
where he can assume responsible positions in the industry.

Facilities include complete laboratories and modern equipment for instruction in powerplants, propellers and accessories, aircraft construction, and maintenance and repair, including hydraulic systems and instruments.

Aeronautical Technology Curriculum

**FRESHMAN**

<table>
<thead>
<tr>
<th>Course</th>
<th>F</th>
<th>W</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aeronautics 5, 6, 7</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Aeronautics 5a, 6a, 7a</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Math 34, 35, 46</td>
<td>3</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>English 1, 2, 3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>TME 56</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Welding 92</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I.E. 71</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M.S., A.S., or P.E.</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
<td>20</td>
<td>20</td>
</tr>
</tbody>
</table>

**SOPHOMORE**

<table>
<thead>
<tr>
<th>Course</th>
<th>F</th>
<th>W</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aeronautics 8, 9, 10</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Aeronautics 8a, 9a, 10a</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>I.E. 15, 16, 17</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>C.E. 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physics 17, 18, 19</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>A.S., M.S., or P.E.</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
<td>17</td>
<td>17</td>
</tr>
</tbody>
</table>

**JUNIOR**

<table>
<thead>
<tr>
<th>Course</th>
<th>F</th>
<th>W</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry 10, 11</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>English 111</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aeronautics 100, 105, 134</td>
<td>3</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Aeronautics 101, 102, 128</td>
<td>4</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Economics 125</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I.E. 120</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approved Electives</td>
<td>6</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
<td>16</td>
<td>16</td>
</tr>
</tbody>
</table>

**SENIOR**

<table>
<thead>
<tr>
<th>Course</th>
<th>F</th>
<th>W</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aeronautics 103, 104, 132</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>TME 150</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M.E. 110</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>TME 148</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>TME 180, Aeronautics 130</td>
<td>3</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>I.E. 19</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Speech 105</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Approved Electives</td>
<td>4</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>17</td>
<td>18</td>
</tr>
</tbody>
</table>

---

1. Two credits are given for A.S. or M.S. each quarter.
2. Electives must be approved by department head. May include advanced military or air science.

**Aeronautical Technology Courses**

5, 5a. Composite Aircraft Structure. Design, construction, repair, and maintenance of composite aircraft, including wood structures, fabric work and finishing, control systems, landing gear, engine mounts, and pertinent Civil Air Regulations. Five lectures, five labs. (4 and 4F) Merrill

6, 6a. All-metal Aircraft Structure. Design, construction, repair, and maintenance of all-metal aircraft, including layout, template and flat plate development, bend allowance, hand forming, riveting procedure, special tool construction, power press and power shear operation, heat treatment, corrosion prevention, and pertinent Civil Air Regulations. Five lectures, five labs. (4 and 4W) Merrill

7, 7a. Aircraft Maintenance. The maintenance, repair, and alteration of modern aircraft and miscellaneous related equipment, including aircraft hydraulics, electrical equipment and installation, and general servicing of components; rigging, weight and balance computations, periodic inspections, recording of repairs and alterations, time and material cost estimates, material and equipment requirements. Pertinent Civil Air Regulations are studied. Five lectures, five labs. (4 and 4S) 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, magnetos, generators, and voltage control system, batteries and starters, and fuel pumps. Application and compliance with pertinent Civil Air Regulations. Basic related material includes combustion and combustible mixtures, electricity
164 College of Engineering

and magnetism, 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 4S) Hill

31. 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, S) Staff

34. Navigation. Maps, charts, and navigational problems. Required by the FAA for all pilot rating. Open to all students. (3F) Merrill

37. Private Pilot Certificate. Flight School Primary. Flight training to meet FAA requirements. Satisfactory completion of FAA tests required for certification. Credit arranged; limit three credits. (F, W, S) Staff

100. Fundamentals of Turbo-Jet Propulsion. History, development and general principles of jet propulsion. Thrust and performance, combustion systems, metallurgy, fuels, fuel controls, lubrication and ignition systems, aerodynamic problems, applications. Prerequisite: Aeronautics 10. (3F) Summers

101. 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

102. Advanced Turbo-Jet Propulsion and Gas Turbines. Extension of fundamental theory, axial and centrifugal flow compressors, gas turbines, jet propulsion, turbo-prop engines. Prerequisite: Aeronautics 100. Two lectures, one lab. (3W) Summers

103. Elementary Aircraft Design. Basic constructional concepts relating to aircraft design. (3F) Summers


105. Aircraft Woods and Plastics. Analysis of materials as applied to aircraft. Emphasis on investigation and development of methods involving design criteria. (2W) Staff

126. 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. (3S) Staff

130. Aeronautics Seminar. Current topics in production methods, cost, design, supply and organization of interest to aeronautical technicians. (2F, W, S) Staff

132. 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. (3S) Staff

134. Aircraft Electrical Systems and Equipment. The more complex electrical systems used in larger aircraft. Prerequisite: I.E. 71, Aeronautics 10. Three lectures, one lab. (4S) Summers

137. Commercial Pilot Certificate. Flight training to meet FAA requirements. Satisfactory completion of FAA tests required for certification. Prerequisites: Private Pilot Certificate and Aeronautics 34. Credit arranged; limit 10 credits. (F, W, S) Staff

Automotive Technology

Students majoring in Automotive or Diesel Technology will register in the General Industrial Technology Degree Curriculum. The courses which make up the major area in Automotive Technology are as follows: Automotive 1, 2, 3, 4, 5, 6, 61, 101, 102, 103, 151, 152, 162, I.E. 113.

The major area in Diesel Technology consists of the following courses: Automotive 21, 22, 23, 4, 5, 6, 101, 103, 122, 151, 152, 162, I.E. 113.

The following courses are also required in Auto & Diesel: Welding 91 and 94 in the Freshman year, Chemistry 12, and Welding 190 or 191.
Training programs leading to a Bachelor of Science degree are offered both in Automotive and Diesel Technology. Two-year terminal programs are offered in these same areas and also in Auto Body Reconditioning. In addition, general service courses are provided for students in other departments or programs who desire to become familiar with various phases of automobile work. Courses are also conducted in Driver Education Teacher Training.

Facilities include a modern building designed and built specifically for automotive and aircraft instruction. The laboratories contain the most modern servicing and testing equipment, and provide ideal conditions for study.

The course of study in Automotive or Diesel Technology prepares the student to be a technician well trained to interpret the designs of engineers and direct the work of skilled craftsmen. This major also prepares one to become a shop foreman, shop superintendent, or with special preparation, a school instructor. Excellent background is provided for entrance into civil service, private business, and managerial positions with large companies.

Service Courses, open to any student, are: Auto 51, 52, 53, 55, 61, 62 and 162.

Automotive Technology Courses

Note: All courses include technical lectures and related shop experience. Theory, construction, operational characteristics, and recommended repair procedures are emphasized.

1. Steering Correction. Brakes, steering mechanisms, suspension systems, frames, balance, and alignment. (5F, W) Willey

2. Automotive Engines. Covers modern automobile engines, including cooling and lubrication. (5F, W) Willey

3. Driving Mechanisms. Clutches, transmissions, U-joints, drive lines, and rear axle assemblies. (5S) Hurst


5. Auto Electrics. Ignition, batteries, generating systems, and cranking motors. (5F, W) Slaugh

6. Motor Tune-up. Trouble diagnosis and testing procedures. Covers horns, lighting systems, and other electrical units along with engines and carburetion units. Prerequisites: Automotive 2, 4, 5. (5S) Slaugh

12. Fender Reconditioning. Modern processes of straightening and priming fenders. (5F) Willey


21. Heavy Duty Chassis. Steering devices, suspension systems, brakes, frames, and alignment factors on trucks and tractors. (5S) Hurst

22. Automotive Diesel Engines. Four-stroke cycle and two-stroke cycle Diesel engines used in trucks and tractors. (5W) Hurst

23. Heavy-duty Drives. Power transmission units used on trucks and tractors. (5F) Hurst

51. Automobile Chassis. A general course on brakes and steering units. Open to any student who wishes to learn minor service procedures. (3F) Hurst

52. 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. (3S) Willey

53. Automobile and Farm Engine Electricity. Stresses service and repair procedures within the reach of the average driver. Covers battery and magneto ignition and includes the major electrical systems. (3S) Slaugh

55. 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) Slaugh

Automotive Technology 165
166 College of Engineering

61. 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

62. Upholstering. Modern automobile and furniture upholstering processes. Students upholster their own units as they learn. (3W) Willey

101. Frame, Suspension, and Steering Systems. An advanced course in steering geometry and steering problems. Power brakes and power steering devices are included. Prerequisites: Automotive 1, Math 34, 44. (3F) Hurst

102. 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: Automotive 2, Math 44. (3W) Willey

103. Automatic Transmissions. Includes modern automatic transmissions and torque converters, electric clutches, and hydraulic systems. Prerequisite: Automotive 3. (3W, S) Hurst

122. Fuel Injection Systems. Various types of Diesel and gasoline injection systems are included. Modern testing equipment is used. Prerequisite: Automotive 22. (3W) Hurst

151. Carburetion. Combustion processes, heat cycles, and fuel characteristics are studied in connection with internal combustion engine carburetion problems. Prerequisites: Automotive 4, Math 35. (3F) Willey

152. Motors, Generators, and Magnetos. An advanced course covering technical phases of these units. Laws of Physics are applied. Prerequisites: Automotive 5 and preferably Physics 19. (3W) Willey

162. Metal Refinishing. Principles and practices in metal preparation and finishing 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. (3F) Willey

Welding Technology

Students majoring in Welding Technology will register in the General Industrial Technology Degree Curriculum. The courses which make up the major area in Welding Technology are as follows: Welding 41, 42, 43, 44, 45, 46, 153, 154, 161, 162, 163. TME 57, and 148 are also required in this major.

This program provides instruction in all phases of electric and oxy-acetylene welding, with a curriculum leading to a Bachelor of Science degree. In addition, general service courses are offered for students in other departments who desire to become familiar with basic welding as it applies to their fields of endeavor.

Welding Technology Courses

In each of the following courses, Welding techniques in various positions are practiced. American Welding Society (A.W.S.) tests are made on samples welded in different positions. Safety precautions and proper use of equipment are emphasized.

41. 42, 43. Acetylene Welding. Principles and practices in all phases of oxy-acetylene welding, heating, and cutting operations. Designed primarily for those who desire to obtain the necessary knowledge and skill for welding in industry. (5F, 5W, 5S) Staff

44, 45, 46. Electric Arc Welding. Principles and practices in all phases of Electric Arc Welding. Gives students an opportunity to reach a high degree of efficiency in the welding of mild steel. Attention is given to hard surfacing, semi-automatic, and submerged arc welding. (5F, 5W, 5S) Staff

91. Acetylene Welding. Principles and practices in fundamentals of oxy-acetylene welding and cutting. A general service course open to all university students. Two lectures, two two-hour labs. (3F, W, S) Staff

92. Aero Welding. A basic course providing an introduction to the fundamental principles of oxy-acetylene welding and cutting as it applies to aircraft production and repair as set forth by Civil Air Regulations. Sufficient laboratory practice is provided to prepare students for CAA Tests in aircraft welding. Two lectures, two two-hour labs. (3W) France
94. 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, S) Morgan

97. 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 oxy-acetylene and arc processes, brazing of ferrous and non-ferrous metals, silver soldering and oxy-acetylene cutting. Two lectures, two two-hour labs. (3F, S) France

153, 154. Advanced Acetylene Welding. A detailed survey and analysis of the oxy-acetylene welding processes and procedures, together with sufficient laboratory practice to qualify for welding code tests. Special cutting problems, inspection and management, and welding metallurgy. Prerequisite: Welding 43. (3F, 3W) France

161, 162, 163. Advanced Electric Welding. Designed for welding majors. Consideration is given to inspection, weldability of metals, welding metallurgy, design and cost estimating. Laboratory practice includes inert gas welding, manual arc welding, submerged arc welding, and resistance welding. Prerequisite: Welding 44 or 94. (3F, 3W, 3S) Staff

190. Advanced Acetylene Welding. Designed to meet the need of those desiring more information and practice in welding than is given in Welding 91. Prerequisite: Welding 91. (3S) France

191. Advanced Electric Arc Welding. A continuation of Welding 94. Teaches methods of vertical and overhead welding and special problems such as hard surfacing and the welding of cast iron. Special problems in research are included. Prerequisite: Welding 94. (3F, W, S) Morgan

Sketch of Water Research Laboratory, now under construction
College of Family Life building
College of

Family Life

Department of Clothing and Textiles, 172
Department of Family and Child Development, 174
Department of Food and Nutrition, 177
Department of Homemaking Education, 179
Department of Household Economics and Management, 181
Combination Major in Family Life and Office Administration, 183

Degrees Offered:

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 his or her 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, Household Economics and Management, and Homemaking Education.

Bachelor of Science and Master of Science degrees are offered in each of these programs. Courses may be arranged so that one can obtain an MS degree work in Summer School, providing that the research project is done on the job during the winter months. The Ph.D. degree is offered in the food and nutrition Department only.

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:

- 190. Independent Study. For qualified students upon consultation with the instructor. Credit arranged. (F, W, S, Su) Staff
- 290. Independent Study. For qualified students upon consultation with instructor. Credit arranged. (F, W, S, Su) Staff
- 295. Research for Master's Thesis. Credit Arranged. (F, W, S, Su) Staff

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 those courses most appropriate to their personal needs and interests. For those recently married or contemplating marriage the following are specially recommended:

- 5 Art in Everyday Living
- CT 30 Basic Clothing Construction
- 15 Clothing Selection for Men
- 24 Introduction to Textiles
- 106 Family Clothing
- FCD 20 Preparation for Marriage and Family Living
- 67 Early Childhood
- 120 Marriage
- FN 22 Principles of Nutrition
- 23 Principles of Food Preparation
- 25 Meal Preparation for the Family
- HEM 149 Home Management
- 155 Family Finance
Undergraduate Study

The Department of Clothing and Textiles offers work leading to the Bachelor of Science degree in the following areas:

1) Clothing and Textiles
2) Fashion Merchandising
3) Textile Technology and Research

Clothing and Textiles Major. The curriculum for a major in Clothing and Textiles includes the following courses: Clothing and Textiles 5, 24, 30, 106, 115, 120, 124, 134, 136, 140, 170, 174, 180, 191, 195 and an additional ten credits to be selected from Visual Arts 135; Psychology 161; Sociology 130, 140, 154, 165; Economics 107, 171, 172; and Political Science and History.

 Majors are required to take Chemistry 10, 11 and 12 and are advised to take Philosophy 50 as part of their lower division requirements.

Clothing and Textiles Minor. Students wishing a minor in Clothing and Textiles, should take Clothing and Textiles 5, 24, 30, 106 and six credits selected from other courses included in the Clothing and Textiles major.

Fashion Merchandising Major. Students preparing for Fashion Merchandising may wish to complete a major in Clothing and Textiles and a minor in Business Administration or vice versa. The curriculum in Business Administration should include Business Administration 151, 156, and 161.

Textiles Technology and Research Major. Students preparing for Textile Technology and Research should complete a double major in Clothing and Textiles and Chemistry.

Graduate Study

The Clothing and Textiles Department offers study and research to qualify candidates for a Master of Science degree (see Graduate catalog).

Clothing and Textiles Courses

5. Art 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 College of Family Life. (3F, W, S) Teresawa

10. Basic Clothing Construction. Application of construction principles with commercial patterns. Emphasis is on organization, basic speed techniques, and fundamental fitting as related to individual needs. Class may be exempted upon departmental approval for previous work or successful completion of a pretest. (3F, W) Lewis

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. (2W, S) Staff

24. Introduction to Textiles. A study of fibers, yarns, fabric construction and finishes as related to the appreciation, selection, use and care of current textiles. (3F, S) Clayton
Clothing and Textiles of pattern, grain, and textures on design and lining and draping two garments.

140. Design by draping fabric on the dress. Emphasis is placed on fitting and the effect of the principles of dress design to the construction of a basic dress. Alteration of commercial patterns to fit variously proportioned figures. Prerequisite: Clothing and Textiles 10 or equivalent. (3F, W, S) Clayton, Pierson

**106. Family Clothing. A study of the factors which influence clothing as related to family needs; the economic, sociological, and psychological influences. (3F) Lewis

115. Costume Selection and Design. Practical application of the principles of design to the problems of costume selection and design. Emphasis is placed on developing judgment in solving specific selection and design problems. Prerequisites: Clothing and Textiles 5, 24, 30. Recommended: Visual Arts 5, 135. (3F, W, S) Lewis

120. Comparative Construction Techniques. Development of judgment, originality, and skill in clothing construction with emphasis on alternative techniques and intricate construction detail. Prerequisites: Clothing and Textiles 115 or equivalent. (2F, W, S) Pierson

124. Weaving. Fundamental principles of weaving. Emphasis is placed on the understanding of fabric construction and finishing through the weaving and finishing of yardage for place mats, napkins, aprons, and skirt or blouse fabrics. Prerequisite: Clothing and Textiles 24. (3F, W, S) Clayton

**134. History of Textiles. A study of textile development from ancient times to the present as related to the socio-economic and political influence of the time. Emphasis is placed on fabric construction, and motifs typical of each period. (3F) Terasawa

**136. History of Costume. A study of costume for men and women from ancient times to the present as related to the social, economic, and political influences of the times and their importance in the evolution and inspiration of modern dress. Prerequisite: Clothing and Textiles 134. (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) Clayton

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. (3S) Terasawa

**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. Prerequisites: Clothing and Textiles 24; Chemistry 10, 11, 13. (3S) Terasawa

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, W and alternate Su) Terasawa

190. Independent Study. See Family Life 190. Credit arranged. (F, W, S, Su) Staff

191. Seminar. Reports and discussions on newer developments in the Clothing and Textiles field. (2S) Staff

195. Couturier Design. A comprehensive analysis of the synthesis of knowledge and skill in clothing construction and design, required of all senior clothing and textiles majors. Prerequisites CT 120, 140, 170 (1S) Staff

**204. Fashion Merchandising. A study of the factors which influence economies of clothing: an analysis of the fashion industry; economic problems in the manufacturing and marketing of clothing. (3W) Staff

**205. Consumer Problems in Clothing and Textiles. A study of the problems encountered by consumers in the purchase of clothing and textiles with emphasis on current developments in labeling and fitting of ready-to-wear. (2S) Staff

**206. Socio-Psychological Aspects of Clothing. A study of the socio-psychological factors that influence the role played by clothing as related to individual needs. (3W) Staff

290. Independent Study. See Family Life 290. Credit arranged. (F, W, S, Su) Staff

291. Graduate Seminar. Open to graduate students. (2S) Staff


*Taught 1963-64
Family and Child Development

PROFESSOR Don C. Carter, HEAD; ASSOCIATE PROFESSORS Dorothy B. Lewis, C. Jay Skidmore; INSTRUCTOR Carroll C. Lambert; HEAD TEACHER in CHILD DEVELOPMENT LABORATORY AND COOPERATIVE NURSERY Valera G. Holman.

Office in Family Life 118

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 either 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: Family and Child Development 108, 130 or 164, 174, 175 with an additional 15 credits to be selected from Family and Child Development 20, 77, 115, 120, 130, 150, 164, 187; English 122; Education 133; Fine Arts—Art 50 or 151; Fine Arts—Music 150; Fine Arts—Theatre 54; Foods and Nutrition 22; Physical Education 81, 84; Speech 118, 122.

Child Development Major. The curriculum for a major in Child Development includes: Family and Child Development 108, 130 or 164, 174, 175 with an additional 18 credits to be selected from Family and Child Development 67, 68, 77, 100, 115, 120, 125, 150, 164, 180, 185, 187; Clothing and Textiles 5, 106; English 122; Foods and Nutrition 22, 23, 141; Fine Arts—Art 50; Household Economics and Management 149, 155; Physical Education 81, 83, 84; Psychology 112, 123, 135, 145; Sociology 130, 156, 171, 172; Zoology 102.

Child Development Minor. To minor in Child Development one should take Family and Child Development 67, 68, 108, 130 or 164, 174, 175. The minor is recommended for men in such fields as Social Work and Elementary Education who, perhaps 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, 150, 180, 187; Household Economics and Management: 149, 155; Sociology
Family and Child Development 175

160 or Social Work 165; Psychology 112; Zoology 102 and nine hours selected from supporting courses in related fields.

Marriage and Family Relations Minor. The curriculum for a minor includes: Family and Child Development 120, 180, 187, and either 67 or 100 with at least six credit hours selected from the other courses included in the Marriage and Family Relations major.

Teacher Certification. To teach in kindergarten or elementary school, as a Child Development major, or in high school as a Marriage and Family Relations major, a student must meet the state requirements for teacher certification. It is recommended that a student take a teaching certificate with his major. Majors in Marriage and Family Relations should take a teaching minor in some subject required to be taught in high school.

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.

Family and Child Development Courses


68. Preschool Laboratory. Directed observation in the Child Development Laboratory. Recommended to parallel FCD 67. (2F, W, S) Staff

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. (3F) Lewis

100. Human Growth and Development. Growth and development from birth to maturity. General behavior patterns characteristics of different levels of maturity; individual differences and needs. Prerequisite: Psychology 53. (3F, W, S) Carter

108. Guidance of the Young Child. Review of development principles with emphasis on social and emotional growth; fostering growth through creative materials and play equipment; guidance philosophy, principles and techniques. Two lectures. Two hours lab weekly. Prerequisites: Family and Child Development 67, 68. (3F, W, S) Lewis


120. Marriage. Engagement; marriage relationships; understanding of self. For men and women. (3F, W, S) 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. (3S) 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 ongoing programs. (1-3 Su) Staff

130. Play and Play Materials. Meaning of play and its value in early childhood. Consideration of attitudes and materials which foster creative expression in the young child. (3F, S) Staff

**Taught 1964-65
176 College of Family Life

150. Seminar. Discussion of topics in current literature plus independent reading selected according to your interest. (2S) Carter

164. Nursery School Planning and Administration. Development of the nursery school movement. Problems of physical plant, equipment, public relations, staff and budgeting of the child care center. (3S) Lewis


175. Practice Teaching in the Nursery School. Experience in application of generalizations 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 Development 106 and 130 or 164. Arrangements must be made for practice teaching well in advance of registration. (6F, W, S, Su) Lambert

180. Marriage Counseling. The philosophy, principles, and techniques of pre-marital and marriage counseling. (3W) Skidmore

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. (3S, Su) Skidmore

187. Family Theory. Differential conceptual approaches to the study of the family. Analysis of theories and points of view from various schools of thought. (3P) Skidmore

190. Independent Study. See Family Life 190. Credit arranged. (F, W, S, Su) Staff


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. Individual study and observation of children within the context of a guidance emphasis. (3Su) Staff

235. Theory and practice of play therapy. See Psychology 235 (3a) Tschudy

238. Practice in Play Therapy. See Psychology 278. (2S) Tschudy

251. Seminar in Family Relations. Analysis of selected topics in family relations. (2W) Carter

252. Seminar in Child Development. Analysis of selected topics dealing with growth, behavior, and development of the child. (2S) Carter

275. Internship in Nursery Education. Work with young children in a situation involving limited supervision and personal responsibility for program planning and direction. Emphasizes experimental methods in working with children, and development of insight into children’s behavior. Credit arranged. (W, S, Su) Lambert

278. Practicum in Agencies Serving Children. Experience in working in agencies serving children. Limited to advanced students who have completed Family and Child Development 174 and 175. Time and credit arranged. (F, W, S) Lambert

290. Independent Study. See Family Life 290. Credit arranged. (F, W, S, Su) Staff

295. Research for Master’s Thesis. See Family Life 295. Credit arranged. (F, W, S, Su) Staff
The Food and Nutrition Department can contribute importantly to life and provide valuable experience in personal and family living.

The three majors in the department are:

1) Food and Nutrition
2) Dietetics
3) Food Technology (Independent, major)

A student majoring in Food and Nutrition is prepared for positions in food test kitchens, in food and nutrition research, and as commercial demonstrators. A major in Dietetics is prepared to take a student internship in an approved hospital, or a university or industrial plant operation which qualifies an individual as a professional dietician.

With a Master of Science degree the graduate in Food and Nutrition Dietetics or food technology is qualified for college teaching.

Undergraduate Study

Food and Nutrition Major. Curriculum for a major in Food and Nutrition includes: Chemistry 10, 11, 12 and 190; Physiology 4; Bacteriology 10 or 70; Food and Nutrition 22, 23, 25, 107, 140, 141, 145, 146, 150, 180 and a minimum of eighteen hours in other areas of the College of Family Life. Classes recommended in these areas are: CT 5; FCD 20 and 67; Hem 65, 100, 149, and 150 or 151. Classes recommended as electives are: Homemaking Education 123, Animal Husbandry 185; Food and Nutrition 125, 135; Bacteriology 120 or 121.

Dietetics Major. Majors in Dietetics must select courses as outlined by the American Dietetic Association to meet the total number of required hours from specified areas. In addition to courses required for the Food and Nutrition major, the Dietetic major will take the following: Food and Nutrition 182, Business Administration 100, Psychology 102, Homemaking Education 120. Students should consult with advisers for any variations according to the American Dietetic Association plans.

Food Technology Inter-departmental Major. Candidate for the BS degree in Food Technology will meet requirements set up by the F and N Department in cooperation with the Interdepartmental Curriculum Committee in Food Technology. Students must consult with adviser on course outline.

Food and Nutrition Minor. Students from other colleges, as well as students from other departments of the College of Family Life, may select a minor in the Food and Nutrition Department. Courses recommended for a minor are: Food and Nutrition 22, 23, 25, 140 and five additional hours to be se-
lected from other courses offered by the department.

Homemaking Education Curriculum. The curriculum to prepare one for high school teaching includes Food and Nutrition 22, 23, 25, 140 and one upper division course.

Graduate Study

The Master of Science degree is offered in Food and Nutrition. In cooperation with other departments, a Master of Science and a Doctor of Philosophy degree are offered in Nutrition and Biochemistry and in Food Technology. Detailed information may be obtained from the department.

Food and Nutrition Courses

22. Principles of Nutrition. The relation of food to health; factors influencing nutritive requirements; problems applicable to individual interests and needs. (3F, W, S) Rowland

23. 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: Food and Nutrition 22. (3F, W, S)

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: Food and Nutrition 22. (3F, W, S) Rowland

107. Experimental Foods. Development of experimental methods; their application to investigation in cooking and food preservation; a study of the literature in the field. Prerequisite: Food and Nutrition 22, 23. (3F, W, S)

125. Food Economics. Basic information on the food marketing systems from the point of view of the consumer. The course is directed specifically toward food and marketing problems of families with emphasis on what the consumer should consider in shopping for food. (2F)

135. Weight Control. Individual help will be given to those students who need to lose or gain weight. Diets will be planned to fit the individual's needs. Help with personal problems will be given. (2S)

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 determination of nitrogen, minerals, and ascorbic acid. Three lectures and two laboratories. Prerequisites: Food and Nutrition 22, 23, and Organic Chemistry. (5F, W) Merkley

141. Child Nutrition. Nutritional requirements of the mother during pregnancy and lactation; nutrition of child through infancy and adolescence. Prerequisite: Food and Nutrition 22 and 140. (2W) Schoulte

145. Diet Therapy. Application of dietetic principles to problems of disease, with calculations and preparation of diets in diseased conditions. Three lectures and one laboratory. Prerequisite: Food and Nutrition 140. (4S)

146. Food Technology. Manufacture and preservation of food products; influence of those processes on physical, chemical, and nutritive value of foods. Prerequisites: Bacteriology 10 or 70; Food and Nutrition 22 and 23. One lecture and one laboratory. (2F and alternate Su)

150. Seminar. Reports and discussion on current literature. Prerequisites: Chemistry 190; Food and Nutrition 107, 125, 140. (1W)

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. (5W) Schoulte

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, the keeping of adequate records, specification writing, purchasing methods and varied aspects of money management as it affects food service in institutions. (5S)

190. Independent Study. See Family Life 190. Credit arranged. (F, W, S, Su)

201. Laboratory Methods in Food and Nutrition. Problems in food and nutrition, including nitrogen, mineral, and vitamin determinations. Prerequisite: Organic Chemistry. (2S) Merkley


203. Nutrition Laboratory. Micro-chemical determinations of vitamins and other com-

*Taught 1963-64
**Taught 1964-65
in small amounts of blood. 

Pre-requisites: Chemistry 190 or equivalent. (2W) 

Wilcox


Staff

230. Human Nutrition I. Critical review of literature, relating to energy metabolism, proteins, fats, and carbohydrates. Prerequisite: Food and Nutrition 140. (3W) 

Wilcox

231. Human Nutrition II. Critical review of the literature in the field of vitamin and mineral metabolism. Prerequisite: Food and Nutrition 140. (3S) 

Merkley

233. Readings in Foods. A critical review of scientific literature in the field of foods. Prerequisite: Food and Nutrition 107. (2F) 

Staff

243. Nutrition and Growth. Relation of nutrition to growth from the prenatal period to old age. Prerequisite: Food and Nutrition 140. (2S) 

Staff

290. Independent Study. See Family Life 290. Credit arranged. (F, W, S, Su) 

Staff

291. Graduate Seminar. Reports and discussions on current literature. (1W) 

Staff

Note! Nutrition and Biochemistry Seminar. (See Animal Husbandry 270)


Staff

Homemaking Education 179

Department of

Homemaking Education

ASSISTANT PROFESSOR Virginia H. Harder, HEAD; INSTRUCTOR Norma W. Pierson.

Office in Family Life 209

Homemaking Education provides professional training for teaching homemaking in the secondary schools. In addition it provides valuable experiences for personal and family living. Bachelor of Science and Master of Science degrees may be earned in Homemaking Education.

Undergraduate Study

Composite Major for Secondary School Teaching. The Composite major requirements include:

1) Subject matter areas: Clothing and Textiles 5, 24, 30, 115, and 120; Family and Child Development 67, 68, 108 and six additional hours selected from Family and Child Development 77, 120, 125, 180, 185, 187 or Psychology 202; Food and Nutrition 22, 23, 25, 140 and an additional three hour class selected from Food and Nutrition 107, 135, 151, 146; Household Economics and Management 65, 75, 100, 149, 150, 155; Family Health 152.

In addition to filling University group requirements students should keep in mind Homemaking Education prerequisites: Psychology 53 and Chemistry 10, 11, 12.

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 102; Public Health 154 or 155; Education 111 and 114; Homemaking Education 120, 121, 122, and 124.

Requirements for State Vocational Homemaking include those for Vocational Homemaking in Secondary Schools.
Services available to teachers are:

1. Guidance and help in meeting requirements for renewing certificates.
2. Opportunity to meet certification requirements.
3. Advanced study leading to the Master of Science degree in Homemaking Education.
4. In-service education

3) Recommendation concerning competency in the Clothing and Textiles area. This is placed in the student's file for professional employment purposes.

*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, 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 may be spread over 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 is 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. (87, 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. (2W) 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 Home-making. (2F, W) Pierson

190. Independent Study. See Family Life 190. Credit arranged. (F, W, S, Su) Staff

217. Current Developments in Homemaking Education. Newer developments in homemaking at the secondary level. Serves advanced undergraduate or graduate students. Students may arrange with instructor to substitute this class for Homemaking Education 120. (3Su) Harder

237. Seminar. Opportunity for investigations and reporting on individual problems. Credit arranged. (F, W, S) Staff

290. Independent Study. See Family Life 290. Credit arranged. (F, W, S, Su) Staff


Department of Household Economics and Management

ASSOCIATE PROFESSOR Rhea H. Gardner, EXTENSION SPECIALIST; ASSISTANT PROFESSORS Edith Nyman, HEAD, Lavina Harper; INSTRUCTOR Virginia S. Lewis.

Office in Family Life 203

Courses in this department help students to understand the theory of management and decision-making in terms of personal values. The management theory is applied to specific aspects of management in the home: housing, family finance, and selection of household furnishings and household equipment. Course content gives meaning to the relationship between general economic conditions and economic problems of families and provides a background for intelligent civic action in furthering human well-being.

Undergraduate Study


Two separate majors are available:

1) Housing and Household Equipment

2) Economics and Management

The same department curriculum is basic to each, but supporting course work from related areas, taken to complete each major, varies with the emphasis desired. Related areas are: Economics, Agricultural Economics, Sociology, Business Administration, Psychology, Philosophy, Political Science, Chemistry, Physics, Foods and Nutrition, and Family Relations.

A minor developed in the area of
182 College of Family Life

Economics, Physics, Psychology, Radio-TV, Journalism, Speech, Foods and Nutrition, Clothing and Textiles, or Family and Child Development, provides additional training for employment.

Housing and Household Equipment Major. The curriculum for a major in this area includes: Household Economics and Management 65, 75, 100, 149, 150 or 151, 155, 160, with an additional 20 hours selected from: Mathematics 24, 25, 26; Physics 6; Chemistry 10, 11, 12; Economics 51, 52; Landscape Architecture 3, 20; Visual Arts 40, 135, 140; Homemaking Education 123. Recommended supporting electives are: Business Administration 100, 151; Sociology 5, 130, 160.

Economics and Management Major. The curriculum for a major in this area includes: Household Economics and Management 65, 75, 100, 149, 150, or 151, 155, 160 and an additional 20 hours selected from: Business Administration 20 or 100, 151, 156; Economics 106, 108; Political Science 1, 160; Sociology 130, 160; Tool Engineering 180; Philosophy 45 or 50. Recommended supporting electives are: Psychology 161 or Sociology 140; Mathematics 24, 25, 26.

Departmental Minor. The curriculum for a departmental minor includes Household Economics and Management 100, 149, and 155 plus six additional credits in the department and an additional three hour related supporting course.

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, and 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, Foods and Nutrition, and Clothing and Textiles.

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; trends; renting vs. buying and building vs. buying a used home; kitchen planning. (3F, W, S) Harper

75. Home Furnishings. Characteristics of home furnishings in relation to their classification, beauty, respective quality, use and care. (3F, W, S) Lewis


149. Home Management. The process of management as affected by family resources, values, goals and general socio-economic conditions. (3F, W, S) Nyman

150. Home Management House. Residence in a Home Management House for a five week period to provide experience in management and family life. Application must be made with resident adviser in advance of registration. Girls without required prerequisites may apply for one five-week period during winter quarter. Prerequisites: Food and Nutrition 22, 23, 25; Household Economics and Management 149. (4F, W, S) Harper

151. Home Management Problems. For married students only, but similar to 150. Provides guidance in management as applied in individual homes. (4S) Nyman

155. Family Finance. How families plan finances and the factors that determine financial decisions. (3F, W, S) Nyman
160. Seminar. Reports and discussions on current reading in Household Economics and Management. (W, S) Staff

190. Independent Study. See Family Life 190. Credit arranged. (F, W, S) Staff

290. Independent Study. See Family Life 290. Credit arranged. (F, W, S) Staff

295. Research for Master’s Thesis. See Family Life 295. Credit arranged. (F, W, S) 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 of Science 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

Household Economics and Management

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEM 65</td>
<td>Housing</td>
<td>3</td>
</tr>
<tr>
<td>HEM 75</td>
<td>Home Furnishings</td>
<td>3</td>
</tr>
<tr>
<td>HEM 100</td>
<td>Household Equipment</td>
<td>3</td>
</tr>
<tr>
<td>HEM 149</td>
<td>Home Management</td>
<td>3</td>
</tr>
<tr>
<td>HEM 150</td>
<td>Home Management House</td>
<td>4</td>
</tr>
<tr>
<td>HEM 155</td>
<td>Family Finances</td>
<td>3</td>
</tr>
</tbody>
</table>

Clothing and Textiles

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT 10</td>
<td>Basic Clothing Construction</td>
<td>3</td>
</tr>
<tr>
<td>CT 24</td>
<td>Textiles</td>
<td>3</td>
</tr>
<tr>
<td>CT 30</td>
<td>Intermediate Clothing Construction</td>
<td>3</td>
</tr>
<tr>
<td>CT 136</td>
<td>History of Costume</td>
<td>3</td>
</tr>
<tr>
<td>CT 140</td>
<td>Draping</td>
<td>3</td>
</tr>
<tr>
<td>CT 180</td>
<td>Tailoring</td>
<td>3</td>
</tr>
<tr>
<td>CT 170</td>
<td>Flat Pattern Designing</td>
<td>3</td>
</tr>
<tr>
<td>CT 106</td>
<td>Family Clothing</td>
<td>3</td>
</tr>
</tbody>
</table>

Foods and Nutrition

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>FN 22</td>
<td>Principles of Nutrition</td>
<td>3</td>
</tr>
<tr>
<td>FN 23</td>
<td>Laboratory for Nutrition and Food Preparation</td>
<td>3</td>
</tr>
<tr>
<td>FN 25</td>
<td>Meal Preparation for the Family</td>
<td>3</td>
</tr>
<tr>
<td>FN 107</td>
<td>Experimental Foods</td>
<td>3</td>
</tr>
<tr>
<td>FN 125</td>
<td>Food Economics</td>
<td>2</td>
</tr>
</tbody>
</table>

FN 135 | Weight Control | 2 |
FN 140 | Nutrition | 5 |
FN 141 | Child Nutrition | 2 |
FN 146 | Food Technology | 2 |

Family and Child Development

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>FCD 20</td>
<td>Preparation for Marriage and Family Relations</td>
<td>3</td>
</tr>
<tr>
<td>or</td>
<td>FCD 120</td>
<td>Marriage</td>
</tr>
<tr>
<td>FCD 67</td>
<td>Early Childhood</td>
<td>3</td>
</tr>
<tr>
<td>FCD 68</td>
<td>Preschool Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>FCD 77</td>
<td>Child from 6-12</td>
<td>3</td>
</tr>
<tr>
<td>FCD 100</td>
<td>Human Growth and Development</td>
<td>3</td>
</tr>
<tr>
<td>FCD 108</td>
<td>Guidance of the Young Child</td>
<td>3</td>
</tr>
<tr>
<td>FCD 115</td>
<td>Growth of the Infant</td>
<td>3</td>
</tr>
<tr>
<td>FCD 130</td>
<td>Play and Play Materials</td>
<td>3</td>
</tr>
<tr>
<td>FCD 185</td>
<td>Family in Middle and Later Years</td>
<td>3</td>
</tr>
</tbody>
</table>

Office Administration Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS 51</td>
<td>Intro. to Sec. Training</td>
<td>2</td>
</tr>
<tr>
<td>SS 42</td>
<td>Intro. Type</td>
<td>2</td>
</tr>
<tr>
<td>SS 65</td>
<td>Records Administration</td>
<td>3</td>
</tr>
<tr>
<td>SS 92</td>
<td>Business Machines</td>
<td>2</td>
</tr>
<tr>
<td>SS 167</td>
<td>Office Practice</td>
<td>3</td>
</tr>
<tr>
<td>SS 175</td>
<td>Office Management</td>
<td>3</td>
</tr>
<tr>
<td>SS 186,</td>
<td>187</td>
<td>Secretarial Procedures</td>
</tr>
<tr>
<td>+BA 1</td>
<td>Accounting</td>
<td>4</td>
</tr>
<tr>
<td>BA 20</td>
<td>Intro. to Business</td>
<td>3</td>
</tr>
<tr>
<td>SS 141,</td>
<td>142,</td>
<td>Dictation and Transcription</td>
</tr>
<tr>
<td>BA 143</td>
<td>Business Communications</td>
<td>3</td>
</tr>
</tbody>
</table>

---

*It is recommended that BA 2 also be completed. 4 hours.
College of Forest, Range and Wildlife Management is housed here
College of Forest, Range and Wildlife Management
College of

Forest, Range and Wildlife Management

Department of Forest Management, 189
   General Forestry, 189
   Timber Management, 189
   Forest Recreation Management, 189

Department of Range Management, 193
   General Range Management, 194
   Forest-Range Management, 194
   Watershed Management, 194

Department of Wildlife Resources, 196
   Game Management, 196
   Fishery Management, 197

Degrees Offered:
   Bachelor of Science
   Master of Forestry
   Master of Science
   Doctor of Philosophy
Increasing activity in the fields of Forest Management, Range Management, Wildlife Management, 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 conservation and management of wild lands and their resources so that they may be of continuing benefit for present and future generations of citizens.

The favorable geographical location of this College of Forest, Range, and Wildlife Management 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 prepare a student for positions with federal or state agencies and for private work in (1) Forest Management, (2) Range Management and (3) Wildlife Resources. A Forest Management student may choose between three options: one designed to train for general Forestry work, as with the public land managing agencies, one more strictly for Timber Management, and one in Forest Recreation Management. As a Range Management 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 correlated with personality and ability to deal with people.

Application forms may be obtained from the Admission's Of-
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 Management Department or the Forest-Range Management option offered by the Range Management 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 School 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 Management 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 instruction. Besides short trips scheduled for individual courses, each department conducts an extensive field-problems trip in the spring quarter of the junior year, or the fall quarter of the senior year. This trip is required of all students. The trip for Range Management seniors is taken just before the fall quarter starts. The trip for Forest Management and wildlife 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 $40 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 Forest, Range, and Wildlife Management. These are the W. B. Rice Memorial Loan Fund, the Turner Memorial Fund and the Bureau of Land Management Fund. Loans are made for short periods. The funds are administered by a faculty committee. Application should be made through the Dean’s office.

**Graduation Requirements.** The following general requirements must be met for graduation from the College of Forest, Range, and Wildlife Management: (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) Three hours of Social Science, in addition to General Economics. (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 quali-
fying work experience. In certain instances Summer Camp attendance may fulfill this requirement.

A Watershed Research Unit of the Intermountain Forest and Range Experiment Station, United States Forest Service, was established at Utah State University in 1961. Collaborators with the unit are: Paul E. Packer, MS; J. D. Schultz, MS; and R. O. Meeuwig, MS.

Department of

Forest Management

PROFESSORS J. Whitney Floyd, HEAD, T. W. Daniel; ASSOCIATE PROFESSORS Raymond R. Moore, S. Ross Tocher; ASSISTANT PROFESSORS Frank W. Kearns, Walter H. Johnson; ASSISTANT PROFESSOR AND EXTENSION FORESTER John D. Hunt; COLLABORATORS Roger S. Peterson, R. G. Krebill FOREST PATHOLOGY; J. Alan Wagar, FOREST RECREATION.

Office in Forestry and Biological Science 116

Upon completion of any of the following three programs of study, a student is granted the degree of Bachelor of Science in Forest Management. These three programs of study are designed to give comprehensive training in all branches of Forest Management, 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 three options to enroll:

(1) The option in General Forestry basically provides training in Timber Management. However, in recognition of the needs of several of the land and resource managing agencies, it also provides training in Range Management and in Watershed Management. This pattern of training meets the needs of personnel engaged in the administration of public forest lands.

(2) The second option, Timber Management, provides major emphasis on the growing, harvesting, and utilization of timber crops, and is appropriate training for employment in private forest industries or specialized timber work with the public forest managing agencies.

(3) The third option, in Forest Recreation Management, is designed to train a person for employment with the National Park Service, the U.S. Bureau of Outdoor Recreation, state departments of conservation, forestry or park services, or municipal park services. Suitable training in outdoor recreation organization, management, and supervision is provided, and in addition to this 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 Forest, Range and Wildlife Management in 1962. This provides additional strength to the teaching and research program in Forest Recreation.

Honors. Any students 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.

#### FRESHMAN YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Quarter taught and credit</th>
<th>F</th>
<th>W</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>English 1, 2, 3</td>
<td></td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Mathematics 34, 35, 44¹</td>
<td></td>
<td>3</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Chemistry 10, 11, 12</td>
<td></td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Forest Management 1</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range Management 1</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wildlife Resources 1</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Animal Husbandry ²</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mechanical Engineering ⁶</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M.S., A.S., or P.E.</td>
<td></td>
<td>1-2</td>
<td>1-2</td>
<td>1-2</td>
</tr>
</tbody>
</table>

#### SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Quarter taught and credit</th>
<th>F</th>
<th>W</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Botany 24, 25, 30</td>
<td></td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Botany 129</td>
<td></td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Civil Engineering 81</td>
<td></td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forestry 134</td>
<td></td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>English 112</td>
<td></td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physics 6</td>
<td></td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agronomy 58</td>
<td></td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economics 51</td>
<td></td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speech</td>
<td></td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geology 3</td>
<td></td>
<td>5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### SUMMER CAMP

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
<th>F</th>
<th>W</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest Management 96</td>
<td></td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forest Management 97</td>
<td></td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range Management 98</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wildlife Management 99</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### A—GENERAL FORESTRY JUNIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Quarter taught and credit</th>
<th>F</th>
<th>W</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest Management 106, 107</td>
<td></td>
<td>4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Forest Management 112, 113</td>
<td></td>
<td>3</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Landscape Architecture 3³</td>
<td></td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forest Management 114, 115</td>
<td></td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Forest Management 118</td>
<td></td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹Students 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.

²Not required of students taking the Timber Management option.

³Not required of students who have had adequate training in engineering-mechanical drawing in high school.

⁴P.E. is 1 credit; M.S. and A.S. are each 2 credits. Not required for those who have served with the armed forces.

### SENIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Quarter taught and credit</th>
<th>F</th>
<th>W</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest Management 119</td>
<td></td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forest Management 120</td>
<td></td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forest Management 121</td>
<td></td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forest Management 122, 123</td>
<td></td>
<td>4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Forest Management 125</td>
<td></td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range 131</td>
<td></td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range 162</td>
<td></td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range 180</td>
<td></td>
<td>4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Electives</td>
<td></td>
<td>4</td>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

#### H—TIMBER MANAGEMENT

If the Timber Management option is chosen add the following courses to those of the General Forestry option and omit Range Management 131, 162, 180, and Forest Management 119:

<table>
<thead>
<tr>
<th>Course</th>
<th>Quarter taught and credit</th>
<th>F</th>
<th>W</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest Management 116</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forest Management 125</td>
<td></td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forest Management 129</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forest Management 130</td>
<td></td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forest Management 131</td>
<td></td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zoology 105</td>
<td></td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Botany 140</td>
<td></td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electives</td>
<td></td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### C—FOREST RECREATION MANAGEMENT

If the Forest Recreation Management is chosen a student takes the same schedule as General Forestry with the exception of Animal Husbandry 2 and Range 162; plus the following courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Quarter taught and credit</th>
<th>F</th>
<th>W</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landscape Architecture 130</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forest Management 138</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forest Management 139</td>
<td></td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Landscape Architecture 3³</td>
<td></td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electives</td>
<td></td>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Graduate Study

*The degree of Master of Science in Forest Management 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.*

³Taken in spring quarter of freshman year.
of Graduate Studies. Normally all of the courses in the 200 series taught in the Forest Management Department are required. One or two years may be required, depending upon whether a student can devote full or only part time to his studies. An applicant should submit an official transcript of the 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.

The Master of Forestry degree program is available to students possessing a non-Forestry Bache­lor's degree with acceptable scholar­ship. The requirements include completion of the required basic lower division courses, program, the required upper division Forest Management curriculum, and ten units of graduate (200 series) course work. This program may re­quire two or more years, depending upon how closely related the undergraduate work is to Forestry. For this program, application should be made as described in the para­graph above.

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. Stu­dents having the Bachelor's or Master's degrees should contact the department head for information concerning eligibility for study toward this degree.

Graduate Assistantships are available to graduate students in Forest Management. Application for assistantships should be made to the head of the Forest Manage­ment Department.

Forest Management 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

26. Wood Technology and Mechanical Proper­ties of Wood. For vocational education or industrial arts majors. Covers structure, identification, and mechanical properties of commercial woods of the United States. (3W) Johnson

96. Forest Surveying. Practical field problems in surveying methods commonly employed in Forest, Range, and Wildlife Management. Lab. Fee $5. (Summer camp 3 credits) Daniel, 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.) Daniel, Moore

103. Silviculture and Dendrology. Basic Silv­ies: Silvicultural systems; western conifers and western regional silviculture; elements of eastern hardwoods and types. Not open to Forest Management majors. Prerequisites: Range 126 and Sumer Camp. (4W) Kearns

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 Management majors. Prerequisite: Forestry 103. (3S) Moore

106. Forest Measurements I. Measurements of timber in log, tree, and stand; log rules and scaling; statistical methods useful in analysing 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: Forestry 106. (3S) 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 Forest, Range, and Wildlife Management. (3F) Tocher

112. Dendrology I. Hardwoods. Identification, distribution and silvics of the more important forest trees in the United States. Prerequisite: Summer Camp. (3F) Hunt

113. Dendrology II. Conifers. Identification, distribution, and silvics of the more important forest trees of the United States. Prerequisite: Summer Camp. (2W) Hunt

114. Silviculture I. Characteristics of the tree species which influence silvicultural practice in the United States. Prerequisites:
192 College of Forestry

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. (3S) 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. (2S) Daniel

118. Forest Protection I. Prevention, presuppression and suppression of forest and range fires, including economic and physical effect; fire behavior. Field trips. (3W) Hunt

119. Forest Protection II. Problems of administration and economics in protecting forests from biological enemies. Prerequisites: Forestry 115, 121. (3W) Johnson

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, and in the distribution of forest products. Prerequisite: Forestry 122. (3S) Kearns

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) Johnson

130. Milling and Products. Manufacturing, grading, seasoning and preserving lumber, including study of the wood-using industries and their products. (4S) Johnson

131. Forest Products Marketing. Principles of marketing applied to lumber and other forest products. (3S) Kearns

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. (3W) Floyd

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) Tocher

137. Improvements and Recreation. Recreational use of forests and the classifications and planning of areas suitable for this purpose. Field trips. (3F) Hunt

138. Recreational Land Classification. Land classifications and economies of various forms of forest recreational use. (2S) Kearns

139. Recreational Structures. Construction of various forest recreational facilities. (3W) Tocher

145. Forest Problems. Individual study and research upon a selected forestry problem approved by the instructor. (1-3F, W, S) Staff

146. Junior Field Problems. Study of forest operations. Junior year. Fee $40. (3S) Staff

201, 202, 203. Advanced Forestry Seminar. Review and discussion of advanced current literature. (1F, 1W, 1S) Staff

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

265. 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, S) Staff

266. Forest Management and Valuation. Application of forest management principles; forest organization and development; forest regulation, valuation and control of operations. (2F) Moore

267. Forest Protection. Advanced study in specialized fields of forest protection. (2W) Staff

288. Forest Measurements. Application of statistical measurements to forest problems. (3F) Moore

296. Forest Economics. Study of the interaction of markets on the demand for lumber and forest products. (2F) Kearns

299. Forest Problems. Individual advanced study upon a selected forestry problem. (2 to 10F, W, S) Staff

Staff

*Taught 1963-64.
Office in Forestry and Biological Science 122

A four-year program leading to the degree of Bachelor of Science in Range Management is available. Opportunity is given under this program to specialize in General Range Management, Forest-Range Management, or Watershed Management.

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, Indian Service, 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 Management 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 Basic Courses. A core of basic course work as outlined below must be completed. In consultation with his adviser, a student must elect other course work to meet his personal objective in training. The adviser must approve a complete study program before the student can become a candidate for a degree. It is recommended that this be done as early as possible and, in no instance, later than the junior year.

The University requires that the student satisfy the following in order to meet the minimum requirements for graduation:

Humanities and Social Science 25 Units (with at least 10 in each field). Natural Sciences 18 Units.

Part of the above requirement will be satisfied when the student has completed the courses listed below.

During the freshman and sophomore years, all Range majors must complete the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Minimum Quarter-hour credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>9</td>
</tr>
<tr>
<td>College algebra and trigonometry</td>
<td>8</td>
</tr>
<tr>
<td>Chemistry, including organic</td>
<td>16</td>
</tr>
<tr>
<td>Botany, including taxonomy</td>
<td>15</td>
</tr>
<tr>
<td>Physics</td>
<td>4</td>
</tr>
<tr>
<td>Economics</td>
<td>5</td>
</tr>
<tr>
<td>Soils</td>
<td>5</td>
</tr>
<tr>
<td>Geology</td>
<td>5</td>
</tr>
<tr>
<td>Zoology</td>
<td>5</td>
</tr>
</tbody>
</table>

During the junior and senior years Range majors must complete the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Minimum Quarter-hour credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant ecology</td>
<td>5</td>
</tr>
<tr>
<td>Plant physiology</td>
<td>5</td>
</tr>
<tr>
<td>Range plant communities</td>
<td>10</td>
</tr>
<tr>
<td>Watershed management</td>
<td>4</td>
</tr>
<tr>
<td>General range management</td>
<td>5</td>
</tr>
<tr>
<td>Range field problems</td>
<td>3</td>
</tr>
<tr>
<td>Range technical problems</td>
<td>3</td>
</tr>
<tr>
<td>Range improvement</td>
<td>3</td>
</tr>
<tr>
<td>Agrostology</td>
<td>4</td>
</tr>
<tr>
<td>Adv. Zoology or Wildlife</td>
<td>5</td>
</tr>
<tr>
<td>Range seminar</td>
<td>2</td>
</tr>
</tbody>
</table>
The following fields of specialization are recognized in the department:

1. General Range Management. Elective course work should emphasize range management and animal husbandry. The student is fitted for management of range lands, public range land administration, and private range operation.

2. Forest-Range Management. Elective course work in Forest Management should be emphasized, including Summer Camp. This option provides training for multiple use management of forest and range lands. The student is especially fitted for work with the U.S. Forest Service.

3. Watershed Management. Elective work should emphasize Mathematics, Soils, and Hydrology. Sophomore students should take Plane and Solid Analytical Geometry, Integral Calculus, and Differential Calculus. With proper selection of elective subjects, a student may qualify for employment as a forester, research forester, or as a range conservationist.

Minor in Range Management. The following courses in Range Management are suggested for students who wish to minor in the field (requirements subject to approval by the Range Department): Range 126, Plant Ecology, five credits; Range 160, Principles of Managing Range Lands, five credits; Range 161, Range Analysis Techniques, one credit; Range 130, 131, 132, Range Plant Communities, ten credits; Range 163, Range Improvement, three credits; Range 181, Range Economics, three credits.

Graduate Study

The degree of Master of Science in Range Management 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 Husbandry, Botany, Wildlife, Economics, or Soils. A Bachelor's degree in Range Management 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 also is 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. Several of these assistantships are available each year. Interested students should apply to the department head for further details.

Range Management Courses

management of forested ranges. Prerequisite: Plant taxonomy. Two lectures, two labs. Lab fee $2. Saturday field trips may be scheduled. (4F) Grumbles

132. Desert Communities. Composition, distribution, successional patterns, and management of desert ranges. Prerequisite: Plant taxonomy. Two lectures, one lab. Lab fee $4. Saturday field trips may be scheduled. (3S) Grumbles

160. Principles of Managing Range Lands. A general course designed to give a knowledge of how to evaluate, manage, and perpetuate ranges. (6F) Cook

161. Range Analysis Techniques. Theory, application, and limitations of vegetation analysis methods and techniques. Field practice in vegetation sampling and range analysis. To be taken concurrently with Range 160. Credit not allowed those with credit in Range 98. Lab fee $3. Field trips to be arranged. (1F) Grumbles

162. Range Management. Problems in managing native range lands; maintenance of production; utilization of range forage; and range livestock management. Prerequisite: Summer Camp. (5S) Grumbles

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) Parker

164. Technical Problems in Range Management. Specialized problems in range administration and management encountered by the technician. Prerequisite: Range 160 or 162. (3W) Stoddart

180. Watershed Management. Management of timber and forage producing lands to produce maximum quantities of high quality water without loss of stability. Prerequisite: Plant Ecology, Senior classification. Three lectures, one lab. Lab fee $4. Saturday field trips may be scheduled. (4W) Goodwin

181. Range Economics. Development of the range industry, cost of production, range land utilization, organization of cattle and sheep industry, and value of range forage. Prerequisite: Range 160 or 162. (3W) Grumbles

193. Range Seminar. Supervised discussion and review of range animal literature. Prerequisite: Senior classification. (2W) Grumbles

194. Range Seminar. Supervised discussion and review of range plant literature. Prerequisite: Senior classification. (2S) Grumbles

195. Range Problems. Individual study and research upon a selected range problem. Prerequisite: Faculty approval. (1 to 3 F, W, S, Su) Staff

196, 197. Range Field Problems. Field study of range operation and research. Lab fee $40. Prerequisite: Plant Ecology and Plant Communities. (3F) Grumbles

200. Range Thesis. Original research and study on a problem in range management. (1 to 15 F, W, S, Su) Staff

204. Land Use Seminar. Current problems and practices in wildlife management, with emphasis on western range. (2F) Smith

*205. Seminar in Range Nutrition. Problems in management and research in the field of plant and animal nutrition on range land. Prerequisite: Animal Nutrition. (3W) Cook


207. Graduate Seminar. Review of current research in range management by graduate student and faculty. (1S) Grumbles

**210. Environmental Factors. Environmental factors and interaction between organisms and environment as found on native range land. Prerequisites: Plant Ecology and Plant physiology. (3W) Goodwin

*211. Synecology. Development, structure, analysis, and classification of native range vegetation. Prerequisite: Plant Ecology. (3W) Goodwin

*280. Watershed Analysis. Advanced study of technical problems encountered in watershed management. Prerequisite: Watershed Management. (2F) Goodwin

**281. Advanced Range Economics. Advanced study of economic factors affecting conservation practices with special consideration to range lands and range operations. Prerequisite: Range Economics. (2S) Smith

*Taught 1963-64
**Taught 1964-65
Department of

Wildlife Resources


Office in Forestry and Biological Science 126

Students majoring 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 has a Cooperative Wildlife Research Unit, a Cooperative Fishery Unit, and a program in wildlife extension.

Program of Studies

The first two years will 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</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>English 1, 2, 3</td>
<td>9</td>
</tr>
<tr>
<td>College algebra and trigonometry</td>
<td>8</td>
</tr>
<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>
<td>4</td>
</tr>
<tr>
<td>Economics</td>
<td>5</td>
</tr>
<tr>
<td>Soils</td>
<td>5</td>
</tr>
<tr>
<td>Survey courses in forest, range, and wildlife management</td>
<td>4</td>
</tr>
<tr>
<td>M.S., A.S., or P.E.</td>
<td>3</td>
</tr>
</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 132, 141; Botany 112; Chemistry: organic, physical, or biochemistry; Civil Engineering 81, 171; Animal Husbandry 150; Geology 3; English 111, 112, 117; Journalism 112; Photography 51; Physical Education 36; Physiology 4, 121, 122, 131; Zoology 112, 116, 119, 121, 122, 128, 129.

Required for Graduation of All Wildlife Students

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wildlife 145, Principles of Wildlife Management</td>
<td>3</td>
</tr>
<tr>
<td>Wildlife 157, 158, 159, Seminar (Senior Year)</td>
<td>3</td>
</tr>
<tr>
<td>Wildlife 160, Animal Ecology</td>
<td>5</td>
</tr>
<tr>
<td>Range 126, Plant Ecology</td>
<td>5</td>
</tr>
<tr>
<td>Applied Statistics 131, Statistical Methods</td>
<td>4</td>
</tr>
<tr>
<td>English (Advanced Writing)</td>
<td>6</td>
</tr>
<tr>
<td>Speech 105, Technical Speaking</td>
<td>3</td>
</tr>
<tr>
<td>*Social Sciences and Humanities (including above required courses)</td>
<td>25 hours with at least 10 in each group. In addition to these courses, one of the following options may be chosen.</td>
</tr>
</tbody>
</table>

Option A. Game Management

Any two of the following three

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wildlife 146, Management of Upland Game</td>
<td>3</td>
</tr>
<tr>
<td>Wildlife 147, Management of Waterfowl and Furbears</td>
<td>5</td>
</tr>
<tr>
<td>Wildlife 153, Management of Big Game</td>
<td>5</td>
</tr>
</tbody>
</table>
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 Management ................................ 3
Wildlife 169, Techniques of Fishery
Management ....................................................... 5
Zoology 155, Ichthyology ......................................... 3
Zoology 156, Ichthyology Lab ...................................... 2
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 usually several grants from outside agencies available to support graduate research. 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 Leaders of the Wildlife Research or Fishery Unit or to the Head of the Department.

Wildlife Resources Courses

1. Elements of Wildlife Management. Introduction to the problems and methods of wildlife management. (1S) Wagner
99. Wildlife Practice. Integrated studies of wildlife populations in relation to land use. 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, distribution, environmental needs, and plans for management of waterfowl and furbearers, especially muskrat and beaver. Prerequisite: Wildlife 145. Three lectures, field trips. (5S) 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, S) 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. (5W) Wagner
155. Economic Wildlife. General importance of wildlife resources; natural history, economic values and control methods for rodents and predators; identification of skulls and skins; brief evaluation of hawks and reptiles. Two lectures, one lab. (3W) Kelker
Ichthyology. Ecology, classification, and life histories of native and introduced fishes. Two lectures, two labs. (See Zoology 155 and 156.) (5W) Sigler
157, 158, 159. Wildlife Seminar. Discussion of current developments in wildlife management. Two recitation periods per week. (1F, 1W, 1S) Staff
198 College of Forestry

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. (8F) Wagner

161. Limnology. Physical, chemical and biological factors affecting occurrence and productivity of fishes and other aquatic animals in fresh waters. Prerequisites: Botany 30, Entomology 13. Two lectures, two labs. (4F) Neuhold

162. Fishery Biology. Anatomy, development, respiration, and excretion of fresh water teleosts. Two lectures, two labs. (4W) Neuhold

165. Fishery Management. Principles and techniques of lake, pond and stream improvements; ecology of game fishes, propagation methods, common fish diseases. Prerequisite: Zoology 155. Two lectures, one lab. (3S) Sigler

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. (3S) Helm


170. Wildlife Problems. Individual study and research upon a selected wildlife problem. (1 to 5F, W, S, 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. (3W) Kelker

175. Wildlife Law Enforcement. Review of state and federal regulations of fish and game; discussions of apprehension of violators, collection of evidence and its use in court. (3W) Sigler

210. Advanced Field Problems. Field training in techniques not covered in undergraduate courses. (1 to 5F, W, S) Staff

248. Animal Behavior. Cause, function and development of behavior among animals. Three lectures, one lab. (4F) Stokes

253. Advanced Big Game Management. Population dynamics, census methods, hunting regulations, and management plans. Prerequisite: Wildlife 155 or equivalent. Two lectures, one lab. (3W) Wagner

257. Graduate Seminar. Discussion of problems in selection and writing of research projects; discussion of current problems. (2F) Helm

258. Graduate Seminar. Discussion of current investigations by class members and by representatives of state and federal agencies. (2W) Low

259. Graduate Seminar. Review of current literature. Discussion of the completion and publication of students' technical papers. (2S) Neuhold


261. Advanced Limnology. Advanced study of factors affecting productivity of fresh water. Prerequisite: Wildlife 161 or equivalent. Two lectures, two labs. (4F) Sigler

270. Research and Thesis. Credit for field or laboratory research, library work, and thesis writing. (1 to 15F, W, S, Su) Staff
College of

Humanities and Arts

General Education, 201

Liberal Studies, 202
  Honors Courses, 204

Department of English and Journalism, 204
  English, 204
  American Studies, 205
  Writing and Mass Communications, 206
  Journalism, 206
  Photography, 206

Department of Fine Arts, 211
  Music, 211
  Theatre Arts, 217
  Visual Arts, 219

Department of Landscape Architecture and Environmental Planning, 225

Department of Languages, 227
  Languages, 227
  Philosophy, 232
  Philosophical Literature, 232

Department of Speech, 233

Degrees Offered:
  Bachelor of Science
  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:

English and Journalism (English, American Studies, Writing and Mass Communications, Journalism and Photography), Fine Arts (Music, Theatre Arts, Visual Arts), Landscape Architecture and Environmental Planning, Languages (and Philosophy), and Speech. 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 Education

Integrated Courses. The following are broad courses which may be used to satisfy group requirements. They are listed here to facilitate selection and advisement.

Biology

Administered by the staffs of the Departments of Bacteriology and Public Health; Botany and Plant Pathology; Zoology, Entomology, and Physiology.

1. Principles of Biology. Basic principles of life as illustrated in plants and animals, with emphasis on concepts of fundamental importance, including organization of living things, energy relationships, growth, relation of environments, kinds of living things, reproduction, development, inheritance, and evolution. Five lectures. (5F; W, S, Su) Staff

Physical Science

Administered by the staffs of the Departments of Chemistry; Geology; Physics.

Principles essential to understanding the physical universe. Elements of astronomy, chemistry, geology, and physics integrated for use in interpreting human experiences. Chemistry 31. 3 credits. Geology 31. 3 credits. Physics 6. 4 credits.
Humanities (Languages, Arts)

English 34, 35, 36—Great Books and Ideas.
English 40, 41—World Literature.
English 53, 54, 58—American Literature.
Philosophy 56—Beginning Logic.
Music 1—Enjoying Music.
Music 25—Orchestra.
Music 27—University Band.
Music 28—Varsity Band.
Music 33—Choir.
Theatre 1—Understanding Theatre.
Visual Arts 1—Exploring Art.
Visual Arts 10—Analyzing Contemporary Painting.
Philosophy 45—Introduction to Problems of Philosophy.

Philosophy 140, 141, 142—History of Philosophy.
Two years of foreign language are also recommended as an option for satisfaction of the Languages and Arts, or Humanities, group requirement.

Social Science

History 4, 5, 6—History of Civilization.
Political Science 1—Government and the Individual.
History 13, 14—United States History.

Liberal Studies

PROFESSOR T. Y. Booth, COORDINATOR.

Office in Main 182

The program in Liberal Studies has two functions: One is to provide a course of study combining elements of both the humanities and the sciences and leading to a degree in Liberal Studies. 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.

The second 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 unwisely may transfer to the Liberal Studies program upon receiving permission from the Office of Student Services and from the Dean of the College of Humanities and Arts.

Curricula in Liberal Studies

The following three courses of study, each leading to a Bachelor's degree, are available in Liberal Studies. 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 Philosophy¹; 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 15-credit requirement: History 4, 5 and either 13 or 14.

(C) Philosophy: Philosophy 45, 50, 140, 141, 142, 160; Political Science 145, 146, 147.

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.¹ Mathematics 35, 46, 97, 98, 99, 110 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 10-11-12; 104-105-106, or 121-122, or 134.

(2) Biological sciences.¹ Zoology 3, 4, 101, 107, 112, and 131; Botany 24, 25, 30, 118; Bacteriology 10, 160; Public Health 50, 155; Physiology 104. If students select this series they 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

¹See Philosophy Division of Department of Languages. Political Science 145, 146 and 147 deal with political philosophies and are therefore relevant.

³Ten of these credits may be applied toward the group requirement in the field.
the literature of a foreign language; Philosophy 45, 50, 140, 141, 142, 160; History; Political Science 145, 146, 147; Sociology 70; Economics 51, 52.

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. (2S) Staff

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

Department of

English and Journalism

(English, Writing and Mass Communications, American Studies, Journalism and Photography)


English Office in Library 320

Journalism Offices in Main 182 and Information Service Building

Photography Office in TG Building

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 five different majors available in the English and Journalism Department:

1. A Standard English major.
2. An English Teaching major.
3. An American Studies major.
4. A Writing and Mass Communications major.
5. A Journalism and Photography major.

The Standard English Major. Students may complete the Standard English Major and the necessary requirements for certification during the four years. This will qualify them for either graduate work or secondary teaching.

In the standard English major, the student should take courses specified in the eight areas below:

1. Lower Division (minimum fifteen hours): 40, 41, 53, 54, 60, 61.
2. Early English (minimum fifteen hours): 162, 166, 175, 180.
3. Late English (minimum five hours): 190, 191.
4. American Literature (minimum nine hours): 150, 151, 152, 153, 155, 156, 157, 158.
5. World Literature (minimum five hours): 140, 141, 147, 148, 149.
6. Types (maximum twelve hours): 137, 163, 164, 168, 169.
8. Language (minimum 24 hours, two years): French, German, Spanish, Latin.

With the consent of his adviser the student may select other courses to meet the requirements in areas 6 and 7.

He will be expected to complete between 45 and 50 total hours in addition to the Language courses and the Basic Communications course, which is required of all freshmen and other students who have not had its equivalent.

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 Language Arts group requirements, the student should complete a minimum of 25 hours in English, as follows:

1. English 60, 61 (ten hours).
2. English 150, 151, 152 (nine hours).
3. English 104 (three hours).
4. English 112 or 117b (three hours).

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 the course approved.

The American Studies Major. An American Studies major combines courses with those 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, 46, 53, 54, 58, 60, 61, 147, 150, 151, 152, 153, 154, 155, 157, 158, 159.
2. A minimum of sixteen hours in History, preferably 13, 14, 156, 157, 158.
(3) A minimum of eleven hours in Political Science, preferably 106, 117, 118, 119.

(4) A minimum of six hours in the following areas: Economics, Sociology, Art, Music, and Education.

(5) A minimum of twenty-four hours—two years—in a Language: French, German, Spanish or Latin.

An American Studies major is not required to complete a minor. He should contact Dr. Hubert W. Smith to have his course approved.

The Writing and Mass Communications Major. For a career as a creative writer, journalist, technical writer, public relations counselor, or mass communications expert, a student plans a two-fold course as follows:

(1) Complete a minimum of thirty hours in addition to Basic Communication or its equivalent, from such writing courses as Journalism 12, 13, 14, 112, 84, 184, 185, 186, 187 and English 12a, 12b, 111, 112, 117a, 117b, 117c, 199.

Suggested additional courses are Fine Arts 160; Speech 81, 125; English 5, 104; Philosophy 45, 50, 140, 141, 142, 160.

(2) Complete a minimum of thirty hours from the following courses offered by the English Department: 33, 34, 35, 36, 37, 40, 41, 42, 46, 48, 53, 54, 58, 60, 61, 68, 137, 140, 147, 148, 149, 150, 151, 152, 154, 158, 163, 164, 165, 168, 169, 170, 190, 191.

(3) Two years of foreign language.

The student should plan to take at least one writing course each quarter. No minor is required.

Journalism and Photography Major. A major in Journalism and Photography requires completion of Journalism 1, 2, 3, 12, 13, 14, 84, 106, 112, 125, 164, 184; Photography 51, 61, 151, 161; Speech 81, 82, 83, 181; English 5, 111, 117a and b, and at least twenty credits in English and American Literature. Students are urged to enroll for as many Philosophy and History courses as possible.

It is recommended that a minor be selected from the following: Accounting, Art, Business Administration, Economics, History, Language, Political Science, Psychology, Sociology, Social Science, Speech. See Professor John J. Stewart. For details of a Photography minor, see Mr. Arlen Hansen, TG Building.

Graduate Study

Master of Science Degree. The candidate for a Master of Science degree in English must present a Bachelor's degree with English as a major, or an equivalent. To complete the degree he must (1) take the Graduate Record Examination given by the School of Graduate Studies; (2) pass the English departmental examination; (3) students submitting a thesis will be expected to perform acceptably in courses totaling at least 20 graduate ("200") hours in addition to the hours credited to the thesis; these 20 hours must include at least 3 seminar classes. Students not submitting a thesis will be expected to perform acceptably in courses totaling at least 30 graduate ("200") hours; these 30 hours must include at least 4 seminars. Exceptions will be made only by action of the Committee; (4) present from the language department, a statement of proficiency in reading of one foreign language; (5) present an acceptable thesis; (6) pass successfully a test on 15 books recommended by the English Department; (7) pass successfully
the final oral examination under the auspices of the Graduate School.

Master of Science 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. Hubert W. Smith. The emphasis in graduate work will be largely governed by (a) the candidate'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.

A selection of the following courses may be applied toward satisfying requirements for the Master's degree in American Studies: English 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 201, 252, and 253; History 143, 144, 152, 156, 157, 158, 171, 203, and 224; Political Science 101, 117, 118, 119, 125, 127, 140, 160, 180, 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.

In either program (English or American Studies) the candidate may elect an alternate plan which requires a minimum of 45 credit hours of which at least twenty must be in courses numbered above 200 (202 a, b, c, cannot be counted as part of the twenty). 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

1. 2. 3. Basic Communications. Required of all freshmen. Designed to increase the skills of students in writing, reading, speaking, listening. (3F, 3W, 3S) Staff

4. Elements of Grammar. For students who wish training in grammar beyond that given in Basic Communications. (3F, W, S) Mortensen

5. Vocabulary. A study of word formation and derivation as a means of understanding scientific terms and of increasing vocabulary. (3F, W, S) Staff

12 a, 12 b. Practice in Composition. For students who wish to practice in composition beyond that given in Basic Communications. (2F, W, S) Staff

14, 15, 16. English for Foreign Students. Required of all foreign students who fail to pass the English Entrance test. The courses are designed to assist the student in mastering the written and spoken forms of the English language. (3F, W, S) Staff

31. Floating Poetry. Poetry that has lived in oral tradition since medieval time. (3S) Hendricks

32. Readings in Poetry. To develop appreciation for poetry. Verse forms, various types of poems, and the idea underlying lasting poetry. (3F) Nielsen

33. Readings in Short Story. (3F, W, S) Rice

34. Great Books and Ideas. Man's ideas about himself, the universe, and the divine. (3F) Rice, Nielsen

35. Great Books and Ideas. Man's ideas about social relationships. (3W) Rice, Nielsen

36. Great Books and Ideas. Man's ideas about the modern world. (3S) Rice, Nielsen

(Courses 34, 35, 36 are related but they are taught as independent units and need not be taken as a series.)
37. Reading in the Novel. (3F, W, S) Bullen
40. World Literature Before 1650. (5F, W, S) Nielsen, Axelrad
41. World Literature from 1660 to the Present. (5F, W, S) Axelrad, Nielsen
42. Readings in Mythology. (3S) Stock
46. The Bible as English Literature. (5S) Taylor
48. Modern European Literature. (3F) Staff
53. American Literature, Early Period. (5F, W, S) Smith, Taylor, Hunsaker
54. American Literature, Late Period. (5F, W, S) Smith, Taylor, Hunsaker
58. Modern American Literature. (3W) Taylor
60. English Literature, Early Period. (5F, W, S) Skabelund
61. English Literature, Late Period. (5F, W, S) Skabelund
68. Modern English Literature. (3S) Bullen
104. Grammar. Designed for teachers. (3S) Mortensen
111. Technical Writing. Effective communication of ideas via the technical report and the scientific article. For junior and senior students of engineering, forestry, and the physical and life 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.) (3F, W, S) Frieszche, Axelrad
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. (3F, W, S) Mortensen
117. Creative Writing
(a) Short Stories. (3S) Rice
(b) Essays. (3F) Rice
(c) Poetry. (3W) Nielsen
122. Children's Literature. Prose and poetry of children to the junior high school age. (3F, W) Mortensen
123. Literature for Adolescents. Prose and poetry of the high school age. (3W) Mortensen
134. Literary Criticism. Masterpieces of criticism from Plato and Aristotle to Croce. (4W) Patrick
137. English Novel. The English novel in the 18th and 19th centuries. (3W) Bullen
140. Greek Literature. An introduction to the major poets, dramatists, historians, and philosophers of Greece from Homer to Aristotle. All readings in English translations. (5F) Stock
141. Roman Literature. An introduction to the major poetry, drama, history, and philosophy of Latin writers from Plautus and Terence to St. Augustine. All readings in English translations. (5W) Stock
148. Comparative Literature. The Romantic Period in England and Germany. (3F) Staff
149. Comparative Literature. The Nineteenth Century in England and Europe. (3S) Frieszche
150. American Poetry. From Philip Frenenque to the Present. (3F) Smith, Taylor
151. American Fiction. Nineteenth and early Twentieth Century fiction writers. (3W) Smith, Taylor
152. American Drama. Historical treatment of American drama: extensive reading of representative plays. (3S) 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, settlers, and homesteaders. (3S) 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. (2) Staff
155. The Colonial Period in American Literature. An introduction to seminal ideas of American thought and institutions as formulated by the Puritans and other writers of the period. (3W) 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. (3F) 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) Hawhorne, (c) Melville, (d) James. (2) Staff

162. Chaucer. (5F) Hendricks

163. Shakespeare. Comedies and History Plays. (5W) Patrick

164. Shakespeare. The Tragedies. (5S) Patrick

165. Readings in Individual English Authors. No prerequisite. (a) Wordsworth, (b) Byron, (c) Shelley, (d) Tennyson, (e) Browning, (f) Hardy. (2) Staff

166. Middle English Literature in Translation. A study of English literature from the 12th century to the renaissance. (5S) Frietzsche

167. Critical Studies of Individual English 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) Donne, (b) Dryden, (c) Swift, (d) Arnold. (2) Staff

168. Readings in World Drama. Aeschylus to Ibsen. (5W) Booth

169. Readings in World Drama. Ibsen to the present. (5S) Booth

170. Milton. (3W) Rice

175. Literature of the English Renaissance. (5F) Frietzsche

180. Restoration and Eighteenth Century. (6S) Steensma

190. The Romantic Period. (5F) Patrick

191. The Victorian Period. (5W) Frietzsche

199. Readings and Conference. Credit arranged. Any quarter. Students must have the approval of the Head of the department. (3S) Staff

200. Thesis. Credit arranged. (F, W, S) Staff

201. Bibliography and Methods. Required of all candidates for the Master's degree in English. (3F, S) Bullen

202. A, I, 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, 1S) Staff

205. History of the English Language. (8S) Hendricks

209. Anglo-Saxon. Required of all candidates for the Master's degree. (5W) Hendricks

211. Bibliography and Research Methods. An intensive course in preparation of bibliography, use of source materials, and other problems of thesis writing. Open to graduate students only; recommended for first quarter of graduate study. (2F, W, S) Axelrad, Frietzsche

234. Seminar in Modern Criticism. (3) Patrick

251. Seminar: Early American Literature. (a) The Puritan Mind, b) The Impact of Deism, (c) Democracy and Religious Diversity. (3) Staff


253. Seminar: 20th Century American Literature. (a) Modern Poetic and Critical Schools, (b) Modern Fiction and Drama, (c) 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

275. Seminar in English Literature 1580-1685. (3) Frietzsche

280. Seminar in Eighteenth Century Literature. (3) Steensma

290. 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. (1-5F, W, S) 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. (Student Life editors may register for English 199). (1F, 1W, 1S) Stewart

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. (3F) Allred

13. Reporting. Continuation of 12 with emphasis on newspaper style, social responsi-
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. (4W) Klages

**125. Editorial Responsibility.** Editorials and other elements of the modern editorial page, writing of editorials; essentials of press law and ethics. (5F) Culmsee

**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: Journ. 12, 13, 14 or permission of instructor. (3S) Allred

166. Journalism Practices. Laboratory work in publications, radio or television. (2F, 2W, 2S) Staff

184. TV Writing. Writing and editing news, drama and other television material. To be studied concurrently with Speech 181. (3F) Stewart

185, 186, 187. Special Problems in Journalism. (1 to 2F, 1 to 2W, 1 to 2S) Culmsee

191. School Publications. For the prospective teacher. Problems of advising staffs of school newspapers, yearbooks and magazines. Staff
The Department of Fine Arts is comprised of Music, Theatre Arts, and Visual Arts. It has a threefold purpose: (1) It offers rewarding contact with the arts to the University and community at large through experience as viewers, listeners or participants in a variety of exhibits, dramas and concerts. (2) It prepares students to teach the arts in the elementary and secondary schools and participate in other professional endeavors in the arts. (3) It offers graduate studies designed to deepen artistic insight and to qualify for the Master of Science degree and advanced professional positions.

Music

The Department of Fine Arts program in Music serves three functions: (1) Provides courses which meet lower division or general education requirements in Language and Arts; (2) provides courses that further increase understanding and appreciation of music and develop particular skills; (3) provides specific sequences of courses leading to the Bachelor's and Master's degrees in music and music education.

A placement examination in music theory will be administered to each freshman student prior to his initial registration. This examination will determine whether the first course in music theory should be preceded by a course in music fundamentals. In this case the music theory sequence will be taken in the sophomore year.

Every student is expected to meet a minimal performance ability on his major instrument. His specific individual instruction requirement will be determined by jury examination to be given at the close of each spring quarter. Transfer and re-entering students must submit to an examination and evaluation during their first quarter of study in the department.

Graduating seniors will be required to appear in public recital. Alternative projects will be prescribed for music majors who wish to specialize in history or composition. The area of specialization must be determined no later than the junior year.

Quarterly participation in two major performing ensembles is required. The student will be assigned to these ensembles by his adviser.

Group instruction requirements may be waived by examination.

Music students must attend all
musical presentations sponsored by the Fine Arts Department.

The following course sequence, listing requirements, is recommended.

**Music Education Major**

**FRESHMAN YEAR**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>FA-M 4</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>80 (three quarters)</td>
<td>3</td>
</tr>
<tr>
<td>84 (three quarters)</td>
<td>3</td>
</tr>
<tr>
<td>85 Group Percussion</td>
<td>1</td>
</tr>
<tr>
<td>Psych 53</td>
<td>5</td>
</tr>
</tbody>
</table>

**SOPHOMORE YEAR**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>FA-M 81 (three quarters)</td>
<td>3</td>
</tr>
<tr>
<td>82 (three quarters)</td>
<td>3</td>
</tr>
<tr>
<td>83 (three quarters)</td>
<td>3</td>
</tr>
<tr>
<td>104</td>
<td>5</td>
</tr>
<tr>
<td>105</td>
<td>5</td>
</tr>
<tr>
<td>106</td>
<td>5</td>
</tr>
<tr>
<td>PH 154</td>
<td>3</td>
</tr>
</tbody>
</table>

**JUNIOR YEAR**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>FA-M 101</td>
<td>3</td>
</tr>
<tr>
<td>102</td>
<td>3</td>
</tr>
<tr>
<td>103</td>
<td>3</td>
</tr>
<tr>
<td>107</td>
<td>3</td>
</tr>
<tr>
<td>141</td>
<td>3</td>
</tr>
<tr>
<td>150</td>
<td>3</td>
</tr>
<tr>
<td>Ed 111</td>
<td>3</td>
</tr>
<tr>
<td>114</td>
<td>3</td>
</tr>
<tr>
<td>Psych 100</td>
<td>3</td>
</tr>
<tr>
<td>102</td>
<td>3</td>
</tr>
</tbody>
</table>

**SENIOR YEAR**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>FA-M 151</td>
<td>3</td>
</tr>
<tr>
<td>153</td>
<td>3</td>
</tr>
<tr>
<td>140</td>
<td>3</td>
</tr>
<tr>
<td>Ed or Psych Elective (upper division)</td>
<td>3</td>
</tr>
<tr>
<td>Ed 127</td>
<td>5</td>
</tr>
<tr>
<td>129</td>
<td>5</td>
</tr>
<tr>
<td>130</td>
<td>4</td>
</tr>
</tbody>
</table>

**Music Major.** Each music major is required to register quarterly for private instruction in his chosen field. Upon entrance, his adviser will provide him with a list of assignments indicating minimum levels of competency for each year of study. The student must be evaluated by a faculty jury at the end of each year.

**Major in Piano**

**Entrance Requirements:** Be grounded in correct touch and reliable technique and have acquired systematic methods of practice. Play all major and minor scales correctly in moderately rapid tempo and the broken chords in octave position in all keys. Have studied some of the standard etudes, such as Czerny, Op. 299, Book I; Heller, Op. 46 and 47; Bach, Little Preludes and a few Two-Part Inventions, and other compositions corresponding in difficulty to Haydn Sonata No. 11, G major No. 20 (Schirmer); Mozart Sonatas, C major No. 3, F major No. 13 (Schirmer); Beethoven Variations on Nel Cor Piu, Sonata, Op. 49, No. 1; Schubert Impromptu, Op. 142, No. 2.

**End of Second Year:** Read at sight accompaniments and solo pieces of moderate difficulty. Play scales and arpeggios in rapid tempo; play scales in parallel and contrary motion, in thirds and sixths, and in various rhythms; and have acquired some octave technique. Have studied compositions of at least the following grades of difficulty: Bach: some Three-Part Inventions, at least two preludes and fugues from the Well-Tempered Clavichord, dance forms from French Suites and Partitas. Haydn: Sonata E flat, No. 3 (Schirmer); Sonata D major. Mozart: Sonata No. 1, F major, or No. 16, A major (Schirmer). Beethoven: Sonatas or movements from sonatas, such as Op. 2, No. 1; Op. 14, Nos. 1 and 2; Op. 10, No. 1 or 2; Op. 26, etc. Schubert: Impromptu B flat. Mendelssohn: Songs without Words—such as Spring Song, Hunting Song. Schumann: Nocturne F major, Novelette F major, Fantasiestücke, The Bird as a Prophet. Chopin:
Polonaise C sharp minor; Valse E minor; Nocturne, Op. 9, No. 2; Nocturne F minor, Op. 55, No. 1; Nocturne B major, Op. 31, No. 1. Liszt: Liebestraum; transcriptions, such as On Wings of Song, Du bist die Ruh. Compositions of corresponding difficulty by standard modern composers.

End of Fourth Year. Have had considerable experience in ensemble playing and show satisfactory ability in sight reading. Show a thorough knowledge of the principles of tone production and velocity and demonstrate their application to scales, arpeggios, chords, octaves, and double notes. Have a comprehensive repertory of such representative works as: Bach: Chromatic Fantasie and Fugue, Toccatas; transcriptions by Busoni, Taussig, Liszt, D’Albert. Beethoven: later sonatas such as Op. 53, 57, and a concerto. Chopin: ballades, polonaises, Fantaisie, Barcarolle, scherzos, etudes, preludes, and a concerto. Liszt: rhapsodies, Paganini Studies, transcriptions, a concerto. Brahms: Rhapsodie B minor, Sonata F minor. Impressionists: Debussy, Ravel. Compositions by contemporary composers, such as Copland, Prokofieff, Bartok.

Major in Voice

<table>
<thead>
<tr>
<th>Course</th>
<th>FRESHMAN YEAR</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>FA-M 4</td>
<td>4 Theory</td>
<td>5</td>
</tr>
<tr>
<td>FA-M 5</td>
<td>5 Theory</td>
<td>5</td>
</tr>
<tr>
<td>FA-M 6</td>
<td>6 Theory</td>
<td>5</td>
</tr>
<tr>
<td>FA-M 80</td>
<td>(Three quarters group piano)</td>
<td>3</td>
</tr>
<tr>
<td>FA-M 33 or 36</td>
<td>(choir three quarters)</td>
<td>3</td>
</tr>
<tr>
<td>French or German 1, 2, 3</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>Plus: group requirements and electives</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>SOPHOMORE YEAR</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>FA-M 104</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>FA-M 105</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>FA-M 106</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>FA-M 60</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>French or German 1, 2, 3</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course</th>
<th>JUNIOR YEAR</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>FA-M 101, 102, 103.</td>
<td>(music history)</td>
<td>9</td>
</tr>
<tr>
<td>FA-M 107</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>FA-M 146</td>
<td>(advanced vocal repertory)</td>
<td>3</td>
</tr>
<tr>
<td>FA-M 183</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>FA-M 135</td>
<td>(three quarters)</td>
<td>9</td>
</tr>
<tr>
<td>FA-M 160</td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

SENIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>FA-M 160 Piano</td>
<td>3</td>
</tr>
<tr>
<td>FA-M 112</td>
<td>3</td>
</tr>
<tr>
<td>FA-M 180</td>
<td>2</td>
</tr>
<tr>
<td>FA-M 135</td>
<td>9</td>
</tr>
<tr>
<td>FA TH 52</td>
<td>1</td>
</tr>
<tr>
<td>FA TH 44</td>
<td>3</td>
</tr>
</tbody>
</table>

Major in Strings

FRESHMAN YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>FA-M 4</td>
<td></td>
</tr>
<tr>
<td>FA-M 5</td>
<td></td>
</tr>
<tr>
<td>FA-M 6</td>
<td></td>
</tr>
<tr>
<td>FA-M 80</td>
<td>(three quarters)</td>
</tr>
<tr>
<td>French or German 1, 2, 3</td>
<td></td>
</tr>
</tbody>
</table>

SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>FA-M 60</td>
<td>(three quarters)</td>
</tr>
<tr>
<td>FA-M 104</td>
<td></td>
</tr>
<tr>
<td>FA-M 105</td>
<td></td>
</tr>
<tr>
<td>FA-M 106</td>
<td></td>
</tr>
<tr>
<td>FA-M 185</td>
<td></td>
</tr>
<tr>
<td>French or German 4, 5, 6</td>
<td></td>
</tr>
</tbody>
</table>

JUNIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>FA-M 84</td>
<td>(Spring quarter)</td>
</tr>
<tr>
<td>FA-M 112</td>
<td></td>
</tr>
<tr>
<td>FA-M 141</td>
<td></td>
</tr>
<tr>
<td>FA-M 180</td>
<td></td>
</tr>
<tr>
<td>FA-M 183</td>
<td></td>
</tr>
<tr>
<td>FA-M 186</td>
<td></td>
</tr>
</tbody>
</table>

SENIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>FA-M 81</td>
<td>(three quarters)</td>
</tr>
<tr>
<td>FA-M 101</td>
<td></td>
</tr>
<tr>
<td>FA-M 102</td>
<td></td>
</tr>
<tr>
<td>FA-M 103</td>
<td></td>
</tr>
<tr>
<td>FA-M 107</td>
<td></td>
</tr>
<tr>
<td>Hist. 166</td>
<td></td>
</tr>
<tr>
<td>Hist. 167</td>
<td></td>
</tr>
</tbody>
</table>

Those interested in other areas of specialization will be advised individually.

Music Minor

The performance and theory requirements of the degrees in music
and music education do not apply to the music minor. Participation in one major performing ensemble will be expected as will attendance at all concerts presented during the student's musical studies. The program of study may be adjusted to the needs of the student, but the following courses are recommended:

Course Credit
FA-M 2 3
80 (three consecutive quarters) 3
81 (three consecutive quarters) 3
101, 102, or 103 3
112, 185, or 186 3
180, 181, 182 3
Performing Organization 3

Music Education Minor

For a minor in Music Education a student must take at least 18 hours in music, which shall include the following courses or their equivalent:

Course Credit
FA-M 1 Enjoying Music 3
2 Fundamentals of Music 3
80 Group Piano 3
81 Group Voice 3
150 Music in the Elementary Grades 3

Additional elective courses will be selected in consultation with the minor advisor to serve the best interests of each particular student.

Graduate Study

A Master of Science degree may be earned in Music with a major in either Music Education or Applied Music.

To major in Music Education one must: (1) Have a teaching knowledge of all instruments and voice; (2) be able to play simple accompaniment on the piano; (3) participate in large and small ensemble performances at USU, on an instrument or vocally; (4) satisfy the graduate committee as to competence in vocal or instrumental specialization. (Additional private instruction may be required by this committee.)

In addition to these general requirements, students may be required to take the graduate record examination, and a music counseling examination, which covers music history, literature, theory, education and one instrumental or vocal specialty. From the results of these examinations the graduate committee will be able to suggest the most profitable course work and private instruction necessary to complete the Master of Science degree in Music Education.

Twenty-five hours of music credit beyond the bachelor's degree will be recommended by the advisor. Of these, the following courses are required: Music 258, 3 hours; Music 259, 3 hours; Music 280, 3 hours. Students may elect additional credit from the following: Aesthetics; Music 201, 3 hours; Music 205, credit arranged; Music 243, 1 hour, and any upper division courses recommended by the advisor.

Students may elect a thesis project, or a lecture-recital. All work is to be completed under supervision of the graduate Committee.

Requirements for majoring in Applied Music are the same as those for Music Education, with these exceptions: (1) Students need not have a teaching knowledge of all instruments and voice in order to specialize vocally or instrumentally; (2) the counseling examination does not include the area of Music Education; (3) the Music Education Seminar is recommended, but not required; (4) students may elect a thesis project, a lecture recital or a music recital.

The following course work is a minimum requirement: Music Lit-
erature Seminar, 3 hours; Music Theory Seminar, 3 hours; private instruction, 6 hours; ensemble performance, 3 hours. Six hours of credit will be given for the thesis, lecture recital or music recital. Other elective courses most helpful to the individual situation are encouraged.

Music Courses

1. Enjoying Music. Designed to increase understanding and enjoyment of music through studying and hearing selected compositions in all musical forms. (3F, 3W, 3S) Staff


25, 125. Orchestra. Provides training and practical experience in a wide range of orchestral works, including symphonies and major choral works. Credit arranged. (F, W, S) Staff

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. (2F, 2W, 2S) Dalby

28, 128. Varsity Band. A training band for students who wish to qualify for membership in the University Concert Band. A band practice to provide additional experience for music majors in rehearsal techniques, conducting and playing minor instruments. Practical study of literature for use in the public schools. (F, W, S) Wardle

33, 133. University Choir. Rehearsal and public performance of great choral literature with emphasis on oratorio and larger forms. Opportunity to perform with orchestra. (1F, W, S) Puffer

42, 142. Piano Ensemble. Works for two pianos and for piano, four-hands, training in sight reading, developing ability in ensemble playing. Audition required. Four students per section. (F, 1W, 1S) Wassermann

43, 143. String Ensemble. Offers opportunities for capable string players and pianists to form trios, quartets, and other small units. (1F, 1W, 1S) Staff

44. Brass Ensemble. Brass quartets, sextets, and larger groups. Members are selected from applicants. (1F, 1W, 1S) Hanson, Wardle

45. Woodwind Ensemble. A study of the literature for woodwind quintet and other small groups. (1F, 1W, 1S) Dalby


60, 160. Individual Piano Instruction. Staff

62, 162. Individual Organ Instruction. Staff

64, 164. Individual Vocal Instruction. Dittmer

70, 170. Individual Woodwind Instruction. Dalby

72, 172. Individual Brass Instruction. Hanson, Wardle

74, 174. Individual Violin and Viola Instruction. Staff

75, 175. Individual Cello Instruction. (1F, W, S) Pahtz

77, 78, 79. Piano Literature. A listening course designed to present piano music for the general student as well as the trained musician. It is not necessary to read music nor play the piano to benefit from this course. Fall Quarter: Piano music to the time of Beethoven; Winter Quarter: To the early romantics; Spring Quarter: Up to the contemporary composers. During all quarters, representative piano literature is analyzed and performed by the instructor. (2F, W, S) Wasserman

80. Group Piano Instruction. (1F, 1W, 1S) Dalby

81. Group Vocal Instruction. (1F, 1W, 1S) Dittmer

82. Group Woodwind Instruction. (1F, 1W, 1S) Dalby

83. Group Brass Instruction. (1F, 1W, 1S) Hanson, Wardle

84. Group String Instruction. (1F, 1W, 1S) Stoffel

85. Group Percussion. (1F) Dalby

91, 92, 93. Music Arts. Several approved concerts, musical recitals, plays and motion pictures are scheduled each quarter with attendance required at a specific number of these events. Passing grades will be awarded for those attending the programs and meeting minimum requirements. (1½F, W, S) Tippett

101, 102, 103. Music History and Literature. Basic course for music majors and those desiring a comprehensive background in music.
216 College of Humanities and Arts

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 through Romanticism; spring quarter through contemporary music. Required of all music majors and minors. Music 1, recommended prerequisite. (3F, 3W, 3S) Wassermann


107. Scoring and Arranging. Study of each of the standard instruments in use today, their employment in small ensembles and large groups. Scoring and arranging for band and orchestra. (3W) Dalby

108. Counterpoint. Writing music in 16th century contrapuntal style. (3W) Dalby

111. Composition. Projects in creative composition for more advanced students. Prerequisites 106 and 107. (3S) Staff

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 development and form and statements by composers discussing their philosophy and aims are studied. (3Su) Staff

124. Chamber Orchestra. The preparation and performance of music for chamber orchestra and theatre. To serve regularly in conjunction with the spring musical and programs devoted to the 18th century repertoire. Staff

135. Opera Workshop. 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. (3Su, F, W, S) Puffer

136. University Chorale. A select mixed concert chorus performing a wide range of chorale literature. Attendance required at all public performances. Admission by audition. Auditions are conducted at first and second rehearsals, or by appointment with the director. Open to lower and upper division students. (1F, W, S) Puffer

137. Madrigal Singers. Study and performance of madrigals, motets, and distinctive choral literature. Membership by audition. Auditions are conducted at first and second rehearsals or by appointment with the director. (1F, 1W, 1S) Dittmer

138. Men's Chorus. A selected group of men singers. Admission by audition. Auditions are conducted at first and second rehearsals or by appointment with the director. (1F, 1W, 1S) Puffer

139. Women's Chorus. A selected group of women singers. Admission by audition. Auditions are conducted at first and second rehearsals or by appointment with the director. (1F, 1W, 1S) Puffer

140. Choral Conducting. Basic routines of organizing and training choruses. Assigned projects in conducting small and large vocal ensembles. (3F) Puffer

141. Instrumental Conducting. Basic routines in dealing with instruments in ensembles, band, and orchestra. (3W) Dalby

145. Advanced Vocal Repertory. The German Lied and contemporary song literature. Prerequisite: FAM 46. (1F, W, C) Puffer

150. Music for Elementary Schools. Application of music to the elementary school classroom. Problems, methods, and materials in singing, rhythms, creative music, reading and listening. (3W, 3S) Dittmer

151, 152, 153. Secondary School Methods and Materials. Teaching and administration of various phases of the music program. 151, Choral Methods (3F); 152, Orchestral Methods (3W); 153, Band Methods (3S). Staff

155. Piano Teaching Methods. Designed to prepare qualified pianists to teach piano according to the latest methods, and acquaint them with the newest music materials and techniques. Problems common to piano teaching analyzed, and teacher-student relationships emphasized. (2F) Wasserman

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) Wasserman

183. Enjoying Opera. History and traditions of music theatre through lecture and recordings. (2W) Puffer

184. Sacred Music. Evolution of cantata and oratorio and consideration of modern hymns and sacred music. (3W) Staff

185. Symphonic Literature. The evolution of symphonic music is studied and analyzed from recorded examples from masters of the Baroque, Classic, Romantic, and Contemporary Periods. (3) Staff

186. Chamber Music. An analysis of chamber music forms and their development, including sonata literature. (3S) Staff

201. Introduction to Musicology. Designed to lay the foundation for broad philosophy of music through a study of music acoustics, aesthetics, sources of music literature, and principles of music pedagogy. (3W) Staff

205. Special Problems in Music. An advanced course designed to meet specific problems of the music educator. (1 to 3S) Staff
221a. Woodwind Clinic. An intensive study of the woodwind instruments, with recommended methods of teaching. Daily, June 17-29 (1Su) Staff

221b. Brass Clinic. An intensive study of the brass instruments with recommended methods of teaching. Daily, June 17-29 (1Su) Staff

221c. Percussion Clinic. An intensive study of the percussion instruments with recommended methods of teaching. Daily, June 17-29 (1Su) Staff

243. Chamber Music Interpretation. An intensive study of chamber music styles and the varied problems of this interpretation. Emphasis will also be placed on actual performance. Students will also receive training in the coaching of beginning and intermediate ensembles. (1S, Su) Staff

251. Advanced Choral Methods. Rehearsal techniques and materials to use with the secondary school choir. The study of phonetics and its relation to good choral sound. Teachers registering for this class are expected to sing in clinic chorus. Daily, June 17-29 (1Su) Staff

252. Advanced Orchestra Methods. Techniques of training the school orchestra. A consideration of special problems relating to the string instruments. Teachers registering for this class are expected to play in the clinic orchestra. Daily, June 17-29 (1Su) Staff

253. Advanced Band Methods. Techniques in training the band. Private consultation on problems in rehearsal techniques, public relations, etc. Teachers registering for this class are expected to play in the clinic reading band. Daily, June 17-29 (1Su) Staff

258. Seminar in Music Education. Teaching and administration of various phases of the music program. Special projects. (3S) Dally

259. Seminar in Music Theory. A study of the practical aspects of musical theory as related to analysis, pedagogy and composition. (3F) Dittemer

260. Seminar in Music Literature. A graduate course designed to give a survey of important musical literature and vital source material for its study. (3S) Staff

287. Individual Recital. This course is designed for the preparation and presentation of an individual recital on any instrument or voice prescribed and supervised by the major professor. (3F, 3W, 3S) Staff

Theatre Arts

The undergraduate curriculum and Utah State Theatre productions are planned to help students prepare for teaching careers or for advanced study in Theatre Arts.

Fifty credits of course work and participation in Utah State Theatre plays are required of the teaching and non-teaching major and minor. A detailed list of requirements may be obtained from the department office. If one desires to complete a composite major in Theatre Arts and another division or department, English, Speech, Music, or Visual Arts, he should arrange his program with the advisors assigned to him by the heads of the departments concerned.

For a minor in Theatre Arts a minimum of eighteen credit hours is required. For the teaching minor in Theatre Arts twenty to twenty-four credit hours are required. A detailed list of requirements may be obtained from the minor adviser. All majors and minors should register for FA-TH 1 in the first quarter of study.

Each year the Utah State Theatre produces a number of plays. Theatre Arts majors are required to participate in at least four, and Theatre Arts minors in at least two of these productions per year.

Graduate Study

Theatre Arts offers advanced course work and seminars leading to the Master of Science degree with a major in Theatre Arts. During the first quarter of residence, and before admission to candidacy for the Master of Science degree, the candidate takes two diagnostic or program planning examinations. The first of these is a comprehensive written examination covering theatre history, literature and criticism, acting, directing, scenery and costume design, technical theatre practice, current drama and theatre. The second is an oral skills test in which a student demonstrates be-
before a departmental committee his competency in voice and diction, extemporaneous speaking and interpretative reading or acting. The results of these diagnostic inquiries are used to assist him and his faculty adviser in planning a complete program of study and in selecting the thesis subject or project.

As a candidate for the Master of Science degree in Theatre Arts one may, with the approval of his supervisory committee, elect to write a thesis or he may present a creative project in playwriting, directing, acting, scene or costume designing or technical practice. As part of the creative project and in lieu of a thesis, he submits a manuscript, production book or project record.

Theatre Arts Courses

1. Understanding Theatre. A course planned to develop understanding of dramatic art through learning the contributions made by playwrights, actors, directors, designers, technicians and theatre builders to the art of the theatre. (3F, 3W, 3S) 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. (SW) Call

10. Drama Appreciation. For the student who wishes to enhance his enjoyment of plays seen in the theatre or read in the library. Study of the major forms or types of drama—tragedy, comedy, farce, melodrama—process and major styles of drama—classicism, romanticism, realism, symbolism, and expressionism. (3W) Morgan


44. Fundamentals of Acting. Theory and practice of the basic concepts of acting. (3F) Staff

46. Intermediate Acting. A continuation of FA-TH 44, with emphasis on characterization

and the development of the actor’s physical, mental and emotional resources. (SW) Call

50. Stagecraft. Technical organization and planning of the production. Building, rigging, and shifting of scenery and construction of properties. (2F, 2W, 2S) Brandt

52. Makeup. Practice and theory of straight and character makeup for the stage. One two-hour laboratory period per week. Recommended for prospective directors of school, church and community theatres. (1F) Morgan


55, 57. 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, 1W, 1S) Staff

56. Puppetry. The design, construction, and manipulation of puppets. Recommended particularly for elementary teachers. (SW) Reynolds

100, 102, 104. Masterpieces of Theatre. A study of plays as presented in the theatre. Fall quarter: Greek, Roman, Medieval and early Renaissance plays. Winter Quarter: plays of the late Renaissance to Ibsen. Spring quarter: modern European and American dramas. (3F, 3W, 3S) Staff


130. History of the Theatre. Historical survey of the evolutionary processes in the theatre from ancient to modern times. Actors and acting methods, stages and production effects, etc. are studied. (6F) Call

144. Advanced Acting. Emphasis on the creative approach to acting, analysis and creation of the role and ensemble playing (SS). (3S) Staff

146. Directing. Theory and practice of the principles of stage directing. (3S) Call

148. Private Instruction. Individual tutoring to develop competence in voice, acting, directing, scenic and costume design. Special fee. Credit arranged. (F, W, S) 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. (SW) Morgan

152. Stage Costuming. Fundamentals of pattern drafting, construction of stage costumes and accessories, organization and care of costume wardrobes. (3F) 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. Prerequisites: FA-TH, or consent of instructor. (3S) Brauner

154. Stage Lighting. Study and application of the principles of stage lighting. Practice in planning the lighting for a play, mounting instruments and in the operation of control boards. (2) Brandt

156. Theatre Organization and Management. Study of the managerial aspects (organization, promotion, financing) of the educational and community theatres. (2S) Call

158. Creative Dramatics. Guidance of children in the creation of scenes and plays with improvised dialogue and action. Application of creative dramatics to the classroom situation. Recommended for prospective elementary school teachers. (2S) Call

160. Playwriting. Analysis of dramatic structure as it relates to play directing, dramatic literature and the writing of plays. (3) Morgan

190. Problems in Drama. Selected research problems of merit and of mutual interest to students and instructors are investigated. Credit arranged. (F, W, S) Staff

192. Projects in Theatre. Advanced work in 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, S) Staff

194. Problems of Drama Directors. Play selections, 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. (3S) Morgan

196. Advanced Directing. Practice in stage direction. The student selects, casts, directs, and presents short plays and scenes. Prerequisite: FA-TH 146. (3S) Staff

200. Seminar in Drama. Intensive study of special problems in drama and theatre. Credit arranged. (F, W, S) Staff


204. Thesis. Credit arranged. (F, W, S) Staff

206. Directed Readings in Drama. By permission of the instructor. Credit arranged. Staff

208. Scene Study. Study of scenes in famous plays. Credit arranged. (F, W, S) Staff

210. Special Projects in Theatre. Directed study and practice in specialized phases of theatre art. Credit arranged. (F, W, S) Staff

214. Topics in Drama. Study of selected topics in dramatic theory and practice. Credit arranged. Staff

216. Seminar in Theatre. Intensive study of special problems in drama and theatre. Credit arranged. Staff

218. Directed Readings in Theatre. By permission of the instructor. Credit arranged. Staff

220. Directed Projects in Theatre. Directed study and practice in specialized phases of theatre art. Credit arranged. Staff

222. Advanced Projects in Theatre. Graduate projects in any branch of theatre art. Credit arranged. (F, W, S) Staff

Visual Arts

Group Requirement Classes: A general education in the visual arts is of lasting value to most university students. Several courses are offered which will satisfy Language and Arts group requirements. These classes are: Visual Arts 1, 10, 35, 36, 37 and 40.

Major Requirements. Students may specialize in any of ten major areas. Nine courses are required of all visual art majors: Visual Art 1, 5, 6, 8, 10, 12, 14, 35 and 36 or 37. The design series, Visual Arts 5, 6, and 7, is a prerequisite which should be completed with at least a grade of "C" before art majors may enroll in classes with higher numbers.

It is important for Art majors to develop their competence in original creative expression. In the area of the students specialization it will be necessary to take some of the upper division courses more than once. With the exception of Art 135, 140, 151, 152, all upper division art studio courses may be repeated up to a maximum of three times with credit being given for each quarter's work.

The additional major requirements are listed for each area of specialization. The major professor may prescribe other courses to serve the particular needs of different students.

Minor Requirements: The requirements for a minor in art are flexible and can be completed in any of the ten major areas of specialization with the approval of the major professor. A minor in general art may include the following: FA-A 1, 2 and 3 or 4, 5, 8, 14 and three hours credit chosen from the crafts. Exceptions can
be made in this series with the approval of the major and minor professors.

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 nine courses, Advertising Design and Illustration majors are required to take the following: Visual Arts 9, 21, 22, 23, 24, 25, 26, 104, 105, 111, 112, 121, 122. Additional prescribed classes to be selected on consultation with advisors are: Visual Art 19, 27, 28, 29, 30, 40.

Art Education. To teach art in the secondary schools individuals 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 commendable talent 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 nine basic courses Art Education majors are required to take the following classes: Visual Arts 19, 21, 25, 27, 30, 40, 60, 111, 115, or 116, 127, 135, 152, plus additional classes prescribed by the advisor.

Minimum Requirements for an Art Minor for students majoring in Elementary Education: Visual Arts 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 nine courses Ceramic majors are required to take: Visual Arts 19, 30, 31, 60, 119, 130, 131, 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: Visual Arts 40, 66, 115, 116, 166 and C&T 24. Additional prescribed classes to be selected on consultation with advisers are Visual Arts 135, 140, 142, 143.

**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 nine courses, Interior Design Majors are required to take the following: Visual Arts 40, 66, 115, 116, 135, 140, 142, 143, 144; C&T 24. Additional prescribed classes to be selected on consultation with advisers are: Visual Arts 135, 140, 142, 143.

**Photography:** Photography is one of the most modern art forms. Recent exhibits of photographic prints in color and black and white have aroused national and international interest among creative artists. There is a basic difference between commercial photography and art photography for creative expression. A thorough mastery of the basic art elements and principles of design are essential for any creative photographer. USU has a well-equipped photo studio. In addition to the basic nine courses Art Photography majors are required to take: Visual Arts 27, 28, 29, 105, 121, 135. Upon the recommendation of the major professor other classes may be prescribed and courses in the photography sequence may be repeated with credit in order to improve the student's competence. Portfolios and exhibitions of student work are required.

**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. Printing 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 nine basic courses Printmaking majors are required to take: Visual Arts 9, 13, 25, 26, 30, 40, 104, 109, 111, 127. Additional prescribed courses for printmaking majors are: Visual Arts 19, 30, 112, 125.

Sculpture is one of the oldest forms of artistic creation. Contemporary sculptors are still utilizing the ancient materials of stone, wood, ceramics, and metal. Combinations of new materials and mobiles are increasing the sculptural opportunities. USU is beginning to develop sculpture and hopes to develop it as equal to any of the other major art areas. In addition to the basic nine requirements Sculpture majors are required to take: Visual Arts 13, 19, 30, 9, 104, 105, 31, 130, 60, 160, plus additional classes according to individual needs as prescribed by the major professor.

Graduate Study


To become a candidate for the Master's degree; (1) Pass the qualifying examination given in the School of Graduate Studies. (2) Present a portfolio of art work to the Visual Arts Staff for its consideration. The art faculty will determine whether it will be required to take certain courses to correct any apparent deficiencies. Credit in such courses cannot be counted toward the Master's degree. (3) Select, with one of the department heads and a graduate committee, a study program and a thesis project. (4) Take a minimum of 30 hours in residence. (5) Complete within six years the requirements of the degree. This degree may be acquired through summer study. A maximum of nine credits of graduate work completed at another approved Graduate School may be allowed toward the Master's degree. The graduate committee shall determine whether all or what portion of nine hours will be accepted. (6) Take at least 45 hours of credit in courses numbered 100 or above which are approved for graduate credit. (7) Complete at least ten credits in the 200 category, exclusive of thesis project, for which a maximum of nine credits can be received. The thesis project is selected and approved during the first quarter. (8) Register for no more than three hours of thesis credit per quarter. (9) Keep a written and illustrated record of the progress on the thesis project. (10) Pass an oral examination on this thesis project. (11) Prepare three final copies of the written and illustrated thesis project. One is for the University library, one remains in the Fine Arts Department, the other is returned to the student. (12) Design at the time of graduation, a comprehensive exhibit of all graduate work. The thesis project should be an important part of the display.

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 every day life. (3F, 3W, 3S)

5. Beginning Design. Introduces the basic art elements and is comprised of projects largely in two dimensions. Required of Visual Arts Majors. (3F, 3W, 3S) Staff

6. Intermediate Design. Composition of spatial volume with points, lines, planes and color, and shapes with color and texture. Also sculptural experience with handles, stands, and mobiles. Prerequisite: FA-A 5. (3W) Staff

7. Advanced Design. Introduction of the potential and limitations of various creative media. Design and work with metal, wood, leather, etc. Prerequisite: FA-A 6. (3S) Staff

8. Basic Drawing. An individually creative approach to drawing natural forms from observation and memory. Various media are used. Prerequisite to all painting courses. (3F, 3W, 3S) Larson, Lindstrom

9. Anatomy for Artists. Analysis of bone structure of the body, with emphasis on surface characteristics. Prerequisite to life drawing. (3W) Groutage

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, 3W, 3S) 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. (3F, 3W, 3S) Staff

12. Intermediate Drawing. Prerequisite, Basic drawing. Drawing in charcoal and conte crayon. (3F, 3W, 3S) Staff

13. Drawing and Composition. Prerequisite, Basic Drawing and Intermediate drawing. Intensive drawing in all media emphasizing various approaches to composition. (3F, 3W, 3S) 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, 3W) Larson

19. Jewelry and Metalsmithing. Making interesting jewelry and the design and production of objects in nonferrous metals, using the basic techniques of metalsmithing. Emphasis on raising and fabricating metal holloware in conjunction with the various technical means to that end: sawing, filing, soldering, buffing, etc. Prerequisites: FA-A 5, 6, 7. (3F, 3W) Staff

21. Poster Making. Techniques and methods of constructing posters. Useful for education majors. (3) Staff

22. Beginning Lettering and Layout. Introduction to basic letter forms such as Roman, Gothic, and Scripts. (3F, 3W, 3S) Groutage

23. Advanced Lettering. Brush letters and scripts. Finished letters for magazine and newspaper advertisements, packaging labels and symbols. (3S) Groutage


25. Wood Cut. The making of prints from designs cut in the plank grain of wood using from one to many colors. (3F) Groutage

26. Serigraphs. The study of various techniques in silk screen printing including glue, tusche glue, cut paper, and lacquer film for the purpose of making multiple original works of art. (3W) Groutage

27. Art Photography. Means of producing fine photographs. (3F) Reynolds


29. Art Photography. Introduction to color, color film, color harmonies, multiple exposures and other techniques necessary to produce fine color work. (3S) Reynolds

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 lecture. Desirable prerequisites: FA-A 1, 5. (3F, 3W, 3S) Staff

31. Ceramics. Emphasis on the use of the potter's wheel. Design and experimentation are stressed. Introduction to glazing techniques, kiln stacking and firing. Prerequisite: FA-A 30. (3F, 3W, 3S) Staff

35, 36, 37. Art History. A three-quarter sequence for Visual Arts 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: Primitive, classical, medieval, renaissance, neoclassical, the important schools of modern art, and contemporary works. (3F, 3W, 3S) Staff

46. Essentials in Interior Design. Study of historic styles; analysis of art elements; principles of design applied to home planning and furnishing. (3F, 3W, 3S) Staff

50. Art for Young Children. For child development majors, mothers, kindergarten and first grade teachers. (3F) Staff

60. Beginning Sculpture. Creative expression in a variety of plastic media. Emphasizes aesthetic employment of form and technique
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.

104. life drawing. anatomical rendering and analysis of the drawing in relation to creative composition. (8s)

105. advanced drawing and composition. emphasis is given to drawing several objects in strong compositional design. (8s) thorpe

109. landscape. various approaches and techniques in landscape painting, in oil and related media. fieldtrips. prerequisites: fa-a 8, 14. (3f, 3s)

111. watercolor and related media. students may use any aqueous medium or combination. several lab periods will be spent sketching out-of-doors. prerequisite: fa-a 11. (3f, s) lindstrom

112. portrait painting. problems of portrait painting with emphasis on the literal representation of form. various ages and racial types are studied. prerequisites: fa-a 8, 14. (3s)

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: fa-a 5. (3f)

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: fa-a 5. (3s)

Flexible scheduling for work and study, with studio work at all levels. Refund of tuition for those students who are not fully enrolled. For information contact the college of humanities and arts, university of kentucky, woodford street, louisville, kentucky 40208.

224 college of humanities and arts

in plaster, clay, wood, metal, and stone. (3f, 3w, 3s) elser

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.

104. life drawing. anatomical rendering and analysis of the drawing in relation to creative composition. (3s)

127. advertising design and illustration workshop. advanced advertising with emphasis on designing and executing advertising pages, booklets, posters, and renderings in a variety of media for the portfolio. credit arranged. (3w) groutage

128. advertising design and illustration. theory of designing the cover, page, package, letterhead and poster. basic techniques in illustration. the course trains the student in producing professional advertising and illustrating art which would enable him to find employment in this field. desirable prerequisites: fa-a 5, 6, 7, 21, 22. (3w, 3s) groutage

129. advertising design and illustration. workshop. advanced advertising with emphasis on designing and executing advertising pages, booklets, posters, and renderings in a variety of media for the portfolio. credit arranged. (s) groutage

130. ceramic glazing and decorating. explores the many ways of using various types of glazes in conjunction with decorating techniques. ceramic studio operation and care. prerequisites: fa-a 30, 31. (3f, 3w, 3s) lindstrom, elser

131. glaze calculation. calculation of glaze formulas: operation of the kilns. prerequisites: fa-a 30, 31, 130. (3f, 3w, 3s) lindstrom, elser

132. ceramic workshop. advanced work in area selected with the aid of the major professor. credit arranged. (f, w, s) lindstrom, elser

135. color. color as a design element in stage lighting, painting, and everyday living. physical, psychological and artistic aspects are correlated. (3s) reynolds

140. applied interior design. practical application of art elements and principles of design to problems of home decoration and furnishings. prerequisite: fa-a 40. (3w) larson

141. 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 fa-a 140. (3w) larson

143. advanced problems in interior design. experimental projects in home planning and furnishing. prerequisites: fa-a 40, 140. (3s) 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 fine arts staff. (1-5f, w, s, su) larson

151. art methods for elementary grades. methods of teaching drawing, painting, design and handwork in the elementary schools. required preparation for a grade school teacher. (3f, w, s) 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. (3W) Reynolds

160. Advanced Sculpture. Creative sculptural expression in a variety of plastic media. Emphasizes esthetic employment of form and the techniques necessary for casting, built up plaster modeling, beating metals, stone cutting and wood carving. (3F, W, S) Elsner

166. Advanced Fabric Design in Weaving. Special projects in applying original designs to creative weaving of tapestries, rugs and dramatic textiles. Prerequisites: FA-A 5 and 66 or equivalent. (3 to 5 F, W, S) Larson

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, Sculpture Studio, Experimental Media Studio, Metallsmithing Studio, Ceramics Studio. Credit arranged. (F, W, S) Staff

272. Art Research, Seminar and Thesis Problems. Credit arranged. (F, W, S) Staff

Department of

Landscape Architecture and Environmental Planning

PROFESSOR Laval S. Morris, HEAD.

Office in Main 34

Landscape Architecture and Environmental Planning is concerned with the arrangement of land and the objects man places on it for use. The physical plan, including rural areas as well as urban, is made a consideration of design. Functional qualities of a plan are given first consideration and the aesthetic qualities furnished by nature and added by man are integrated by design. Projects range from individual home grounds to complete cities.

Bachelor of Science 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 listed in fields which are closely related, such as Civil Engineering, Visual Arts, Horticulture, and Botany; (3) Courses required for a liberal education.

Landscape Architecture 225

FRESHMAN YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Cr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elem. of Land Planning, L.A. 3</td>
<td>3</td>
</tr>
<tr>
<td>Graphics, L.A. 20</td>
<td>3</td>
</tr>
<tr>
<td>History and Lit. of Physical Plans, L.A. 30</td>
<td>5</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>General Botany, Botany 24, 30</td>
<td>10</td>
</tr>
<tr>
<td>English 1, 2, 3</td>
<td>9</td>
</tr>
<tr>
<td>Visual Arts</td>
<td>3</td>
</tr>
</tbody>
</table>

SOPHOMORE YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Cr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant materials, L.A. 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, C.E. 81, 89</td>
<td>6</td>
</tr>
<tr>
<td>Visual Arts, 5, 6, 8</td>
<td>9</td>
</tr>
<tr>
<td>Sociology 70</td>
<td>5</td>
</tr>
<tr>
<td>Soils, Agronomy 56</td>
<td>4</td>
</tr>
</tbody>
</table>

JUNIOR YEAR

<table>
<thead>
<tr>
<th>Course</th>
<th>Cr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design, L.A. 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>Arts 14, 111</td>
<td>6</td>
</tr>
<tr>
<td>English Composition</td>
<td>4</td>
</tr>
<tr>
<td>Economics 51, or Ag. Econ. 53</td>
<td>5</td>
</tr>
</tbody>
</table>
Electives

SENIOR YEAR

Course                                      Cr.

Constr., L.A. 160, 161, 162                   9
Advanced Planning and Design, L.A. 180, 181, 182 12
Sculpturing, Art 160                         3
Rec. Planning 130                            3
Seminar, L.A. 195                             1
Writing Feature Articles, Journalism 112      3
Roads and Pavements, C.E. 120                4
Technical Writing, English 111               3
Electives                                    11

Students interested in City Planning may take additional courses in Political Science, Sociology and Economics. Consult with staff.

LA&EP Courses

3. Elements of Land Planning and Design.
Relation of people to land regions and small areas. Principles of design and composition applied to various types of land planning. Design of home grounds is emphasized. Field trip required. (3F, W, S) Morris


30. History and Literature of Landscape Architecture. The history of physical plans as related to the community and its parts. Design and planning in relation to land during the past 5,000 years. Emphasizes present age with implications of the future. (5W) Morris

35. Theory of Design. Form in relation to vertical mass and horizontal space. Abstract design is studied and the resultant forms transposed into concrete space and mass relationships. The chief purpose is to provide you with an awareness of design as early as possible in your training. (3S) Staff

40. 41, 42. Plant Materials. The ecological, functional and aesthetic uses of native and cultivated wood and herbaceous plants for use on the land. Prerequisites: Botany 24, 30, (3F, 3W, S) Brillantine

60, 61, 62. Architectural Design. The design, construction, and orientation of architectural structures as related to land areas. Prerequisites: L.A. 20, 35, (3F, 3W, S) Staff

100. Professional Experience. Prior to graduation all landscape architectural students must have completed three months' experience in a landscape architectural position with a governmental or private organization concerned with landscape architecture. 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, urban parks, forest lands, and private lands in terms of recreational and aesthetic values and uses. (3W) 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 twice during their training. Credit arranged. (Su) Staff

140, 141, 142. Landscape Design. Introduction to the analysis and writing of design criteria and the design of private and public land areas. Theoretical and actual site problems are used. Prerequisites: L.A. 62 and C.E. 82. (3F, 3W, S) Brillantine

150, 151, 152. Planting Design. Pictorial compositions and planting plans developed together. Designed to develop your ability to visualize the finished landscape. (3F, 3W, S) Morris

160, 161, 162. Landscape Construction. Master construction plans, grading, drainage, sprinkling systems, structures, cost estimates and specifications. (3F, 3W, S) Morris

170. City and Regional Planning. An introduction to the scope and methods of city and regional planning. Legislative, administrative, and effectuation of the general interim plan. The physical aspects of town and city are further pursued in all design classes. (3W) Staff

180, 181, 182. Advanced Planning and Design. Urban design, subdivisions, housing projects, public grounds, parks, cemeteries, building groups and recreational areas on various types of topography. (4F, 4W, 4S) Morris

190. Special Problems. Selected problems to meet your individual needs in completing your training. Registration by permission only. Credit arranged. (F, W, S) Staff

195. Seminar. Readings and reports on current topics and trends in Landscape Architecture. Required of senior students. (1W) Morris

210, 211, 212. Advanced Problems in Design and Planning. Credit arranged. (F, W, S) Staff

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 in 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:

Language 100 (required of all majors). 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 or in Latin or in Greek. 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
228 College of Humanities and Arts

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 recommendation of the Department of Languages a student must complete 15 units of approved upper division work.

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.

Summer School Programs

For three successive years USU has conducted a National Defense Education Act Institute for teachers of French and Spanish. Another such Institute has been approved for the summer of 1963.

Steps have also been taken to offer the equivalent of a full year in a beginning language in the two summer sessions, making it possible, thus, for successful students to enter intermediate language courses in the fall of the same year. (Consult the USU Summer Session catalog for specific offerings).

Spring Quarter at Mexico City College

Beginning with the spring quarter of 1963, USU will offer properly qualified students the opportunity to spend one quarter in residence at Mexico City College. 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.

Mexico City College courses approved under this program by the Department of Languages are listed below:


For a description of these courses see catalog of Mexico City College. A list of other Mexico City College courses approved under this program is available on request.

French

Lower Division

1, 2, 3. Elementary French. (5F, 5W, 5S) 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, 3S) Staff
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) Fife, Deval

104. Advanced Grammar and Composition. (3F) Fogleberg

111. Readings in the Theatre. Reading and discussion of selected modern plays designed to develop vocabulary and rapid reading skills. Prerequisite: French 5 or 6a. (2W) Fife, Deval


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 5 or 6a. (2S) Fife, Deval

132. French Literature, 1850-1900. Realism, naturalism, the Parnassians and symbolism. Readings, lectures and discussion of representative novelists, dramatists, poets and critics. Prerequisite: French 103, 111 or 114. (3W) Fife

133. Romanticism in France. Chateaubriand, Hugo, Vigny, Musset, Lamartine. Prerequisite: French 103, 111 or 114. (2S) Fife, Deval

134. 18th Century Philosophers and Morals. Montesquieu, Voltaire, Diderot, Rousseau, Bernardin de Saint-Pierre, Prevost. Prerequisite: French 103, 111 or 114. (2W) Fife

138. The 18th Century Theatre. Comedies of Beaumarchais and Marivaux. Prerequisite: French 103, 111 or 114. (3F) Deval

139. The Comedies of Molière. Prerequisite: French 103, 111 or 114. Fife, Deval

140. The Classical Tragedy: Corneille. Prerequisite: French 103, 111 or 114. (2S) Fife, Deval

141. Philosophers, Moralists and Critics of the Classical Age. Descartes, Pascal, Voltaire, La Fontaine. Prerequisite: French 103, 111 or 114. (2S) Fife, Deval

142. French Literature of the 16th Century. Humanism and the Reformation. The Pléiadé, Rabelais, Montaigne and Ronsard. Prerequisite: French 103, 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. Prerequisite: French 103, 111 or 114. (2S) Fife

144. The Classical Tragedy: Racine. Prerequisite: French 103, 111 or 114. (2F) Fife, Deval

150. French Literature of the 20th Century. Readings, lectures and discussion of representative novelists, dramatists, poets and critics. Prerequisite: French 103, 111 or 114. (3S) Fife, Deval

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, S) Staff

German

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. (3F, 5W, 5S) 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, 3S) 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, 2S) 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, 3S) 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...
230 College of Humanities and Arts

German authors, using annotated texts. Strongly recommended for German majors. Prerequisite: German 6. (2F, 2W, 2S) Staff

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) Scherer, Mussier

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 and Language 100. (3S) Scherer, Mussier

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) Mussler

*120. Nineteenth Century Novelle. Reading and discussion of representative stories by Hauff, Storm, Stifter, Keller, Meyer and others. Prerequisite: German 102 or equivalent. (3W) Scherer

**121. Lessing, Plays and Biography. Prerequisite: German 115. (3S) Mussier

**122. Schiller, Plays, Poetry and Biography. Prerequisite: German 115. (3S) Mussier

**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, 101, 102. (3W) Beyers

**125. The Middle Ages. A survey of the outstanding literary works and authors of the Middle Ages. Prerequisite: German 100, 101, 102. (3F) Mussier

**126. Survey of German Literature. The 18th Century. (3W) Scherer

**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) Staff

**129. Goethe's Dramas. Goethe's dramas other than Faust I and II. Gotz von Berlichingen, Urfaust, Iphigenien, Tasso, Ermont. The influence of Goethe's life upon these works. Prerequisite: German 115. (3F) Scherer, Beyers

**130. Goethe's Faust—Part I. Prerequisite: German 115 and 129. (3S) Mussier

**131. Goethe's Prose. Werther, Dichtung und Wahrheit and selections from Wilhelm Meister. Reading of a biography of Goethe. Prerequisite: German 115. (3W) Scherer

*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) Staff

**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, Hebbe, Liliencron, Dehmel, Rilke, and others. Prerequisite: German 115. (3F) Scherer, Mussier

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, S) Staff

Greek

1, 2, 3. Elementary Greek. (5F, 5W, 5S) (Taught only on sufficient demand.) Mussler

Latin

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 (5F, 5W, 5S) Taught only on sufficient demand.) Mussler

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, 3S) (Taught only on sufficient demand.) Mussler

199. Readings and Conference. Readings in scientific, technical, or literary Latin. Not more than 2 units per quarter nor more than 6 units total may be earned by any student. Mussler

Language (Linguistics and Teaching Methods)


101. Language Laboratory Practice. A course designed to give prospective teachers skill in the use of electronic, acoustical and audiovisual devices and systems as tools for learning a modern language. Prerequisite: Com-
pletion of 2 years study in any modern, foreign language. (2S) Porter-Benson

Portuguese

1. 2. 3. Elementary Portuguese. Grammar, dictation, conversation and reading. (5F, 5W, 3S) (Taught only on sufficient demand.) Porter


199. Readings and Conference. Readings in scientific, technical, or literary Portuguese. Credit arranged. Not more than 5 units total may be earned by any student. (F, W, S) Porter

Russian

1. 2. 3. Elementary Russian. (5F, 5W, 5S) Spoerry

4. 5. 6. Intermediate Russian. Second-year readings and grammar review. (3F, 3W, 3S) Suprunowicz

4a. 5a. 6a. Second-Year Conversation. Accompanies Russian 4, 5, and 6. Required for a teaching minor in Russian. Recommended for all students in second-year Russian. (2F, 2W, 2S) Spoerry

199. Readings and Conference. Readings in technical, scientific, or literary Russian. Credit arranged. Not more than 5 units total may be earned by any student. (F, W, S) Suprunowicz

Spanish

Lower Division

1. 2. 3. Elementary Spanish. (5F, 5W, 5S) Staff

4. 5. 6. Intermediate Spanish. Two years of high school Spanish or Spanish 3. (3F, 3W, 3S) Fogelberg, Reese

4a. 5a. 6a. Second-Year Conversation. Accompanies Spanish 4, 5, and 6. Required of all Spanish majors and strongly advised for all teaching minors. Prerequisite: Two years of high school Spanish or Spanish 3. (2F, 2W, 2S) Fogelberg, Reese

Upper Division

105. Advanced Grammar. Prerequisite: Spanish 6 or equivalent. (3W) Fogelberg

112. Applied Linguistics: Spanish. Attention is paid to the structure of the Spanish language, its phonemic and morphemic make-up. A study is made of how this knowledge can be applied to the teaching of Spanish; practice is given in making pattern drills for use in the laboratory and in the classroom. Prerequisite: Spanish 105 and Language 100. (3W) Staff

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

118. Readings in the Theatre and Poetry. Prerequisite: Spanish 6 or equivalent. (2S) 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, 3S) Staff

125. Survey of Spanish Literature. The early literature and the writers of the Siglo de Oro. Prerequisite: Spanish 118. (3F) Staff

126. Survey of Spanish Literature. From the Siglo de Oro to the later 19th Century. Prerequisite: Spanish 116, 117 or 118. (3W) Staff

127. Survey of Spanish Literature. The later 19th Century and the 20th Century. Prerequisite: Spanish 116, 117 or 118. (3S) Staff

128. 19th Century Spanish Poetry. A study of Spanish poetry of the 19th Century. Prerequisite: Spanish 118 or Spanish 126 or 127. (8S) Staff

129. Cervantes. Reading and analysis of Don Quixote and other works of Cervantes. Prerequisite: Spanish 117 or 125. (3W) Staff

130. The Literature of the Siglo de Oro. A study of the writers of the Siglo de Oro: Lope de Vega, Tirso de Molina and Caldeiron de la Barca. Prerequisite: Spanish 118 or 125. (3F) Staff

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 6 or 6a. (8F) Staff


145. The Development of the Spanish-American Novel. Representative novels from various Spanish-American countries and from various literary periods. Prerequisite: Spanish 116, 117 or 118. (3W) Staff

199. Readings and Conference. Readings in scientific, technical, or literary Spanish. Credit arranged. Not more than 5 units total may be earned by any student. (F, W, S) Staff

*145. The Development of the Spanish-American Novel. Representative novels from various Spanish-American countries and from various literary periods. Prerequisite: Spanish 116, 117 or 118. (3W) Porter

**145. The Development of the Spanish-American Novel. Representative novels from various Spanish-American countries and from various literary periods. Prerequisite: Spanish 116, 117 or 118. (3W) Porter

*145. The Development of the Spanish-American Novel. Representative novels from various Spanish-American countries and from various literary periods. Prerequisite: Spanish 116, 117 or 118. (3W) Porter

**145. The Development of the Spanish-American Novel. Representative novels from various Spanish-American countries and from various literary periods. Prerequisite: Spanish 116, 117 or 118. (3W) Porter

Languages 231
232 College of Humanities and Arts

arranged. Not more than 5 units total may be earned by any student. (F, W, S) Staff

English for Foreign Students

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 31. (3F) Meyer

31. English for Foreign Students. Structure of the language, with exercises and 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) Meyer


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.

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. (SS) Hayward

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. (5F) Beyers

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. (3F) Beyers

**141. History of Early Modern Philosophy.** European thought from the Renaissance through the 18th 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, Leibnitz, Locke, Berkeley, Hume, and Kant. (3W) Beyers

**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. (SS) Beyers

160. 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. (SS) Beyers

161. Symbolic Logic. Deductive systems, valid and invalid arguments, qualifiers relations, and propositional calculus, logic paradox; brief introduction to symbolic logic. (SS) Edwards

Philosophical Literature

The following courses are cited from various departments. The major part of their content is philosophical. They are assembled here for the convenience of students interested in the interpretations which philosophers and scientists have made of man and his place in the universe. They afford opportunities for both teacher and student to apply philosophical principles to the solution of problems in various fields of human thought and action.

In many other courses in History, Political Science, and Literature, the philosophical content is rich. Such courses as Ancient World Civilizations and Modern World Civilizations (History 4 and 5) are invaluable to one wishing to understand the development of human thought.

Students may take advantage of the instruction in religious philosophy offered by churches in Logan. Of such courses, those classed as non-sectarian yield University credit.
Philosophical Literature

34, 35, 36. Great Books and Ideas. (See English Department.)

English 46. The Bible as English Literature. (See English Department.)

English 48. Modern European Literature. (See English Department.)

English 58. Modern American Literature. (See English Department.)

English 68. Modern English Literature. (See English Department.)


Political Science 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. Emphasizes ideas significant in shaping the form and actions of American government today. Students may register for one, two, or three quarters. (2F, 2W, 2S) Harmon

Department of
Speech

PROFESSORS Rex E. Robinson, Head, Chester J. Myers; ASSOCIATE PROFESSORS Burrell F. Hansen, Gwendella Thornley; ASSISTANT PROFESSOR Samuel G. Fletcher.

Office in Main 77

Bachelor of Science Degree. The Department of Speech offers training in Interpretation, Public Address, Radio and Television Broadcasting, and Clinical Speech. The requirements of 45 credits for a departmental major or a teaching major in Speech are as follows: Public Speaking, eight credits (Speech 125 required of all majors); Interpretation, eight credits (Speech 124 required of all majors); Theatre Arts, eight credits. (Theatre Arts 1 and 50 required of all majors); Speech Correction, five credits (Speech 167 required of all majors); Radio and Television, six credits; elective courses in Speech, ten 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.

If he is emphasizing clinical speech and desires to comply with minimum standards for certification he must satisfactorily complete the following Speech courses: 77, 111, 167, 169, 171, 173, 175, 177.
An additional fourteen quarter hours in psychology are required, including Child Psychology or Child Development, Mental Hygiene, and Psychology of the exceptional Child. If seeking certification in Clinical Speech he is exempt from the Theatre Arts requirement and one half of the Radio and Television requirement.

A composite English-Speech major requires the following Speech courses: Public Speaking, eight credits; Interpretation, eight credits; Theatre Arts, eight credits; Speech Correction, five credits; Radio-TV, three credits; Teaching of Speech, three credits. For a distribution of these courses see first paragraph above. For English courses needed for the English-Speech composite major see English Department in this catalog.

A composite Speech-Theatre Arts major requires the following Speech courses: Public Speaking, eight credits; Interpretation, eight credits; Speech Correction, five credits; Radio-TV, three credits; Teaching of Speech, three credits. For a distribution of these courses see first paragraph above. For Theatre Arts courses needed for the Speech-Theatre Arts composite major see Fine Arts Department: Theatre Arts, in this catalog.

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. (5F, W, S) Staff

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, S) Thornley


12. Individual Problems. Individual attention given in private to your 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, S) Staff

16. Dialect. The most prominent dialect works of Burns, Kipling, Drummond, Riley, Dunbar, Harris, Kirk and other writers are studied. (3S) Myers

21. Intermediate Public Speaking. You work with types of speaking most interesting and useful to you. You determine 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, S) Staff

75. Remedial Speech. For persons with a noticeable difficulty in speech; in articulation, quality, pitch, intensity, stuttering, or rhythm. Time and credit arranged. Consult instructor before registering. May be taken more than one quarter. (F, W, S) Staff

**Taught 1964-65.
77. **Phonetics and Voice.** An analysis of the phonetic and phonatory aspects of speech. (3W) **Staff**

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. (3S) **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. One lecture and three hours laboratory per week. (3F, W, S) **Staff**

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, S) **Staff**

107. **Speech Improvement in the Elementary Classroom.** Designed to provide the teacher with techniques to improve the speaking skills of normal and speech handicapped children in the elementary grades. (3Su) **Staff**


110. **Play Reading.** Attention given to cutting and building for public programs. (3S) **Myers**

111. **Psychology and Semantics of Speech.** Principles of psychology which underlie speech. Personal adjustment through speech. An insight into the process of symbol use. (3S) **Staff**

112. **Private Instruction.** Individual attention given in private to your 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, S) **Staff**

113. **Argumentation.** Information and practice in techniques of analysis, investigation, evidence, reasoning, brief making, 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, S) **Robinson**

118. **Story-Telling.** Analysis and classification of typical stories with reference to periods of the child’s development. Consideration is given stories of western pioneer life. Especially for the student teacher, recreation leader, church activity leader, librarian, and parent. (5F, W, S) **Myers**

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. (2S) **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. (3S) **Myers**

124. **Advanced Interpretation.** The mastering of significant selections from great writers. Reading from manuscript and from memory. (5W) **Myers**

125. **Speech Composition.** Advanced theory and practice of public speaking. You build and deliver several short speeches and read selected masterpieces from the world’s public speaking literature. Prerequisite: Sophomore standing and Speech 1, or English 1, 2, 3. (5S) **Robinson**

167. **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. (5F) **Fletcher**

168. **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 and to evaluation techniques and procedures used in speech pathology and audiology. **Fletcher**
**169. Speech Pathology I.** Organic voice defects studied. Cleft palate speech problem considered. Some attention given to the acquisition of substitute voice such as esophageal speech. Prerequisite: Speech 167. (5W) Fletcher

**171. Speech Pathology II.** Study of language and speech problems due to lesions of the nervous system including Cerebral Palsy, Aphasia and other dysarthrias. Prerequisite: Speech 167. (5S) Fletcher

172. Methods in Speech Correction. Instruction is given in appropriate and effective methods of correcting speech defects. Special attention is paid to the techniques involved in removing articulatory errors of elementary and secondary school children. Students develop their own exercises and activities and learn to adapt them to the goals of therapy. It is recommended that it be taken concurrently with Speech 173, Advanced Clinical Practice. (2W) Fletcher

173. Advanced Clinical Practice. Supervised diagnostic and remedial case work in speech pathology. Prerequisite: consent of instructor. May be taken more than one quarter. Credit arranged. Prerequisite: Speech 167. (F, W, S) Staff


*177. Communication Problems of the Hard of Hearing.* Covers speech problems associated with hearing deficiencies. Instruction in lip reading is given. (2S) Staff

181. Television Production. The production and direction of television programs: developing programs, casting and rehearsal procedures, and co-ordination of technical aspects. Prerequisite: Speech 83 or instructor's permission. To be taken concurrently with Journalism 184. (3F) Hansen

**184. Educational Broadcasting.** Projects in developing and producing educational radio and television programs for in-school or broadcast use. Methods in effective utilization in the classroom of televised materials. (3W) 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 6F, W, S) Hansen

190. Problems in Speech. Selected work, individually assigned, handled and directed. Speech problems of mutual interest to you and the instructor are investigated and reported upon. Prerequisite: Instructor's consent. Credit arranged. (F, W, S) Staff


201. Thesis. (2 to 5F, W or S) Staff

290. Research Studies. Advanced research in Speech. Credit arranged. (F, W, S) Staff
College of Science

Department of Applied Statistics, Computer Science, 240
  Applied Statistics, 240
  Computer Science, 241

Department of Bacteriology and Public Health, 243
  Bacteriology and Public Health, 243
  Medical Technology, 246

Department of Botany and Plant Pathology, 247

Department of Chemistry, 249

Department of Geology, 253

Department of Mathematics, 254
  Mathematics, 254
  Mathematical Statistics, 256

Department of Physics, 257

Department of Zoology, 260
  Zoology, 260
  Entomology, 262
  Physiology, 263
  Pre-Dentistry, 264
  Pre-Medicine, 265
  Nursing, 265

Degrees Offered:
  Bachelor of Science
  Master of Science
  Doctor of Philosophy
College of Science
Eldon J. Gardner, Dean
Office in Forestry and Biological Science 105

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 and Plant Pathology, 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. These students 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 advisers, department heads, and dean. Basic course work in mathematics, chemistry, and physics is essential
to most areas of science. A number of 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.

Department of

Applied Statistics, Computer Science

Professor Rex L. Hurst, Head; Assistant Professors Neeti R. Bohidar, Wendell L. Pope, Donald V. Sisson.

Office in Main 15

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, 141, 171, 172, 215, and 220. They are also expected to take extensive work in Computer Science and in the Mathematics Department. It is advisable that a major in Applied Statistics have a strong minor in one of the fields of application.

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, 141, 171, 172, 215, 220, 221, 233.

Graduate Minor. A graduate minor must fill University requirements as to total number of credit hours and must include either 171, 172, or 261, 262, 263; and 281 or 291 or Computer Science 245.

Master of Science Degree. The department offers Master of Science degree in statistics. The area of research includes (i) development of new tools of statistical inference, (ii) refinement of old techniques, (iii) 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 must have either a BS
degree in statistics or a BS degree in Mathematics. Majors of 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.

Suggested Four-Year Curriculum

<table>
<thead>
<tr>
<th>Freshman and Sophomore Years</th>
<th>Cr Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>University group requirements</td>
<td>43</td>
</tr>
<tr>
<td>Mathematics (35, 46, 97, 98, 99)</td>
<td>25</td>
</tr>
<tr>
<td>Physical education</td>
<td>3</td>
</tr>
<tr>
<td>Language (Russian, German, French)</td>
<td>15</td>
</tr>
<tr>
<td>Basic Communications</td>
<td>9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>97</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Junior and Senior Years</th>
<th>Cr Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physics or Chemistry</td>
<td>15</td>
</tr>
<tr>
<td>Computer Science (111, 145, 146, 167)</td>
<td>12</td>
</tr>
<tr>
<td>Philosophy (50, 161)</td>
<td>10</td>
</tr>
<tr>
<td>Electives</td>
<td>37</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>98</strong></td>
</tr>
</tbody>
</table>

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.

Applied Statistics 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. (4W) Staff

132. Statistical Methods. Analysis of variance and covariance. Individual degrees of freedom. Multiple regression. Prerequisite: Applied statistics 131 or equivalent. Three lectures, one lab. (4F) Staff


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) Staff

172. Statistical Theory for Research Workers. Optimum properties of estimators: theory of
242 College of Science

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. (8S) Staff

198. Special Problems. Conferences, reading, and laboratory investigations. (Arranged F, W, S) Bohidar

199. Seminar. Review of current literature and developments in the field of statistics. (1F, W, S) Bohidar

215. 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 131 and 132 or equivalent. Three lectures, one lab. (4S) Staff

220. Intermediate Statistical Methods. Special situations in the analysis of variance; general least squares analysis; multiple comparisons; polynomial and other non-linear curve fitting. Prerequisite: 132 (8S) Hurst

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. (3 Summer) (Taught on demand) Hurst

233. Biological Statistics. Biological assays; quantitative and quantal responses; dosage-response relationships; parallel line and slope-ratio assays; relative potency and LD 50; biological populations and transformations. Prerequisite: Applied Statistics 132. (8S) (Taught on demand) Sisson

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 Poisson 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. Staff

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, Poisson, 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 150, 151 or 140, 141. (5F) Bohidar

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. (8W) Bohidar

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. (8S) Bohidar

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; optimum allocation; stratified random sampling for percentages. Prerequisite: 172 or 263. (3F) Sisson

282. Sampling Design. Ratio estimates; regression estimates; systematic sampling; sub-sampling with units of equal and unequal size; double sampling; source of error in sample surveys. Prerequisite: 281. (8W) (Taught on demand) Sisson

291. Experimental Design. Principles of statistical design for experimental investigations in biological and industrial research; introduction to general linear hypotheses; Markoff's theorem; estimation and tests; theory of randomization and randomization tests; completely randomized designs; randomized blocks, Latin squares, Graeco-latin squares; general treatment of missing value techniques; sensitivity of randomized experiments. Prerequisite: 172 or 263. (3F) Bohidar

292. Experimental Design. Experiments involving several factors; confounding in 2n, 3n and introduction to general Pn factorial
Bacteriology and Public Health 243

systems; mixed factorial systems; fractional replication; split-plot experiments; introduction of quasi-factorial and incomplete block designs; determination of optimum conditions; exploration of response surface. Prerequisite: 291. (3W) Bohidar


Computer Science Courses

1. Digital Computer Utilization. Introduction to the use of digital computers in problem solving and data processing, utilizing assembly processor languages. Techniques of machine operation; accuracy of solution; introduction to numerical methods; digital computers in data processing; history of digital computers; future computer possibilities. Prerequisite: Mathematics 35. (2F, W, S) Staff

45. Computers and Society. A general survey of computers, their capacity and limitations. Examples of computer usage. (1F) Pope

111. Data Processing. Methods of collecting and analyzing research data using data processing machines; card design; coding methods and form design; procedures in handling enumeration and measurement data; use of punch card equipment and high speed computers. Two lectures, one lab. Prerequisite: Math 35. (8W) Hurst

145. Computer Programming. History of computing equipment; philosophy of computing; the organization of problems for solution using a computer; characteristics of the University’s IBM 1620 computer; the use of machine language programming in problem solving. Two lectures, one lab. Prerequisite: Mathematics 35. (3F) Pope

146. Computer Programming. Machine language and symbolic programming for the IBM 1620. Students are expected to gain the programming proficiency to be able to solve problems in their own field. Two lectures, one lab. Prerequisite: 145. (3W) Pope

167. Problem-oriented Programming. 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 and solve problems in their own field using a computer. Two lectures, one lab. Prerequisite: Math 35. (also listed as Electrical Engineering 167) (3F, W, S) Staff

245. Techniques in Operations Research. A study of the methods and techniques used in operations research and systems engineering to efficiently organize complex systems. The study will include linear programming, assignment and allocation of resources, inventory control, least cost estimating and scheduling. Prerequisite: Graduate standing or permission of instructor. (3W) Pope

246. Techniques in Operations Research. Continuation of Computer Science 245. Study will include queuing theory, replacement models, dynamic programming, game theory and Monte Carlo Methods. Prerequisite: Graduate standing or permission of instructor. (3S) Pope

Department of

Bacteriology and Public Health

(Bacteriology, Public Health, Medical Technology)

PROFESSORS W. Whitney Smith, HEAD, Lewis W. Jones, Kenneth R. Stevens; ASSOCIATE PROFESSOR Paul B. Carter; ASSISTANT PROFESSOR Reed S. Roberts.

Office in Plant Industry 310

Bacteriology and Public Health

Bachelor of Science Degree. A General Bacteriology major requires: Bacteriology 10 or 70, 71, 104-105 or 120-121, 110, 160, 168, 180, 201, 291; Chemistry 3, 4, 5, 115, 121, 122, 190; Mathematics 35, 44; Physics 17, 18, 19; Public Health 150; Botany 24 or 25; Zoology 3, 4, 107, 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.

A Public Health major requires:
Public Health 15, 50, 150, 155, 254; Bacteriology 10 or 70, 71, 160; Physiology 4, Physics 6, Zoology 3, 112, 116; Entomology 115; Physical Education 55, 135, 145; Psychology 100 or Family and Child Development 100; Psychology 145 or Sociology 162; Principles of Nutrition 24, Chemistry 10, 11, 12.

Students planning a career in Public Health Laboratory work should take the following courses to satisfy the Public Health major:
Public Health 15, 50, 150; Bacteriology 10, or 70, 71, 104, 105, 120, 160, 168; Medical Technology 131; Physics 6; Chemistry 10, 11, 12, 190; Mathematics 35; Zoology 3, 4, 112, 116.

For a Health Education major consult H. B. Hunsaker, Department Head of Health, Physical Education and Recreation.
For a minor in Health Education take: Public Health 15, 50, 150; Physical Education 135; Principles of Nutrition 24, and Psychology, 145.

Graduate Study

The Department of Bacteriology and Public Health has good facilities for research and advanced studies. Available on the third and fourth floors of the Plant Industry building are the usual technical instruments. The department also has access to an electron microscope, ultra centrifuge, 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 most of 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 have course work in Bacterial Physiology, Systematic Bacteriology, Soil or Industrial Bacteriology, Mycology, Protozoology, Virology. They are expected to have supporting strength, probably as minors or parts of mixed minors, in several of the following: Algology, Biochemistry, Physical Chemistry, Pathology, Physiology, Histology, Entomology, Genetics, Plant Physiology, Physics, Biophysics, and other science specialties.

Candidates are expected to offer two of the following research tools: applied statistics, a reading knowledge of German, a reading knowledge of French, or suitable substitutes justified by the nature of the doctoral project. These should be completed at least one year before the final examination.

All candidates for the PhD degree in bacteriology must have received the equivalent of forty credits either before or during the doctoral program at some other institution which also offers at least a Master's in Bacteriology.
### Bacteriology Courses

1. **Principles of Biology.** Basic life principles illustrated in both plant and animal forms. Designed in combination with Bact. 10 or Physiology 4 to meet the University biological science requirements. (5F, W)  
   **Staff**

10. **Elementary Bacteriology.** Basic concepts, practical applications, demonstrations. Intended primarily for students in non-science fields. (Not open to students who have had Bacteriology 70.) (5F, W, S, Su)  
   **Jones, Stevens**

70. **General Bacteriology.** For majors in science departments. (Not open to students who have had Bacteriology 10.) Prerequisite: Concurrent or previous registration in organic chemistry. (4S)  
   **Jones**

71. **General Bacteriology Laboratory.** Prerequisite: Previous or concurrent registration in Bacteriology 10 or 70. Two 3-hour labs. (2F, W, S)  
   **Jones, Stevens, Roberts**

**104. Dairy Bacteriology.** Micro-organisms of milk and its products. Prerequisite: Bacteriology 10 or 70. (3S)  
   **Jones**

**105. Dairy Bacteriology Laboratory.** Two 8-hour labs. Prerequisite: Bact. 71, and previous or concurrent registration in Bacteriology 104. (2S)  
   **Jones**

**110. Soil Microbiology.** Relationships of micro-organisms to soil fertility. Prerequisite: Bacteriology 10 or 70. (2S)  
   **Jones**

**120. Food Microbiology.** Relationships of micro-organisms to food preservation, spoilage, and poisoning. Prerequisite: Bacteriology 10 or 70. (2S)  
   **Jones**

**121. Food Microbiology Laboratory.** (2F)  
   **Jones**

160. **Pathogenic Bacteriology.** Properties of pathogens and relationships to infectious diseases. Prerequisite: Bact. 71 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. (5S)  
   **Carter**

168. **Immunology.** Prerequisites: Bact. 160 and Biochemistry. Three lectures, two labs. (5W)  
   **Carter**

**172, 173. Bacteriology Laboratory Methods.** (2W, 2S)  
   **Staff**

**180. Physiology of Bacteria.** Cellular chemistry and physiology. Prerequisites: Bact. 10 or 70, Organic Chemistry. (4W)  
   **Jones**

**201. Systematic Bacteriology.** Classification relationships. Prerequisite: Bacteriology 10 or 70. (2S)  
   **Smith**

**Taught 1963-64**

**Taught 1964-65**

### Public Health Courses

Public Health courses do not satisfy biological science group requirements.

15. **Personal Health.** Health problems of University students; especially for freshmen and sophomores. (2F, W, S)  
   **Staff**

50. **Elementary 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 and related areas of health. (3F)  
   **Roberts**

150. **Environmental Sanitation.** Control of: air-, insect-, water-, sewage-, rodent-, refuse-, and food-transmitted diseases. Sanitation of housing, campsites, and schools. (4S)  
   **Roberts**

**151. Public and School Health Administration.** Organization, administration and functions of health agencies. Prerequisite: P.H. 50. (3F)  
   **Staff**

152. **Family Health.** A broad course on the fundamentals of healthful living. For juniors and seniors in Home Economics Education 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. (3W)  
   **Roberts**

**154. School Health Program.** Satisfies state certificate requirements in health education for elementary and secondary levels. For juniors, seniors, and graduates. (3F, W, S)  
   **Stevens, Roberts**

155. **Health Education for Teachers.** Health training for state certification requirements in health education. (4F, W, S, Su)  
   **Stevens, Roberts**

**156. School Health Methods.** Objectives, methods, curricula, and materials. Prerequisite: P.H. 155. (3S)  
   **Staff**

159. **Public Health Laboratory Methods.** Experience in the practice of the Public Health Laboratory. (3 to 15F, W, S)  
   **Fraser**

254. **Special Problems in Public Health.** Assignments, reports, discussions. Preparation of a comprehensive and critical review. Credit arranged. (F, W, S)  
   **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 you for the B.S. degree.

A Medical Technology major should take during the first three years: Bacteriology 10 or 70, 71, 160, 168; Chemistry 3, 4, 5, 12, 115, 190; Physiology 4; Physics 6; Zoology 3, 4, 116. A hospital internship for twelve months is completed during the fourth year. This includes instruction in Medical Technology 131, 133, 134, 135, 136, 137, 138, 139. USU has provision for instruction of laboratory technicians in this internship 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 71. (4S) 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, S) Carter
136. General Pathology Discussions. (2F) Carter
137. Clinical Laboratory Methods Discussion. (2W) Carter
139. Pathological Conference. (1S) Carter
Botany and Plant Pathology

(Cytogenetics, Plant Pathology, Plant Physiology, Taxonomy, Virology)


Office in Plant Industry 201

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 US 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 Botany 24, 25, 30, 116, 117, 120, 130, 240; Chemistry 3, 4, 5; Math 35; 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; Chemistry 121, 122, 190; Physics 141; Zoology 3, 4, 112, 131.

Plant Pathology and Virology: Botany 125, 150; Appl. Stat. 51, 131, 132; Bacteriology 70, 71; Chemistry 121, 122, 190; Entomology 108; Horticulture 131; Math 46, 97, 98, 99; Physics 17, 18, 19; Zoology 3.

Plant Physiology: Agronomy 106; Botany 150, 224, 225; Chemistry 101, 115, 121, 122, 191, 192; Math 46, 97, 98, 99; Physics 17, 18, 19, 140, 141; Physiology 130; Zoology 3, 4.

Taxonomy: Agronomy 56; Botany 104, 108, 112, 118, 125, 150; German 1, 2, 3; Latin 1, 2, 3; Range Management 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: Cytogenetics, 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, Virology and the Inter-departmental 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.

**Botany and Plant Pathology Courses**

1. Principles of Biology. Basic life principles illustrated in both plant and animal forms. See lower division group requirements. (6F, S) Shaw

24. Elementary Botany. The structure, physiology, and reproduction of flowering plants. Consideration given to basic structure and functions of cells, tissues, stems, roots, leaves, flowers, fruits, and seeds. Three lectures, two labs. (6F, S) Boyle, Shaw

25. Elementary Botany. A survey of the plant kingdom. Emphasis on comparative morphology, reproductive processes and evolution of representatives of the major groups of plants. Introduction to the classification of the vascular plants. Three lectures, two labs. (5W) Boyle, Shaw

30. 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. (5S) Holmgren, Shaw

*104. Evolution of Cultivated Plants. Origin, evolution and distribution of certain selected plants which are of economic importance to man. Prerequisites: Botany 25, 30, Zoology 112 or equivalent. Lectures, readings and student reports. (3S) 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 the fundamental principles of botany. Two lectures, two labs. (4W) 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. Two lectures, two labs. (4F) Holmgren

117. Anatomy. Structure and development of major cell types and tissues; comparative anatomy of the stem, root, and leaf of seed-bearing 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. Two lectures, two labs. (4S) Boyle

120. Elementary Plant Physiology. The principal physiological processes of plants, including water relations, synthesis and use of foods, and growth phenomena. Prerequisites: Botany 24 and Chemistry 12. (Chemistry 12 may be taken concurrently.) Four lectures, one lab. (5W, S) Wiebe

**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) Wiebe

**125. Morphology of Vascular Plants.** Structure, development, reproduction, and evolution of the classes and orders of vascular plants. Prerequisites: Botany 24, 25, and 30. Three lectures, two labs. (5S) Shaw

130. Principles of Plant Pathology. Fundamental principles underlying disease in plants. The types of disease and methods of study

*Taught 1963-64
**Taught 1964-65
give the student a comprehensive view of plant pathology. Assumes a knowledge of botany fundamentals. Three lectures, two labs. (5F)

*110. Forest Pathology. Nature, cause and control of disease affecting forest trees. Factors inducing loss in forest products are emphasized. Prerequisites: Botany 24 and 25. 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 25. Three lectures, two labs. (5W)

*224. Plant Growth and Development. Growth processes, with emphasis on hormones, photo-period, 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. Prerequisites: Botany 24, 120 and Chemistry 12. Three lectures, 1 lab. (4F)

226. Plant Virology. Physical and chemical properties of viruses and their biological relationships. Prerequisite: Botany 120. (3S)


Office in Widtsoe Hall 111

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. Each major must attain at least a 2.5 average in Chemistry, Physics and Mathematics courses to qualify for graduation.

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 101, 115, 121, 122, 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 190. Supporting courses to be taken are Physics 17, 18, 19 and Mathematics 35, 44, 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 190; Physics 17, 18, 19, 122, 130, 131 or 140; Mathematics 46, 97, 98, 120 or 150; Lang. 50 or 160. Required professional education courses for the teaching
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.

Doctor of Philosophy Degree. The Chemistry Department offers advanced study and research leading to a degree of Doctor of Philosophy. 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 a 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 Major Curriculum

<table>
<thead>
<tr>
<th></th>
<th>F</th>
<th>W</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FRESHMAN</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemistry 3, 4, 5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Mathematics 35, 46, 97</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>(or 34, 35, 46)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English 1, 2, 3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Military or Air Science or Physical Ed.</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Electives</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>17</td>
<td>17</td>
<td>17</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>F</th>
<th>W</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SOPHOMORE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mathematics 98, 99, 110</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>(or 97, 98, 99)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemistry 121, 122, 115</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Physics 20, 21, 22</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Military or Air Science or Physical Ed.</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>16</td>
<td>16</td>
<td>16</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>F</th>
<th>W</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>JUNIOR</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemistry 190, 134</td>
<td>5</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Chemistry 104, 105, 106</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Chemistry 109, 110, 111</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>German 1, 2, 3</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Electives, group requirements</td>
<td>3</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>17</td>
<td>17</td>
<td>17</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>F</th>
<th>W</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SENIOR</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advanced Physics</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Chemistry 152, 153, 150</td>
<td>3</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Chemistry 160</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Chemistry 198, 199</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Advanced Chemistry or Related Subject</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Electives, group requirements</td>
<td>8</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>18</td>
<td>17</td>
<td>17</td>
</tr>
</tbody>
</table>

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. (5F, 5W, 5S) - Lee

10, 11. General Chemistry. Principles of inorganic chemistry. Prerequisites: One unit of high school or college algebra. Four lectures, one lab. (5F, 5W, 5S) - Staff
12. Elementary Organic Chemistry. An introduction to organic chemistry. Designed to follow Chemistry 11 and completes a one-year terminal course in chemistry. (5S) Staff

13. 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, 3S)

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. (3S)

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, 115; Physics 20, 21, 22; Math 99. Three lectures. (3F, 3W, 3S) Boyd, Moore

109, 110, 111. Experimental Physical Chemistry. Laboratory work correlated with Chemistry 104, 105, 106. (1F, 1W, 1S) Staff

115. Quantitative Analysis. Basic theory and laboratory practice in gravimetric and volumetric analysis. Prerequisites: Chemistry 5, Math 35. Three lectures, two labs. (3S) Cannon

116. Inorganic Preparations. A laboratory course in practical methods of synthetic inorganic chemistry. Prerequisite: Chemistry 5. (Credit arranged) Staff

121, 122. Organic Chemistry. Fundamentals of the chemistry of carbon compounds. Prerequisite: Chemistry 5. Four lectures, one lab. (5F, 5W) Smith, Sternitz

124. Organic Preparations. An advanced laboratory course in the synthesis of complex compounds. Prerequisite: Chemistry 122. (3F) Smith

134. Qualitative Organic Analysis. The classification, reactions and laboratory work involved in the identification of unknown organic compounds. Prerequisites: Chemistry 115, 122. (4S) Smith, Sternitz

135. Chemical Literature. Exercises in finding, assembling and using information available in technical publications. (3S) Staff

150. Inorganic Chemistry. Study of the elements, compounds and bonding theories based upon the atomic structure. Prerequisite: Chemistry 104. Three lectures. (3S) Staff

152. Intermediate Quantitative Analysis. Theory and laboratory practice of complex formation, non-aqueous systems, precipitate formation, electroanalysis and related topics as applied to quantitative analysis. Prerequisites: Chemistry 106, 115. Two lectures, one lab. (3F) Cannon


155. Glass Blowing. A laboratory course in the technique of manufacturing and repairing pyrex brand laboratory glassware. (2W) Staff

160. Undergraduate Seminar. (1W) Staff

190. Elementary Biochemistry. The chemistry of carbohydrates, fats, proteins, enzymes, vitamins, hormones and minerals, and their transformations in plants and animals. Prerequisites: Chemistry 5 and 12 or 121. Four lectures, one laboratory. (5F) Tu, Van Orden

191. Principles of Metabolism. Carbohydrates, fats, and proteins and their metabolism in plants and animals. Prerequisites: Chemistry 122 and 190. Three lectures (3W) Tu, Van Orden

192. Vitamins. Vitamins and hormones and their function in plants and animals. Prerequisites: Chemistry 122 and 190. Three lectures. (3S) Tu, Van Orden


194. Biochemistry Lab: Biological Assays. Microbiological and colorimetric methods for determination of vitamins and amino acids in plants and animal tissues. Prerequisites: Chemistry 190, Bacteriology 70 or 71. To accompany Chemistry 192. Two labs. (2S) Tu

198. Undergraduate Research Problems. Credit arranged. (F, W, S) Staff

199. Undergraduate Thesis. (1F, 1W, 1S) Staff

201. Quantum Chemistry. Quantum Chemistry with emphasis on valence bond and molecular orbital calculations. Prerequisites: Chemistry 106, Math. 110. Three lectures. (3F) Boyd, Moore


203. Chemical Kinetics. Theory of reaction rates with application to current research problems. Prerequisite: Chemistry 201. Three lectures. (3S) Boyd, Moore

204. Chemical Thermodynamics and Statistical Mechanics. Advanced chemical thermodynamics from the standpoint of Gibbs. Prerequisite:
205. Chemical Thermodynamics and Statistical Mechanics. Introduction to statistical mechanics. Prerequisites: Chemistry 201, 204. Three lectures. (3F) Boyd, Moore

206. Chemical Thermodynamics and Statistical Mechanics. Applications of thermodynamics and statistical mechanics to chemical problems. Prerequisite: Chemistry 205. (3S) Boyd, Moore

207. The Colloidal State and Surface Chemistry. Application of physical-chemical principles to surface phenomena. Fundamental properties and theories of colloidally dispersed systems. Examples of colloidal behavior selected from diverse fields. Prerequisites: Chemistry 201, Math. 99. Three lectures. (3W) Staff

208. Crystal Chemistry. An interpretation of chemical and physical properties of crystals. Structural properties derived from X-ray crystallography are emphasized. Prerequisites: Chemistry 202, Math. 99. Three lectures. (3S) Staff

209. Special Topics in Physical Chemistry. Prerequisites: Chemistry 203, Math. 110. (3) Staff

225. Advance Organic Chemistry. Theory and mechanism in organic chemistry. Prerequisites: Chemistry 106 and 184. Three lectures. (3F) Smith, Stermitz


227. Advanced Organic Chemistry. Organic theory, synthesis and stereo-chemistry. Prerequisite: Chemistry 226. Three lectures. (3S) Smith, Stermitz

228. Physical Organic Chemistry. Quantitative aspects of organic theory including kinetics and equilibrium studies. Prerequisites: Chemistry 225, 106. Three lectures. (3F) Smith, Stermitz

229. Theoretical Organic Chemistry. Application of kinetics, thermodynamics and simple quantum mechanics to problems of organic chemistry. Prerequisite: Chemistry 228. Three lectures. (3W) Smith

233. Special Topics in Organic Chemistry. Current topics in organic chemistry. Prerequisite: Chemistry 228. Three lectures. (3S) Staff

234. Chemistry of Natural Products. Alkaloids, steroids and terpenes with emphasis on biosynthesis. Prerequisite: Chemistry 227. Three lectures. (3S) Stermitz

250. Advanced Inorganic Chemistry. Modern topics and theories in inorganic chemistry. Prerequisites: Chemistry 106, 150. Three lectures. (3S) Staff

260. Graduate Seminar. (1F, W, S) Staff

272. Advanced Analytical Chemistry. Modern developments in analytical chemistry. Prerequisites: Chemistry 106, 152, 153. Three lectures. (3F) Spence

273. Advanced Instrumental Analysis. Prerequisites: Chemistry 106, 152, 153. (3S) Spence

274. Special Topics in Analytical Chemistry. Prerequisites: Chemistry 106, 152, 153. (3) Staff

281, 182. General Biochemistry. Chemistry of life processes, including essential physiochemical concepts, enzymes, metabolism, biosyntheses and energetics. Prerequisites. Chemistry 106, 122 and 190. Chemistry 105 and 106 may be taken concurrently by special permission. Three lectures. (3W, 3S) Tu, Van Orden

284, 285. General Biochemistry Laboratory. Modern experimental techniques. To be taken concurrently with Chemistry 281 and 282. (2W, 2S) Tu, Van Orden

288. Special Topics in Biochemistry. Three lectures. (3) 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, S) Greenwood

290. Toxicology. The effects of selected chemical compounds on living organisms. Prerequisites: Chemistry 190 and 122. Three lectures. (3S) Greenwood

291. Toxicology Laboratory. Qualitative and quantitative determinations of inorganic and organic poisons. Observations of symptoms which develop upon administration of poisons. To accompany Chemistry 290. Two labs. (2S) Greenwood

293. Advanced Biochemistry Lab; Biochemical Preparation. Preparation of enzymes and amino acids. Prerequisites: Chemistry 106 and 285. To accompany Chemistry 295. Two labs. (2W) Tu

295. Advanced Biochemistry: Enzymes. Enzymes and their functions in plants and animals. Prerequisites: Chemistry 106, 282. Three lectures. (3W) Tu, Van Orden

298. Graduate Research. Credit arranged. (F, W, S) Staff
Department of

Geology

PROFESSOR J. Stewart Williams, HEAD; ASSOCIATE PROFESSORS Clyde T. Hardy, Donald R. Olsen.

Office in Main 286

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 Zoology 3. Recommended are Mathematics 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, S) Hardy

3. Physical Geology. For majors in Geology, Forest and Range Management, Engineering, Agronomy, and other sciences. (5F, W, S) Olsen

4. Historical Geology. Physical history of the earth and the development of life as indicated by the geologic record. (5F, W, S) Hardy

5. Minerals and Rocks. Identification of common minerals and rocks. Prerequisite: Geology 1 or 3. (3W) Olsen


101. Mineralogy. Identification of minerals by physical and chemical tests. Elementary crystallography. Prerequisites: Geology 3 and Chemistry 10, 11. (5F) Olsen


103. Engineering Geology. Application of geology to engineering problems. (3S) Williams

106. Invertebrate Paleontology. Introduction to the study of invertebrate fossils. Methods of preparation. Prerequisites: Geology 4 and Zoology 3. (5S) Williams

108. Stratigraphy and Sedimentation. Prerequisite: Geology 3. (5W) Hardy

110. Structural Geology. Prerequisite: Geology 3. (5F) Hardy

111. Petroleum Geology. Accumulation and origin of petroleum. Subsurface methods utilized in exploration. Prerequisites: Geology 108, 110. (3S) Hardy

113. Economic Geology. Geologic occurrence of metallic and non-metallic mineral deposits. Prerequisites: Geology 101, 110. (3S) Olsen

114. Geologic Field Methods. Preparation of geologic and topographic maps utilizing the plane table. Measurement of stratigraphic sections. Survey of geophysical techniques. Prerequisites: Geology 3 and Civil Engineering 81. (3S) Hardy
254 College of Science

115. 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. (5F) Williams

116. Special Problems. Directed study of selected problems. Written report required. (1-6 F, W, S) Staff

117. Ground-Water Geology. Geologic conditions that control the occurrence and purity of ground water with special reference to western United States. Prerequisite: Geology 3. (4W) Williams

118. Geologic Field Course. (8Su) Staff

120. Graduate Seminar. (2-5 F, W, S) Staff

122. Stratigraphic Paleontology. (3F) Williams

123. Paleozoic Stratigraphy. (3W) Williams

124. Mesozoic and Cenozoic Stratigraphy. (3S) Hardy

125. Regional Tectonics. (3W) Hardy

126. Petrography. (3S) Olsen

127. Petrogenesis. (3F) Olsen

220. Thesis. (5-15 F, W, S) Staff

Department of

Mathematics

(Mathematics and Mathematical Statistics)


Office in Engineering-Physical Science C-306

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 may elect to fill the requirements for a 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 B.S. degree in Mathematics should have a reading knowledge of French, German, or Russian.

A department-approved teaching major must include Mathematics 99, 150, 151, 152 and an additional nine credit hours of upper division Mathematics selected from Mathematics 120, 123, 124, 175 or other courses meeting departmental approval.

A department-approved teaching minor must include Mathematics 98 and 150, and should include Mathematics 120 and 124.

All students majoring in Mathematics must have had Plane and Solid Geometry. Plane Geometry
is a prerequisite for all university mathematics except Mathematics 20, 34, 35 and 60.

If a student completes both Mathematics 24 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

H.S. 42. Plane Geometry. (F, W; no credit) Staff

20. Elementary Mathematical Concepts. For prospective teachers in the elementary schools. (5F, W, S) Staff

30. Elements of Mathematics. A survey course to help fill the science group requirement. Enough training in immediate algebra is included to allow a student to continue with the study of college algebra. Prerequisite: One year of secondary school mathematics. (Credit will not be given for both Math 30 and Math 34.) (5F, W, S) Staff

33. Solid Geometry. Prerequisite: Math 34 or equivalent. (2S) Staff

34. Introduction to College Algebra. Prerequisite: One year of high school mathematics. It is recommended that students with more than one year of high school algebra register for Math 35. Daily. (3F, W, S) Staff

35. College Algebra. Prerequisite: 34. (5F, W, S) Staff

44. Plane Trigonometry. Prerequisite: 35. (3S) Staff

46. Plane Trigonometry. Prerequisite: 35. (5F, W, S) Staff

50. Descriptive Astronomy. (3S) Staff

60. Mathematics of Finance. (3S) Staff

97. Analytic Geometry and Calculus. Prerequisite: 44 or 46. (5F, W, S) Staff

98. Analytic Geometry and Calculus. Prerequisite: 97. (5F, W, S) Staff

99. Integral Calculus. Prerequisite: 98. (5F, W, S) Staff

110. Calculus and Differential Equations. Prerequisite: 99. (5F, W, S) Staff

116. Modern Algebra. Prerequisite: 99. (3F) Staff

117. Modern Algebra. Prerequisite: 116. (3W) Staff

118. Modern Algebra. Prerequisite: 117. (3S) Staff

119. Theory of Equations. Prerequisite: 99. (3W) Staff

120. Modern Geometry. Prerequisite: 99. (3) Staff

122. Ordinary Differential Equations. Prerequisite: 110. (3) Staff

123. Number Theory. Prerequisite: 99. (3) Staff

124. Foundations of Mathematics. Prerequisite: 99. (3) Staff

126. Numerical Calculus. Prerequisite: 99. (3F) Staff

127. Numerical Calculus. Prerequisite: 126. (3W) Staff

128. Numerical Calculus. Prerequisite: 127. (3S) Staff

130. Advanced Calculus. Prerequisite: 110. (3F) Staff

131. Advanced Calculus. Prerequisite: 110. (3W) Staff

132. Advanced Calculus. Prerequisite: 131. (3S) Staff

134. Elementary Metric Topology. Prerequisite: 99. (3) Staff

140. Advanced Engineering Mathematics. Prerequisite: Math 110. (3) Staff

141. Advanced Engineering Mathematics. Prerequisite: Math 140. (3S) Staff

142. Advanced Engineering Mathematics. Prerequisite: Math 141. (3S) Staff

145. Vector Analysis. Prerequisite: 99. (3) Staff

150. Mathematics for Secondary School Teachers. Prerequisite: Math 98. (3F) Staff

151. Mathematics for Secondary School Teachers. Prerequisite: Math 150. (3W) Staff

152. Mathematics for Secondary School Teachers. Prerequisite: Math 151. (3S) Staff

153. Mathematical Readings. Prerequisite: 99. (3) Staff

160. Determinant and Matrix Theory. Prerequisite: 99. (3) Staff

175. Teaching of Mathematics in the Secondary Schools. Prerequisite: Math 152. (3S) Staff

216. Topics in Abstract Algebra. Prerequisite: Math 118. (3F) Staff

217. Topics in Abstract Algebra. Prerequisite: Math 216. (3W) Staff
251. Real Variables. Prerequisite: 251. (3F) Staff

252. Real Variables. Prerequisite: 252. (3W) Staff

253. Real Variables. Prerequisite: 252. (3S) Staff

254. Theory of Functions. Prerequisite: 132. (3F) Staff

255. Theory of Functions. Prerequisite: 254. (3W) Staff

256. Theory of Functions. Prerequisite: 255. (3S) Staff

257. Advanced Applied Mathematics. Prerequisite: 132. (3) Staff

258. Advanced Applied Mathematics. Prerequisite: 257. (3) Staff

259. Advanced Applied Mathematics. Prerequisite: 258. (3) Staff

260. Graduate Thesis. Credit arranged (F, W, S) Staff

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 or who seek a mathematical background for 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: 99. (5F) Staff

162. Mathematics of Statistics. Prerequisite: 99 and 161. (5W) Staff

163. Mathematics of Statistics. Prerequisite: 162. (5S) Staff

**166. Sequential Analysis and Control of Quality of Output in Manufacturing. (3S) Staff

**167. Statistical Reading and Reports. (3S) Staff

**Taught 1964-65
Department of

Physics


Office in Engineering and Physical Science 140

Bachelor of Science Degree. Requirements for a Physics major: Forty-five credits, of which thirty credits must be upper division courses. Certain approved courses 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 35, 46, 97; Chemistry 3, 4, 5; English 1, 2, 3; Physics 40, 41, 42.

Sophomore Year: Physics 21, 22, 23, 50; Mathematics 98, 99, 110; German, Russian, or other group electives.

Junior Year: Physics 153, 154, 155, 181, 182; Mathematics 130, 131, 132 or 140, 141, 142; Physics 166, 167, 168 or electives.

Senior Year: Physics 125, 126, 127, 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 or a composite teaching major in Physics and Mathematics, 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.

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 and French or Russian; 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. (4F, W, S) Staff

17, 18, 19. General Physics. Mechanics, electricity, magnetism, heat, light, sound, atomic and nuclear physics for non-science majors. Prerequisite: Math 26 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, SS) Staff

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, SS) Staff

23. Quantum and Statistical Physics. Further development of physical phenomena due to the quantum and/or statistical nature of matter. Prerequisite: Physics 22. (3S) Staff

40. Introductory Mechanics I. Introduction to Newtonian Mechanics with brief development of elementary calculus and vector algebra. Prerequisite: Permission of the instructor. (3F) Merrill

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) Merrill

42. Energy Transfer. Wave motion, sound, and heat. Prerequisite: Physics 41. (3S) Merrill

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. (1S) Miller

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 recitation. (4F, W, S) Staff

122. Modern Physics. For engineering, science, and teaching majors. (3F) Jensen

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, S) Edwards

130. Nuclear Physics. A survey of methods and results of recent investigations of nuclear processes. To follow Physics 122. (3S) Edwards

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) Staff

140. Biophysics I. Foundations of physical measurements in biology with emphasis on optical methods: microscopy including phase and interference, spectoscopy, X-ray techniques, crystal analysis. Prerequisite: Physics 19 or 20. (3F) Meyer-Arendt

141. Biophysics II. Introduction to quantitative biology. The underlying physical principles involved in biophysical phenomena are discussed. Prerequisite: Physics 19 or 22. (3W) Staff

143. 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) Jensen


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. Credit for lab arranged. (3F, 3W, 3S) Meyer-Arendt

175, 176, 177. Electricity and Magnetism. Electrostatics, magnetostatics, D.C. and A.C. circuits, electromagnetism, and electromagnetic theory. Use of the calculus and differential equations. (3F, 3W, 3S) Miller
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. (1F) Staff

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. (1F) 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. (1W) Staff

184. Optics Laboratory. A one quarter course including advanced experimental work in optics such as refraction in inhomogeneous media, diffraction, polarization, photomery, spectra, information retrieval. Prerequisite: concurrent or previous registration in physics 166. (1W) Meyer-Arendt

188. Special Problems in Experimental Physics. A laboratory course to give the advanced student experience with precision instruments and their use in physics. Must be taken with Modern Physics, Electricity and Magnetism, Optics and Acoustics. 1 to 3 per quarter. (F, W, S) 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, 1S) Staff

196, 197, 198. Selected Reading in Physics. 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.)

220, 221, 222. Atomic Spectra, Molecular Spectra, and Spectographic Measurements. (3F, 3W, 3S) Staff


250. Research in Physics. Credit arranged. (F, W, S) Staff

260, 261, 262. Thermodynamics, Kinetic Theory, Statistical Thermodynamics. (3F, 3W, 3S) Chatelain

270, 271, 272. Quantum Field Theory. (3F, 3W, 3S) Chatelain

285, 286, 287. Introductory Quantum Mechan- ies. Prerequisite: Advanced Calculus. (3F, 3W, 3S) Chatelain


293, 294, 295. Graduate Seminar in Physics. (1F, 1W, 1S) Staff

296, 297, 298. Theoretical Electricity and Magnetism. (3F, 3W, 3S) Staff
Zoology

(Zoology, Entomology, Physiology, Pre-Dentistry, Pre-Medicine, Nursing)


Office in Forestry-Biological Sciences 116

Bachelor of Science Degree. For a major in Zoology the following courses must be taken: Zoology 3, 4, 107, 112, 118, and 131; Physiology 121 and 122, or 130 and either 151 or 104; Wildlife Resources 160, or any additional upper division course in Zoology; Botany 24, and one of 25, 30, or 120; Mathematics 35 and 46; Physics 17, 18, and 19; Chemistry 3, 4, 5, 121, and 122; and 15 hours of a modern language. The following courses are recommended; Entomology 13, 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 (97, 98, 99, and 110), more chemistry (115 and 190) and applied statistics (131 and 132).

For a pre-medical major in Zoology, the listed pre-medical requirements must be completed, and in addition the following courses must be taken: Zoology 107, 127 or 128, 131, and either 116 or Entomology 115.

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.

Zoology Courses

1. Principles of Biology. See Biology I under Integrated Courses in Program in General Education, College of Humanities and Arts.

3. 4. General Zoology. Detailed study of the animal kingdom with emphasis on structure, function, evolutionary relationships and natural history. Zoology 3 is primarily concerned with the invertebrate phyla and is a prerequi-
site for Zoology 4, which emphasizes the vertebrates. Three lectures, two labs. (5F, 5W, 5S)

101. Invertebrate Zoology. The more important phyla of invertebrates, with some consideration of the local fauna. Prerequisites: Zoology 3. Three lectures, two labs. (5S) 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. (5S)

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 3 and 4 or Botany 24 and 25. Four lectures, one lab. (5F, W, S) 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. (4F)

116. Parasitology. Protozoa and worms parasitic in man, domestic animals and wild animals, and relationships between parasites and their hosts. Prerequisite: Zoology 3. Three lectures, two labs. (5S)

118. Vertebrate Embryology. An introduction to the principles of development of the vertebrates. Prerequisite: Zoology 4 or equivalent. Three lectures, two labs. (5S)

119. Comparative Anatomy. Fundamentals of structure of the main types of vertebrates are studied comparatively. Prerequisite: Zoology 4 or equivalent. Three lectures, two labs. (5W)

121. Ornithology. Structure, classification, distribution and annual cycles of birds, with emphasis on study of the local fauna in the field. Prerequisite: Zoology 4. Two lectures, two labs. (4S)

122. Mammalogy. Structure, classification, life histories and distribution of mammals; introduction to methods of field investigation. Prerequisite: Zoology 4. Two lectures, two labs. (4F)

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. Prerequisites: Zoology 2 and 4. Two lectures, two labs. (4F)

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. (4F)

128. Elements of Histology. Study of tissues, including characteristics of different kinds of tissues and the main organs. Three lectures, two labs. (5F)

129. Histological Technique. Techniques employed in making preparations of animal tissues for microscopic study. Three labs. (3W)

131. Organic Evolution. Critical study of the facts and theories pertaining to evolution. Prerequisite: One basic course in biological science and Zoology 112. (3W)

150. Herpetology. Classification, distribution, life habits, and identification of amphibians and reptiles, with emphasis on the local forms. Prerequisite: Zoology 4. Two lectures, two labs. (4F)


156. Ichthyology Laboratory. Laboratory study of fishes. Must accompany or follow Zoology 155. Two labs. (2W)

201. Special Problems. Individual study of a problem under the guidance of a staff member. Credit arranged. (F, W, S) 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)

207. Theoretical Biology. A critical study of techniques and concepts in modern biological thought. Prerequisite: Zoology 107. (3W)

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. (3W)

213. Biochemical Genetics Laboratory. Experimental methods used in research in biochemical genetics. Must accompany or follow Zoology 212. Two labs. (2W)
262 College of Science

214. Advanced Genetics. Intensive study of heredity and variation with emphasis on current research. Prerequisite: Zoology 102 or 112. (3S) Gardner

231. Genetics and Speciation. Mechanics of heredity and variation applied to processes of evolution in plant and animal groups. Prerequisite: Zoology 102 or 112; Wildlife 160 recommended. (8W) Staff

233. Zoogeography. Principles governing the distribution of animals, with emphasis on terrestrial vertebrates, and of 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. (4F) Hammond

236. Advanced Parasitology. Detailed study of certain parasitic protozoa and helminths, with emphasis on current research. Prerequisite: Zoology 116. (3S) Staff

240. Research and Thesis. Research connected with problem undertaken for partial fulfillment of requirement for Master of Science or Ph.D. degree. Credit arranged. (F, W, S) Staff

251. 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, and advanced undergraduates. (1F) Staff

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, 1S) Hammond

Entomology

Bachelor of Science Degree. For a major in Entomology, the following courses are required: Zoology 3, 4, 107, 112, 131; Entomology 13, 103, 104, 111, 112, 108 or 115; Botany 24, 25, 30, 130; Chemistry 3, 4, 5, (or 10, 11, 12) 121, 122; Physiology 4; Mathematics 35; Wildlife Management 160. The following are recommended: Entomology 21, 120, 230; Agronomy 118; Applied Statistics 131, 132; English 111; Horticulture 131; Physics 6. Students planning graduate work are advised to study a foreign language and take Chemistry series 3, 4, 5, 121, 122.

For a major in Agricultural Entomology under the College of Agriculture, the requirements of that College as well as those of Entomology must be completed.

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 Management. (3S) Hawes

21. Social Life of Honey Bees. Honey bees are among the most highly developed animals with respect to social organization. Factors in this social organization are studied, including communication and physiology. The elements of beekeeping are also considered, including practice in handling bee colonies. (2S) Staff

103. Systematic Entomology. Classification of insects. Insect collection required. Prerequisite: Entomology 13. One lecture, one lab and field collecting. (3F) Hanson

104. Advanced Systematic Entomology. A study of the principles of classification and the rules of zoological nomenclature. Practice is given in the preparation of keys, description of species, and scientific illustration. Prerequisite: Entomology 103. One lecture, two labs. (3W) Hanson

105. Forest Entomology. Principal insects attacking forests and forest products. Some

*Taught 1963-64
attention is also given principles of biological control. 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. Prerequisite: Zoology 3 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) Haws

112. Insect Physiology. Function of the organ systems of insects. Prerequisite: Entomology 111. Three lectures, two labs. (6W) Haws

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 diseases are considered. Prerequisite: Zoology 3 or equivalent. Two lectures, two labs. (4W) Hanson

**120. 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

138. Aquatic Entomology. Identification, distribution, life histories and adaptations of aquatic insects, with particular reference to local streams and lakes. Two lectures, one lab. (5F, 5S) Hanson

**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) Staff

**231. Biological Control of Insect Pests.** Study of invertebrate parasites and predators 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) Staff

250. Research and Thesis. For research connected with problem undertaken for partial fulfillment of requirements for Master of Science or Ph.D. degree. Credit arranged. (F, W, S) 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, 1S) Staff

### Physiology

A major in Physiology must satisfy the Zoology requirements, and in addition complete Mathematics 110.

A teaching 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, S) 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. (3W) Linford

30. Experimental Biology. An introduction to the basics of biological experimentation, both plant and animal. Fundamental principles of biology will be considered on a level more advanced than in Principles of Biology. Prerequisite: Principles of Biology or its equivalent or Physiology 4. Four lectures, 1 lab. (5F, 5S) Sanders

104. Advanced Human Physiology. A survey of the systems of man with emphasis on the functions of the circulatory, nervous and mus-
264 College of Science

Cular systems. Designed primarily for students with teaching majors in the biological sciences. Prerequisites: Physiology 4, Zoology 4, Chemistry 12. Three lectures, two labs. (SS) Sanders

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, Physiology 4, Zoology 3 or 4, Chemistry 3, 4, 5, 121, 122 or equivalent and a course in physics are required. Three lectures, two labs. (5F, 5W) Sanders

130. Cellular Physiology. A study of physiological functions at the cellular level. Prerequisites: Physiology 4 or its equivalent, Chemistry 121 and 122 and Physics 17, 18 and 19 or equivalent. Three lectures, two labs. (SW) Sanders

141. Endocrinology. The glands of internal secretion, with emphasis on the hormones in reproduction. As preparation, Physiology 4, Zoology 3 and 4 and a course in organic chemistry are required. (3F) Sanders

151. Comparative Physiology. A comparative study of organ function in the animal kingdom. Prerequisite: Physiology 121, 122 or 130. Five lectures. (SS) Sanders

201. Special Problems. Laboratory course for special investigations in physiology. Prerequisites: Physiology 121, 122 or special permission. (2 to 5F, W, S) Sanders

241. Physiology of Reproduction. A laboratory course for studying physiology of reproduction in animals. Prerequisite: Physiology 141. Two lectures, one lab. (3W) Sanders

261. Physiology of Response. Nerve-Muscle. A detailed physiological study of nervous and muscle 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, 1S) Sanders

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, 1S) Sanders

291. Research and Thesis. Research connected with problem undertaken for partial fulfillment of requirements for Master of Science or Ph.D. degree. Credit arranged. (F, W, S) Sanders

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**

<table>
<thead>
<tr>
<th>Course</th>
<th>F</th>
<th>W</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry 3, 4, 5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Mathematics 34, 35, 44 or 46</td>
<td>3</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>English 1, 2, 3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Air Sci., Military Sci., or P. E.</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Electives (optional)</td>
<td>3</td>
<td>2</td>
<td>5</td>
</tr>
</tbody>
</table>

Total: 15 16 17

**SOPHOMORE**

<table>
<thead>
<tr>
<th>Course</th>
<th>F</th>
<th>W</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zoology 3, 4</td>
<td>5</td>
<td>5</td>
<td>...</td>
</tr>
<tr>
<td>Physics 17, 18, 19</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Electives (optional)</td>
<td>7</td>
<td>7</td>
<td>12</td>
</tr>
</tbody>
</table>

Total: 17 17 17

**JUNIOR**

<table>
<thead>
<tr>
<th>Course</th>
<th>F</th>
<th>W</th>
<th>S</th>
</tr>
</thead>
</table>
| Chemistry 121, 122              | 5 | 5 | ...
| Zoology 118 or 119              | 5 | 5 or 6 |
| Electives                       | 8 | 7 | 12 |

Total: 17 17 17

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 fulfill the group, English composition, and military requirements of USU and must complete a minimum of 141 credits of pre-professional work.

3 Military Science or Air Science would be two credits each quarter.

Students 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.
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**

<table>
<thead>
<tr>
<th>Course</th>
<th>F</th>
<th>W</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>English 1, 2, 3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Chem. 3, 4, 5</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Math 35, 46</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Air Sci., Military Sci., or P. E.</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Electives</td>
<td>3</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>17</td>
<td>17</td>
<td>17</td>
</tr>
</tbody>
</table>

**SOPHOMORE**

<table>
<thead>
<tr>
<th>Course</th>
<th>F</th>
<th>W</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zoology 3, 4</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Foreign Language</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Physics 17, 18, 19</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Electives</td>
<td>3</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>18</td>
<td>18</td>
<td>18</td>
</tr>
</tbody>
</table>

**JUNIOR**

<table>
<thead>
<tr>
<th>Course</th>
<th>F</th>
<th>W</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chem. 121, 122</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Zoology 112</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zoology 118</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chem. 115</td>
<td>7</td>
<td>7</td>
<td>12</td>
</tr>
<tr>
<td>Electives</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>17</td>
<td>17</td>
<td>17</td>
</tr>
</tbody>
</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 premedical 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 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.
Sketch of Library, nearing completion
School of

Graduate Studies

General Graduate Policies, 269

Graduate Degrees, 271

- Master of Arts Degree, 271
- Master of Science Degree, 271
- Master of Education Degree, 272
- Master of Forestry Degree, 272
- Master of Business Administration Degree, 272
- Master of Industrial Education Degree, 273
- Degree of Civil Engineer, 273
- Degree of Irrigation Engineer, 273
- Doctor of Education Degree, 274
- Doctor of Philosophy Degree, 274

Teaching and Research Assistantships, 275

Fellowships, 276

Tuition Scholarships, 276

Curriculum in Animal Nutrition and Biochemistry, 276

Curriculum in Food Science and Technology, 277

Curriculum in Plant Nutrition and Biochemistry, 278
School of
Graduate Studies

J. Stewart Williams, Dean

Office in Main 182

There are nine graduate degrees offered at Utah State University: Civil Engineer, Irrigation Engineer, Master of Education, Master of Forestry, Master of Science, Master of Business Administration, Master of Industrial Education, Doctor of Education and Doctor of Philosophy.

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 constituted as follows: College of Agriculture, James A. Bennett; College of Business and Social Sciences, Leonard J. Arrington; College of Education, Arden Frandsen; College of Engineering, Cleve H. Milligan; College of Forest, Range and Wildlife Management, Lawrence A. Stoddart; College of Family Life, Ethelwyn B. Wilcox; College of Humanities and Arts, Hubert W. Smith; College of Science, W. S. Boyle; Library, Milton Abrams.

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
School of Graduate Studies

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 the 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. Students pay for microfilming their thesis, and the films are deposited in the University library. For master’s candidates, the fee is five cents per page and students may obtain their own positive copy for a small additional charge. For doctor’s candidates the fee is $20 and the film is produced by and registered with University Micro-films, Ann Arbor, Michigan, who also publish an abstract.

Thesis Alternate. The supervisory committee may permit the substitution of two advanced reports, valued at six 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 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 disserta-
tion may register for the full load, if such registration includes at least 4 credits of research or thesis.

Graduate credit. If properly registered in the School of Graduate Studies any course in the 100 series is recorded as graduate credit. If in education and interested in recertification students should be sure they are 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 of Science degree must include: (1) At least 27 credits taken on the Logan campus; thesis credit counts toward this residence requirement; (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.

Final Examination. A candidate for a Master of Science 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 10.

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, and Secondary School Supervision.

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 45 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 six 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.

Degree of

Master of Forestry

The Master of Forestry degree is given upon completion of a course of study prescribed by the Department of Forest Management within the general requirements of the School of Graduate Studies. It is designed for those who have a Bachelor's degree in some field other than forestry and who wish to earn a degree in forestry. It normally requires from two to three years, depending upon how closely the original field is related to forestry.

Degree of

Master of Business Administration

The Master of Business Administration degree is given upon completion of a course of study prescribed by the Department of Business Administration within the general requirements of the School of Graduate Studies. It is designed to serve the needs of graduates from recognized colleges of business as well as graduates in liberal arts, science, engineering or other fields with a professional interest in management. The entire program, aimed at developing broad executive skills, can be covered in a period of two years. Those with strong backgrounds in business administration and economics, however, should be able to complete the program in a significantly shorter time.
Degree of

Master of Industrial Education

The Master of Industrial Education degree provides advanced 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 over-all record, including course work, the Master's examinations and the Master's Paper, represent creditable accomplishment. Candidates for this degree must have had three years of successful 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.

Diploma in

Educational Administration (Six-Year Program)

A new six-year program in the College of Education terminates in the Diploma in Educational Administration. 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 undergraduate study beyond the Master's degree. (3) a minor field of study, with 20 credits of approved courses. (4) An acceptable dissertation for which a maximum of 18 credits may be given. (5) 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 Coordinator of Graduate Programs in Education.
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 to be 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 in 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 May 1 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 10 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 $900 to $1800 for one-third to one-half teaching service on a nine-month basis. Remuneration for research assistantships may vary from $900 to $2400, depending upon the time of service involved. Generally assistantships are arranged so that the student may complete the Master's degree in two years.

Crops, Veterinary Science, Wildlife Resources, and Zoology.

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.

National Defense Graduate fellowships for the Doctor's degree are available in seven fields: Civil Engineering, Irrigation Engineering, Entomology, Physiology, Zoology, Botany, Plant Virology. They carry stipends of $2,000 for the first year, $2,200 for the second year, and $2,400 for the third year, plus an allowance of $400 per year for each dependent. Non-resident tuition is waived.

Interdepartmental curriculum in Animal Nutrition and Biochemistry

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, spectograph, 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 biochemis-
try) mathematics through trigonometry, physics, bacteriology, botany, physiology, and zoology. Any deficient prerequisite work must be completed without graduate credit.

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.

Master's Degree Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Advanced Nutrition</td>
<td>10</td>
</tr>
<tr>
<td>2. Advanced Biochemistry</td>
<td>10</td>
</tr>
<tr>
<td>3. Statistics</td>
<td>8</td>
</tr>
<tr>
<td>4. Physical Chemistry (Biology)</td>
<td>3</td>
</tr>
<tr>
<td>5. Electives and Research</td>
<td>14-17</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>45-48</strong></td>
</tr>
</tbody>
</table>

Doctorate Degree Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Advanced Nutrition</td>
<td>12</td>
</tr>
<tr>
<td>2. Advanced Biochemistry</td>
<td>16</td>
</tr>
<tr>
<td>3. Statistics</td>
<td>12</td>
</tr>
<tr>
<td>4. Physical Chemistry (Biology)</td>
<td>3</td>
</tr>
<tr>
<td>5. Physiology, Zoology, Pathology</td>
<td>20</td>
</tr>
<tr>
<td>6. Electives and Research</td>
<td>73</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>135</strong></td>
</tr>
</tbody>
</table>

Chairmanship for the curriculum rotates each year: chairman for 1962-63, Lorin E. Harris; chairman for 1963-64, Harris O. Van Orden.

Interdepartmental curriculum in Food Science and Technology

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 Ph.D. 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>Requirement</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science and Technology courses (related to research and specialization)</td>
<td>10</td>
</tr>
<tr>
<td>Advanced Biochemistry and/or organic chemistry (225, 226, 227, 230 or 230, 291, 292, 293, 294, 295, 296, 297)</td>
<td>6</td>
</tr>
<tr>
<td>Applied Statistics 131, 132, 215</td>
<td>12</td>
</tr>
<tr>
<td>Physical Chemistry 101</td>
<td>3</td>
</tr>
<tr>
<td>Quantitative Chemistry 115</td>
<td>5</td>
</tr>
<tr>
<td>Food Microbiology 120, 121</td>
<td>4</td>
</tr>
<tr>
<td>Research and Thesis (maximum)</td>
<td>15</td>
</tr>
</tbody>
</table>
278 School of Graduate Studies

Doctor of Philosophy Degree Requirements
(Beyond M.S. degree requirements)

Science and Technology
(related to research and specialization) ........................................ 12
Advanced Biochemistry and/or organic Chemistry (225, 226, 227, 230 or 291, 292, 293, 294, 295, 297) ........................................ 12
Applied Statistics 131, 132, 215, or 141 156, 220 ........................................ 12

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 should include Botany (general and plant physiology), Chemistry (qualitative, quantitative, organic and elementary biochemistry), Mathematics (including one year of geometry and calculus) and Physics. Any deficiency must be completed before an individual is accepted as a candidate for graduate degree.

Physical Chemistry 101 or 104, 105, 106. if to 9
Biophysics (140, 141) and/or
Radiobiology 143 .......................................................... to 9
Intermediate quantitative chemistry 152
and instrumental analysis 153 .......... 7
Food Microbiology 120, 121 or others .... 4
Research and Thesis (maximum) .......... 45

Summer School
Summer School

Gene S. Jacobson,* Director
Carl Frischknecht, Acting Director

Office in Education Building—207

Dates: June 10-August 16

First Session—June 10—July 12
Second Session—July 15—Aug. 16

Two Summer School sessions of five weeks each will be conducted at Utah State University in 1963. The offerings include a rich program for both graduate and undergraduate students. Opportunities for professional advancement are provided for School Administrators, supervisors, elementary and secondary teachers, guidance counselors and people in most of life's pursuits.

It is possible to attend one or combine two five-week terms for a quarter's work. By attending three full summer sessions a student may accelerate his undergraduate program one complete year. A graduate student may complete requirements for a Master's Degree in three summers at less expense. High School graduates may begin their college career in the summer quarter.

A highly qualified resident faculty will be augmented by distinguished visiting professors and lecturers of National reputation. The instructional services of the University are organized into eight Academic Colleges: Agriculture, Business and Social Sciences, Education, Engineering, Forest Range and Wildlife Management, Family Life, Humanities and Arts; also a school of Graduate Studies.

The Summer School has organized a varied and stimulating program of offerings including: formal courses, workshops, seminars, conferences, lectures, concerts, dramatics, musical activities, weekend tours to scenic wonders and recreation. Numerous challenges and educational opportunities are available at Summer School. A student may profitably spend a one, two, five or ten-week period here for professional, cultural and recreational enrichment.

Utah State University is located on a low plateau adjacent to the mouth of picturesque Logan Canyon, overlooking beautiful Cache Valley. Logan is an attractive College Community in the “Heart of the Rockies” with a population of 20,000 people.

The location of the University, the climate of Logan, its scenic canyons, and nearby national parks and monuments makes Utah State Summer School an ideal institution for study, recreation and vacation.

A copy of the 1963 Catalog will be mailed upon request.

*On leave
Branch Colleges
Branch Colleges

College of Southern Utah, Cedar City

Division of Agriculture, Biology, Forest, Range and Wildlife Management
Division of Air Science
Division of Business and Social Sciences
Division of Education
Division of Engineering and Physical Science
Division of Family Life
Division of Industrial and Vocational Education
Division of Humanities, English and Fine Arts

Snow College, Ephraim

Division of Agriculture and Life Sciences
Division of Business
Division of Education and Social Science
Division of Humanities
Division of Industrial and Vocational Education
Division of Physical Science and Mathematics
Branch Colleges

In addition to eight resident colleges, a School of Graduate Studies and several other divisions located on the Logan Campus, Utah State University includes two branch colleges—Snow College at Ephraim and the College of Southern Utah at Cedar City.

College of Southern Utah

Daryl Chase, President
Royden C. Braithwaite, Director

The College of Southern Utah was founded in 1897 as Branch Normal School of the University of Utah and functioned as such until 1913 when it became a branch of Utah State University. For the next 40 years it was known as Branch Agricultural College. In 1953 the name was changed to College of Southern Utah.

Its 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. The College of Southern Utah is located at Cedar City in Southwestern Utah.

Accreditation. College of Southern Utah is accredited by the Northwest Association of Secondary and Higher Schools and by the National Council for Accreditation on Teacher Education.

Campus and Facilities. The main campus of CSU consists of 60 acres of land and 25 buildings. In addition to its main campus the college includes 3,000 acres of mountain range land, a 1,000-acre valley farm operated jointly with the Experiment Station and numerous livestock sheds and buildings.

Degrees and Certificates. CSU is authorized to issue the certificate of Associate in Science, and by action of the Board of Trustees offers four years of work leading to the degree of Bachelor of Science in elementary education. This degree is awarded through Utah State University: The college also offers a third year junior program in specified areas. Students who follow terminal curricula are awarded a two-year certificate of completion.

Curricula. CSU is authorized to teach lower division courses in all basic areas of instruction, and by action of the Board of Trustees, four years of work in elementary education and other subjects required for the degree in elementary education.

Courses offered at College of Southern Utah parallel lower division courses offered at Utah State University. Course numbers generally coincide with those listed at USU. A student may complete all lower division requirements at College of Southern Utah 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 CSU is issued each year.
284 Branch Colleges

It contains a detailed announcement of all curricula, statement of courses, entrance requirements, rules, and regulations for the college. For a copy of the CSU catalog, or for information concerning the work of College of Southern Utah, address:

Director's Office,
College of Southern Utah,
Cedar City, Utah.

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.

Its 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 30 acres and contains 12 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.
"The state is our campus"

Utah State University
Extension Services

Extension Services
Extension Services

DIRECTOR W. H. Bennett; ASSOCIATE DIRECTORS J. Clark Ballard1, Lloyd A. Drury, Leon Michaelsen, ACTING; DISTRICT DIRECTORS Gordon L. Beckstrand, Marden Broadbent, Lloyd R. Hunsaker; SOCIAL AND ECONOMIC DEVELOPMENT LEADER Stephen L. Brower; STATE 4-H CLUB LEADER Glenn T. Baird; ASSISTANT STATE 4-H CLUB LEADER Amy R. Kearsley; SUPERVISOR, EXTENSION CLASSROOM AND HOME STUDY Bernice Brumley; ADMINISTRATIVE ASSISTANT Arthur Cahoon; SECRETARY TO DIRECTOR Libbie B. Maughan.

State Subject Matter Specialists

AGRICULTURAL ENGINEER Wayne B. Ringer; AGRONOMIST Louis A. Jensen; ANIMAL HUSBANDMAN George R. Henderson; CLOTHING SPECIALIST Theta Johnson; DAIRY MANUFACTURING SPECIALIST A. J. Morris; DAIRYMAN John Barnard; ENTOMOLOGIST George F. Knowlton; FARM MANAGEMENT SPECIALIST Lloyd Clement; HOME MANAGEMENT AND HOME FURNISHINGS SPECIALIST Rhea H. Gardner; HORTICULTURE AND VEGETABLE CROPS SPECIALIST Anson B. Call; INFORMATION SPECIALIST Cleon M. Kotter; ASSISTANT INFORMATION SPECIALIST Thomas C. Jones; LIVESTOCK MARKETING SPECIALIST Morris H. Taylor; MARKETING INFORMATION SPECIALIST Carolyn Dunn; POULTRY SPECIALISTS C. Elmer Clark, C. I. Draper; RADIO AND TELEVISION SPECIALIST Arthur L. Higbee; RANGE MANAGEMENT AND FORESTRY SPECIALIST Karl G. Parker; RECREATION SPECIALIST Clayne R. Jensen; SHEEP AND WOOL SPECIALIST Russell Keetch; SOIL CONSERVATIONIST Paul D. Christensen; VETERINARIAN Don W. Thomas; WILDLIFE SPECIALIST Jack H. Berryman; ORNAMENTAL HORTICULTURE SPECIALIST Arvil L. Stark.

County Agricultural Agents

BEAVER Grant M. Esplin; BOX ELDER A. Fullmer Allred, Ray H. Finch; CACHE Lamont E. Tueller, G. Ray Burtneshaw; CARBON Robert L. Hassell; DAVIS L. Darrell Stokes, Lehi S. Rogers; DUCHESNE William L. Smith; EMERY Gerald R. Olson; GARFIELD Harold G. Lindsay; IRON Wallace D. Sjoblom; JUAB Lynn M. Esplin; KANE Carl Hatch; MILLARD Rodney G. Rickenback, Marven J. Ogden; MORGAN Ray A. Thatcher; PIUTE Rulon W. Buck; RICH Wesley T. Maughan1, Evan Rudd; ROOSEVELT Norris J. Stenquist; SALT LAKE Joseph R. Parrish, D. Wayne Rose; SAN JUAN Rell F. Argyle; SANPETE C. Dennis Funk; SEVIER Paul R. Grimshaw; SUMMIT J. Reed Moore; TOOELE Ernest O. Biggs; UINTAH Ben W. Lindsay; UINTAH-DAGGETT Kay R. Bendixon; UTAH Clair R. Acord, Joel C. Barlow1; WASATCH Paul R. Daniels; WASHINGTON Don A. Huber; WAYNE Jay M. Hall; WEBER Melvin S. Burningham, Fay W. Boyer.

County Home Agents

BEAVER Sofia Ann Yardley; BOX ELDER Jessie Eller; CACHE Bessie K. Lemon; CARBON Clara Schofield; DAVIS Karma P. Swindle; DUCHESNE M. Elaine Hatch; EMERY Evelyn P. Huntsman; GARFIELD Flora H. Bardwell1

1On leave.
Extension Services

William H. Bennett, Director

Office in Agricultural Science 120

Utah State University's Extension Services include the Cooperative Extension Service and General Extension Classwork and Home Study programs, etc.

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 farms and homes 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 28 subject-matter specialists comprise the staff at the state office on the USU campus. These staff members train, supervise and assist county agricultural and home agents and local leaders.

County Extension Agents are located in 27 of Utah's 29 counties. At present there are 37 agricultural agents, and 27 home agents.

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 development; (8) community development; (9) public affairs.

To train leaders and supplement the Extension work done by county agents, the Extension Service sponsors free non-credit shortcourses and conferences in various subjects at the University and at other locations throughout the state. These shortcourses are usually planned and conducted under the joint sponsorship of the Extension Service and cooperating groups. Field days are also held in cooperation with USU's Agricultural Experiment Station and other groups.

**Extension Classwork and Home Study**

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 home campus to register for resident courses. For this group, USU provides a liberal program of educational offerings, including Extension Classwork, Home Study and a number of other educational services fully accredited by the National University Extension Association.

**Extension Classwork**

Organized courses in many departments of Utah State are offered in as many as thirty selected residence centers of the state for groups of people who cannot come to the home campus at Logan, but who desire professional improvement or who are interested in an advanced degree. Such courses are designated as *Extension Classwork*. They carry resident 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 “fifteen hours of on-campus rule,” 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 appointed by the head of the department, with the approval of the University administration.

The registration fees charged for Extension classes conform to the prevailing regulations fixed by the Board of Trustees.

**Adult Education Services**

USU offers a number of special services for adults in the field of education, including the following:

- **Faculty Speaker Service.** The University provides a faculty speaker service for commencement exercises, teacher institutes, parent-teacher meetings, service organizations, and other adult groups which are concerned primarily with problems in public education.
- **University Lecture Series.** USU provides each year a special lecture series dealing with such topics as the Great Religions, International Problems, and Current Problems in Education.
- **Conferences and Institutes.** The University cooperates with teach-
ers, administrators, and boards of education in planning educational conferences and institutes in connection with in-service teacher, parent-teacher, and other group organization improvement programs.

Home Study Courses

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 Home 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 Home Study courses of college grade.

One-fourth of the credits necessary for a Bachelor’s degree (45) may be earned through the Home Study Courses. Each college of the University, subject to faculty approval, determines the nature and the amount of home 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 Home Study credit.

Graduation Deadline. Seniors who plan to apply Home 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 Home 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 Home Study courses should contact the education and information center at the base where he is located.

Veterans. USU is approved by the Veterans Administration to offer Home Study courses under the GI Bill of Rights. If an individual desires Home Study courses he should first contact the local Veterans Administration regional office and determine whether he is still eligible to continue schooling under the GI benefits, and if so, determine what procedures he must follow.

Fees. A fee of $7.50 per credit hour is charged for Home Study courses of college level. High School course fees are $18 per unit and $12 per half-unit. All fees are subject to change.

Home Study Catalog. If an individual is interested in Home Study courses, he may request a Home Study Catalog, which contains full information concerning this program.
'Mid autumn leaves, new friendships that endure forever
Information Services

Public Relations, Services

LeRoy A. Blaser, Director

Publications

John J Stewart, Editor, University Publications
Gladys L. Harrison, Editor, Agricultural Experiment Station Publications
Lois M. Cox, Assistant Editor, Agricultural Experiment Station and University Research
Thomas C. Jones, Editor, Cooperative Extension Service Publications
King Hendricks, Editor, University Monograph Series
Karl W. Klages, Editor, Athletics Publications
J. Lyn Larson, Editor, Alumni Association Publications
Nella Lauritzen, Editor, Engineering Experiment Station Publications
Gwen H. Haws, Editor, School of Graduate Studies Publications
Hubert W. Smith, Editor, Graduate News and Comment

News Releases

J. R. Allred, University News Editor
Karl W. Klages, Athletics News Editor
Cleon M. Kotter, Cooperative Extension Service Information Specialist
Nella Lauritzen, Engineering Experiment Station Editor

Radio and Television Programs

Burrell F. Hansen, Chairman, University Radio and Television
Arthur L. Higbee, Extension Service Radio and Television Specialist
Warren L. Burton, Producer-Director, KUSU-TV
Gerald L. Allen, Manager, KUSU-FM
Boyd V. Humpherys, Radio-TV Chief Engineer

Photographic Service

Arlen L. Hansen, University Photographer

Duplicating Service

Clark Kidd, Supervisor
Research Programs
Research Programs

Division of University Research, 295
Agricultural Experiment Station, 297
Engineering Experiment Station, 300
Utah Scientific Research Foundation, 302
School of Graduate Studies, 303
Utah Cooperative Wildlife Research Unit, 303
Utah Cooperative Fishery Research Unit, 304
Bureau of Educational Research, 304
Research Programs


Utah State University was among the first of the colleges and universities in the Intermountain area to have a research program. Originally the research was principally in agriculture. Now research projects are in every college and almost every department of the University.

Research is closely associated with teaching and student activities. Most of it is 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 Director of University Research. Actual research operations are in several organizations. The principal organizations and areas of research are as follows:

**Division of**

**University Research**

D. Wynne Thorne, Director

**Office in Agricultural Science 136**

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: T. Y. Booth, Literature and Arts; Vernon L. Israelsen, Business and Social Sciences; Datus M. Hammond, Biological Sciences; Jurgen R. Meyer-Arendt, Physical Sciences; Walter R. Borg, Education; Allen W. Stokes, Forest, Range and Wildlife Management; Margaret B. Merkley, Home and Family Living; Clayton Clark, Engineering and Technology; J. Stewart Williams, School of Graduate Studies, and
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. Some important areas of research and types of investigations under way include:

**Education**: Studies are being continued on the evaluation of ability grouping of students in elementary and secondary schools. A survey is being made to determine the benefits of optional summer school programs in secondary schools in Utah. Investigations during the past several years have demonstrated that teaching machines can be an effective aid in the learning process. A continuing study program in physical education is concerned with evaluating the effects of such factors as diet, alcohol and sounds on gross motor performance of college students. In another project the merits of group versus individual problem solving on learning effectiveness are being evaluated.

**Literature and Arts**: Staff members in these areas are assisted in carrying out scholarly, creative programs. One study is concerned with a poetic interpretation of the Book of Genesis. In another, access is had to a large volume of unpublished writings and correspondence of Jack London. Through this is provided a better interpretation of the contributions of Jack London to the process of social revolution. Printmaking is being developed as a special form of artistic expression. A comprehensive collection of cowboy ballads recorded from individuals throughout western United States is being edited and annotated for publication.

**Biological Science**: Emphasis is being placed on developing a new area of research on the biochemistry of gene action. This will be in association with continuing studies on fruit flies and their tumorous traits. Another important activity is the collection of plants from the Intermountain Region, the maintenance of the Intermountain Herbarium, and the publication of a comprehensive description of the flora of this region. New equipment is being utilized to study the behavior of birds and record their calls. The cytology of hybrids produced by grasses of different species is being studied to further clarify evolutionary processes.

**Physical Science**: There has been a rapidly expanding research program in chemistry. Emphasis is being placed on such biologically important substances as riboflavin, alkaloids, and virus particles, and on such reactions as decarboxylation, nitrogen fixation, and alkaloid biosynthesis. A long-time program in geology is devoted to mapping geologic structures of northern Utah and to dating late Pleistocene deposits by carbon 14 measurements and tertiary formations by potassium 40/argon dating.

**Business and Social Science**: Continuing studies are devoted to recording and analyzing the economic history of Utah and related events including early colonization of the territory and the history of Shoshoni Indians. A book is being prepared on the history of political thought and other studies are devoted to analysis of various aspects of state and local government.

**Engineering**: The dynamics and
mathematics of water movement under various conditions are being reduced to basic principles. The properties of soil in relation to certain types of construction and in relation to ground contacts for electronic current are also receiving attention.

*Forest, Range and Wildlife Management:* A year-around field station is being established at Bear Lake where studies in environmental biology, limnology, zoology, geology, botany and hydrology may be conducted. Methods are being explored for obtaining improved utilization and increased carrying capacity from mountain summer ranges. Studies on population dynamics of fish of Bear Lake, ecology and behavior of ground squirrels, ethology of North American quail are some of the points of interest. Special emphasis is being placed on research on recreation in relation to the use of forests and other land and water resources. A cooperative program on recreation with the U. S. Forest Service is under way.

**Agricultural Experiment Station**

D. Wynne Thorne, Director

**Office in Agricultural Science 136**

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 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 19 different departments of the University: Agricultural Economics, Agronomy, Animal Husbandry, Applied Statistics and Computer Science, Bacteriology and Public Health, Botany and Plant Pathology, Chemistry, Civil and Irrigation Engineering, Dairy Industry, Foods and Nutrition, Forestry, Horticulture, Poultry Husbandry, Range Management, Sociology, Veterinary Science, Wildlife Resources, and Zoology. The staff includes about 45 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 170 research projects. Some of the areas of research include: 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 poul-
298 Research Programs

try; production of vegetable and fruit crops; weed control; mapping and classification of soils; fertilizing and managing soils; irrigation and drainage; managing watersheds and rangelands; 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. 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.

Greenhouses are maintained for investigations in horticulture, agronomy, botany, plant pathology, entomology, bacteriology and range management.

Livestock husbandry investigations are conducted at the barns on the University campus, and at the two branch campuses: the College of Southern Utah, at Cedar City, and Snow College at Ephraim; at the U.S. Forest Service Desert Range Station in Millard County; at the Benmore Experimental Range in Tooele County, and on the ranges in different parts of the state.

The Station maintains the following field stations staffed with one or more technically trained men:

**Howell Field Station for Horticultural Research**, located in Weber County, north of Ogden. This is a 71-acre tract of land plus laboratory and storage buildings used for investigations in the production, harvesting, storage and marketing of fruit.

**Farmington Field Station at North Farmington.** This consists of 96 acres of land and a fruit and vegetable processing laboratory and is used for experimental work in horticulture, floriculture and vegetable crops.

**Snow Field Station** located north of Ephraim and operated cooperatively with Snow College. This is a 94-acre tract used for research and demonstration on crop production and dairying.

**Range Livestock Field Station** located in the vicinity of Cedar City and operated cooperatively with the College of Southern Utah. It consists of 1200 acres on the Valley Farm west of Cedar City, 2820 acres of summer range land east of Cedar City, and 7800 acres of leased winter range land near Modena. Breeding and management of range sheep and beef cattle are studied.

The Station also maintains the following experimental farms:

**Animal Husbandry Farm**, located five miles south of Logan near College Ward, to the east of Highway 89. Approximately 230 acres of excellent land have been purchased. When the buildings and other facilities are constructed, most field research on sheep, beef cattle, and swine will be moved there from the present location to the north of the campus.
Cache Valley Reclamation Farm, located northwest of Logan in the center of poorly drained pasture lands, consists of 115 acres. This is used for research on drainage and improvement of fine textured, water-logged lands.

Dairy Farm, at North Logan, includes 200 acres of land, barns, milking parlor and a house. The Station, in cooperation with Agricultural Research Service, maintains an experimental Holstein-Friesian and Jersey dairy herd of about 200 mature purebred animals. Research in this division includes pasture improvement investigations, and feeding, breeding and management studies.

Evans Farm, a 42-acre tract located south of Logan, is used in cooperation with the U.S. Department of Agriculture for a study of improvement of forage plants. Special attention is given development of improved plants for irrigated pastures and for range lands.

Greenville Farm, a 46-acre tract two miles north of the campus, is used for experimental work in plant breeding and other phases of crop production.

Nephi Farm, on Levan Ridge in Juab County, is used for experimental work in dry farming and range seeding. This farm has 103 acres.

Panguitch Farm, north of Panguitch, consists of 150 acres of irrigated land with accompanying buildings. Crop production in high altitude areas and breeding of beef cattle are the principle investigations conducted.

Poultry Farm, in North Logan, is used for research on the breeding, feeding and control of disease in chickens.

Turkey Farm, a 33-acre farm just east of Logan, is used for studies in turkey breeding, nutrition, and disease control.

Benmore area, in Tooele County, consists of 3,500 acres of reseeded range pasture, and is used in cooperation with the U.S. Department of Agriculture for studies in management of range cattle and for research in range management.

Washington County Fruit Plots. About three acres of land near Hurricane are rented by Washington County. The land is used for variety studies of deciduous fruits as a part of a program to improve the economy of Southern Utah.

The Station also conducts experiments on a cooperative basis with farmers and ranchers on more than 250 privately owned farms located in all parts of the state.

The research facilities have a three-fold importance in the institution: First, they make it possible for the teaching faculty to fortify instruction with the results of original research; second, they afford advanced students an opportunity to keep in touch with research methods and facilities; and third, they offer employment to students qualified to act as research assistants or laboratory aids. About 300 students thus employed are on Station payrolls each month of the school year. Several find employment in laboratories and on the experimental farms during the summer months.

USU Agricultural Experiment Station Field Days. During the year approximately 15 field days are held on the various farms and in association with a number of our major research programs. Notices of the dates, places, and subject matter of the field days are printed in the newspapers and carried over radio and television.
300 Research Programs

Engineering Experiment Station

Dean F. Peterson, Dean, College of Engineering
Vaughn E. Hansen, Director, Engineering Experiment Station

Office in Engineering and Physical Science C210

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, especially as these relate to improving the welfare of Utahns, through development of agriculture, industry, natural resources, and in development of methods of more effective engineering teaching.

The Station was established December 2, 1918, by act of the Board of Trustees. The director has supervisory responsibility to the Dean of Engineering for all research conducted by the various departments of agriculture, industry, natural resources, and in development of methods of more effective engineering teaching.

Important public service projects being pursued by the Station include developments in control systems, machinery, computation methods, electrical power applications, electronic designs, and water supply, control and conveyance.

The Station conducts basic and applied research in civil, electrical, mechanical, tool and agricultural engineering. Emphasis is placed upon development of water resources and methods of water control and utilization. Typical subjects currently under study include highways, materials, hydraulics, servomechanisms, and radio propagation.

Staff members of the Civil, Electrical, Mechanical and Tool and Manufacturing Engineering Departments and the Industrial and Technical Education Department are staff members of the Engineering Experiment Station. Staff members may be employed full or part time on research. The Station cooperates closely with the Utah Scientific Research Foundation. All laboratories of the College of Engineering as well as the facilities of the Utah Scientific Research Foundation are available to assist in the execution of the projects of the Station.

Results of these studies are published in research bulletins, engineering reports and papers, or are otherwise made available to those interested.

Following are some of the areas of current research in the Engineering Experiment Station:

Soil cement used as a subgrade for highways, airports and shoulders for highways is being studied to determine its resistance to alkali and to obtain better design. Pozzolan and other additives are being placed in concrete to improve the quality not only of highways, but of runways and even basements and sidewalks.

Water requirements of marshlands are being determined for the State Fish and Game Department.

A new low-cost water level recorder has been developed for use by canal companies.

Water shed characteristics are
being studied to arrive at better methods of predicting flood flows and runoff characteristics.

Significant advances are being made in the hydraulics of surface irrigation. Studies presently being conducted promise much better methods of handling and measuring water in steep and mountain streams.

Low-cost prefabricated irrigation structures for farm use have been designed. They can be readily assembled and installed by the farmer.

The Station is cooperating with the Utah Scientific Research Foundation in the development of new mechanical concepts.

A method of evaluating the relative productive value of land has been developed and a study is underway on the use of gravel envelopes and the general hydraulic characteristics of wells.

New ultrasonic methods are being developed for measuring sediment size and concentration in streams.

Projects are underway on transistors and antennas as well as improving methods of grounding.

Movement of ionization patches in the upper atmosphere is being studied and new techniques are being developed for transmitting snow depth and water content information by radio out of the watersheds to central headquarters.

Rocket design and behavior studies are underway in cooperation with some of the prime defense agency contractors.

Development of the Utah Water Research Laboratory is a major activity of the Engineering Experiment Station. With the completion of the laboratory expanded opportunity will exist for intensive research in all aspects of water development and use.

An effective plan for the utilization of Utah's water resources is under intensive study in cooperation with the Utah Water and Power Board.

New ways are being developed for using climatological data to predict the evaporation of water from lakes and to predict water use by plants.

Reduction of evaporation from large reservoirs and lakes is being accomplished by application of hexadecanol by airplanes.

Radiation detection and radiation testing comprise a broad program closely correlated with the intensive space and defense program of the nation.

Infra-red luminescence from bombarding planetary gases and the characteristics of low-frequency propagation are active projects.

Shock tube development and research is one of the active projects of the mechanical engineering department.
Utah Scientific Research Foundation

W. W. Lundberg, President
W. Karl Somers, Manager

Office in USRF Building, on Campus

This is a non-profit corporation organized in 1944 as an affiliate of the 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 of 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.

The Board of Directors and officers of the Foundation are: Wiford W. Lundberg, President; Iaryl Chase, President of the University; Dee F. Wangsgaard, Huber C. Ward, Ernest G. Earl, Blaine W. Hancey and Ray E. Dillman, Directors; W. Karl Somers, Project Director; and J. LeMar Larsen, Secretary-Treasurer.
Each year at Utah State University nearly two hundred students complete their work for an advanced degree. These degrees include the Master of Business Administration, Master of Education, Master of Industrial Education, 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 completed during the past year are published, in one volume, at commencement time. 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.

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 investiga-
304 Research Programs

tions 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

Donald R. Franklin, Leader

Office in Forestry 303

A Utah Cooperative Fishery Research Unit was established at USU January 1, 1962, to conduct sport fishery training and research.

It is the first of several such units contemplated in selected states.

Objectives of the program include teaching, training of fishery scientists, management surveys and research related to problems of regional or national interest.

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.

It will share facilities and services of the Utah Cooperative Wildlife Research Unit, which operates on a similar basis.

Bureau of

Educational Research

John C. Carlisle, Dean, College of Education
Walter R. Borg, Chairman, Bureau of Educational Research

Office in Main 82-A

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.
Student Services and Activities
Student Services and Activities

Student Services, 307

Religion, 307
Housing, 307
Food Service, 310
Awards and Honors, 310, 315
Scholarships and Grants-in-Aid, 311, 313
Loans, 318
Employment Placement, 319
Counseling, 319
Health, 320
Orientation, 321
Foreign Student Advisement, 321
Speech Clinic, 322
Helpful Courses, 322

Student Activities, 323

Intercollegiate Athletics, 323
Intramurals, 323
Musicals, 323
Theatricals, 323
Debating and Public Speaking, 323
Publications, 323
Radio Station KUSU, 324
Television Studios, 324
Lyceums, 324
Dances and Entertainments, 324
Assemblies, 324
University Forum, 324
Student Government, 324
Student Organizations, 325
Student Services and Activities

DEAN OF STUDENTS Claude J. Burtenshaw; DEAN OF WOMEN Leah Dunford; COORDINATOR OF STUDENT ACTIVITIES Evan Stevenson; COORDINATOR OF STUDENT HOUSING William W. Skidmore; COORDINATOR, COUNSELING AND TESTING E. Wayne Wright; CHAIRMAN, STUDENT HEALTH SERVICES Gus W. Neece; CHAIRMAN, STUDENT EMPLOYMENT PLACEMENT C. D. McBride; CHAIRMAN, STUDENT LOANS Reese Murray; CHAIRMAN, SCHOLARSHIPS, AWARDS, AND HONORS John R. Williams; FOREIGN STUDENT ADVISOR Orson Tew.

Office in Main 133

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 needs and development.

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.

The Office of Student Services invites inquiry from prospective students and those on campus who wish to obtain information and assistance with personal needs or out-of-class activities.

Religion

Separation of Church and State does not dictate a separation of Religion and Education. To be complete, education should provide opportunities for religious education.

LDS, Protestant, and Catholic churches offer courses in religion for USU students. Credit can be received at USU for all University accredited non-sectarian courses successfully completed at any of these churches. Any such courses taken are considered a part of the maximum academic load at USU.

In addition to formal course work, these churches provide religious services, personal counseling, and a program of social activities especially designed for students.

USU is interested in the spiritual and moral growth of all students. They are encouraged to affiliate with 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 housing. In rare instances, special permission may be granted by the Supervisor of Women’s Housing to live with other close relatives when a letter of explanation is written by the parent or guardian of the freshman woman at least one month before the opening of school.

A p a r t m e n t-Living Residence Halls will accommodate six 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. Cooking utensils, dishes, towels, linens, bedspreads, irons, ironing boards for use in apartments, and all other personal effects are to be furnished by the renters. Cost of electricity used in the apartment is shared by the occupants. Telephones may be installed if desired, also on a share-the-expense basis. Rent is $70 to $75 per quarter. Living rooms, recreation and sewing rooms, sun decks, and laundry rooms are shared. The University provides coin metered washing machines. Ample storage space is provided.

A Conventional Board and Room Residence Hall will accommodate 100 women, two to a room. Linen changes, bedding, study desks, lamps, and utilities are furnished. The University provides coin metered washing machines. Towels and other personal effects are not furnished. Cost of $210 per person per quarter covers board and room charges. Cost of room without board is $85 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 $55 per person per quarter. Other utilities are not provided.

Sorority 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.

Supervised Living Accommodations for Single Men

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 Student Union Cafeteria. Linen changes, bedding, study desks, lamps, and utilities are furnished. Towels and other personal effects are not furnished. A cost of $210 per person per quarter covers board and room charges. Cost of room without board is $85 per quarter.

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. Cooking utensils, dishes, towels, linen, irons, ironing boards and all other personal effects are to be furnished by renters. Cost of electricity and telephone expenses are shared by the six men in the apartment. The rent for one quarter is $70 per person.

Fraternity Houses provide board and room for their members and are
managed by their own officers. Rates are determined by the house management and compare favorably with other living rates on campus.

Living Accommodations for Married Students

University Apartments, (Prefabricated Units) 304 in number, 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 bedroom, bathroom and clothes closets. These units can be rented furnished, unfurnished, or partly furnished with rent ranging from $40 to $44 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 $62.50. The tenant pays for electricity and heat in addition. These apartments include 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, also rest rooms and individual shower stalls. The University provides coin metered clothes washing machines and dryers. No provision is made for use of privately-owned laundry equipment. Monthly space rental per trailer home is $18.00.

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 between 12th & 13th East. Charges will be comparable to University housing. The units will house 288 women and 216 men. Ample parking. City bus service on the half hour. Address all inquiries and applications to C. Don Bishop, Mgr., David O. McKay Student Living Center, University Hill, Logan, Utah.

Off-Campus Housing

The Office of Student Housing maintains lists of accommodations for students in private homes. Many apartments, rooms, board and room, and batching 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 had in the Student Union Cafeteria on campus for about 65¢. This arrangement costs an off-campus student about $75.00 per month. Sleeping rooms range from $15 to $25 per month for a single room, and $30 to $60 per month for apartments.

Students desiring off-campus housing may procure the current housing list upon arrival at the
Application for Housing

Prospective students are invited to direct inquiries and requests for application to Co-ordinator 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. Priority lists are based on date of application.

Acceptance for assignment to a University housing accommodation does not automatically guarantee admission to the University. Application for University admission should be made to the Office of Admissions and Records, Main 131.

Housing Regulations, Procedures

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 10¢ per day thereafter is imposed. The $25 fee is forfeited if (a) notice of withdrawal from University housing is made after August 1, 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 7-8:15 a.m., 50-65¢; Lunch, 11:30 a.m.-1:15 p.m., 65-85¢; Dinner 5-6:15 p.m., 75¢-$1. Saturdays and Sundays, Breakfast 8-9 a.m., Lunch, 12-1 p.m., Dinner 5-6 p.m. Dinner is not served on Sundays. The snack bar operates 8 a.m.-10 p.m., Mondays through Saturdays. Open Sunday evenings, 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 other awards may
obtain information from the Office of Student Services, Room 133, 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, 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. Johanna Johansen, 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.

John A. Widtsoe Memorial Scholarship. One graduate scholarship of $500 will be available to an outstanding senior to pursue graduate study; one scholarship of $200 will be given to an outstanding junior; and one scholarship of $200 will be presented to an outstanding freshman. All who receive scholarships must use the monies in University work the coming school year. Checks will be sent to them following registration in the fall term.

The 1927 Class Gift to the College yields an annual income sufficient to provide two 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.

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.

Borden Agriculture Scholarship. A scholarship of $300 to a senior in Agriculture who has completed two or more courses in Dairy Industry and has achieved the highest average grade among the students in Agriculture in all college work preceding the senior year.

Jenkin Jones Memorial Scholarship. An award of $500 given to an outstanding upper 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. Thirteen 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 $300 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. Carlosen Scholarship in Economics. Two $200 scholarships given to outstanding junior or senior students majoring in economics.

Clark Tank Line Transportation. A scholarship made available to a student studying or planning a career in the motor carrier transportation field.

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.

A Cache Valley Cooperative 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 Dairying. 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 $220. 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.

The Eric W. Ryberg Memorial Scholarship in Commerce, sponsored by Eric C. and Marisdean M. Ryberg, is awarded annually to a junior, senior or graduate student in the College of Business and Social Science (preferably one majoring in Business Management). The award is made on the basis of scholarship, character, personal interest in and adaptability to the field of Business Administration, and need. This scholarship carries a stipend of $200.

College of Engineering

The American Society of Tool Engineers. Two $100 Scholarships are awarded to engineering students who show interest, ability and scholarship in pursuing tool engineering curriculum. Donors are Elmo, and McGhee-Hogan Machine Works, Salt Lake City. Application should be made to the Salt Lake City Chapter 85, or the Tool Engineering Department, USU, not later than February 10, each year.

Associated General Contractors Scholarship. A gift of the Intermountain Chapter, A.G.C., provides a scholarship grant of $250 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 A.G.C. 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.

The E. O. Larson Scholarship. The E. O. Larson scholarship in Irrigation Engineering of $200 is awarded annually to a senior or graduate student in the College of Engineering, majoring in civil and irrigation engineering. The award is made on the basis of scholarship, with outside work activities considered, personal interest in and adaptability to the field and personal need.
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 $75 awards in memory of Drs. Joseph E. and Ethelyn O. Greaves for students who have achieved in the fields of Science and Home Economics.

Moen Memorial Scholarship. Two $125 awards 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 of $25 is given annually by the Kappa Chapter of that Organization to the freshman girl in the College of Family Life ranking highest on the following points: (a) scholarship; (b) participation in student activities; (c) service and cooperation; (d) leadership; (e) moral character; (f) judgment and reliability. The candidate must be a member of the Home Economics Club.

College of Humanities and Arts

Deseret News and Salt Lake Telegram Professional Internship. 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.

Wrigley English 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.

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 84, 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 impeccable students whose domicile is in the state of Utah.

USU Faculty Women's League Annual Scholarship provides $125 for one year for a freshman woman. Selection is based on need, scholarship, and leadership.

Fine Arts Talent. The Intermountain Theatres and Utah State University Fine Arts Department sponsor a Fine Arts Film Festival. Regular $100 scholarships are available for talented students regardless of their native state. Students interested should make formal application to the Department of Fine Arts and make arrangements for musical or theatrical auditions or submit a portfolio of art work. Students receiving these awards agree to remain active in their creative art specialty while at Utah State University.

Carl Raymond Gray 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.

Inter collegiate Knight Scholarships. 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 I.K. meetings and tell the group about their future plans.

Logan Kiwanis Club. Three $100 scholarships awarded to outstanding students who are in need of financial assistance.

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 $100 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.

Woody B. Seearle Scholarship. A tuition scholarship is awarded each year by Woody B. Seearle to a needy and deserving graduate of the Uintah High School. Applications should be filed before April 15th with the principal of the U.H.S. 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 Award in Home Economics. An award of $200 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 bases for the award.

Alpha Kappa Psi Scholarship Award. Alpha Kappa Psi Fraternity, Alpha Theta Chapter, of which is established at Utah State University, awards annually the Alpha Kappa Psi Scholarship Medallion to the male senior in business with the highest scholastic average for four years of study in this College.

Alpha Kappa Psi Scholarship Key Award. Alpha Kappa Psi Fraternity, Alpha Theta Chapter of which is established at Utah State University, awards annually the Alpha Kappa Psi Medallion 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 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 I.R.E. 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 A.I.E.E.

American Institute of Electrical Engineers Student Award. This award is made each year to the outstanding senior electrical engineering and AIEE member. The award consists of one year's dues as associate member of AIEE and a certificate of achievement.

The American Legion Military Medal, a gift of the Logan American Legion Post, 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 A.S.C.E. 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 A.S.C.E.; the second by the Civil Engineering faculty; and the third by the student chapter of A.S.C.E.

A.S.C.E. Membership Award. Junior Membership Award. Junior Membership in the American Society of Civil Engineers is awarded by the Intermountain Section, A.S.C.E., 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.

A.S.C.E. Student Chapter Award. Junior Membership in A.S.C.E. 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 Honoray 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.

Burpee Award in Horticulture. An annual award of $100 to the student in Horticulture who rates highest in scholarship, practical experience and interest in flower, vegetable and seed growing.
316 Student Services and Activities

Cache Valley Chapter of the Utah State History 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 of $25 is awarded 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 A.S.C.E. or A.S.A.E. awarded by the Engineering Faculty to a graduating senior in Engineering on the basis of scholarship, and promise of success in engineering. Selection is made by the Engineering Faculty.

Virginia Dare Award. A cash award of $25 to the outstanding junior in Dairy Manufacturing.

Danforth Foundation Home Economics Fellowships. The first is awarded jointly by the Danforth Foundation and Ralston 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 home economics. 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 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 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 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.
Home Economics Awards. Certificates of merit are conferred annually upon senior women in Home Economics adjudged by faculty and seniors upon the following basis: (a) application of Home Economics ideals to daily living, 60 points; (b) leadership in class work and other activities, 50 points. The number of awards shall not exceed 5% of the total graduating class. Candidates shall have a grade point average of three or better.

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.

Mechanical Engineers Faculty Award. An engineering handbook awarded annually to the mechanical Engineering senior with the highest grade point average. The award is made by the Mechanical Engineering faculty.

Merck Award. Merck and Company, manufacturing chemists, award annually a copy of the Merck Index to an outstanding student in organic chemistry and biochemistry.

The Ogden Union Stockyards Challenge Cup. Awarded each year to the student who shows the most proficiency in judging beef cattle.

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, 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, 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 Forest, Range, and Wildlife Management, who has maintained a high academic record and shows promise of achieving outstanding professional success.

Swift and Company Award to a student in Agriculture who is winner of an essay contest on livestock marketing. This award provides an expense paid trip of about one week to Chicago in early spring to study marketing of livestock and livestock products.

United Business Education Association. An award presented by the Smead Manufacturing Company to the senior who has distinguished himself in business education.

A University 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 attainment, 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 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 Industry, 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, 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 for outstanding achievement in business administration.

Colonel Joe E. Whitesides 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.

Loans

Long Term Loans: Utah State University participates in the National Defense Student Loan Program. Loans are made available to full-time, needy students who are progressing satisfactorily toward a degree. Ordinarily, a grade-point average of 2.5 is required for former students; or the student should be in the upper half of his graduating class for high school graduates. 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. 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.

Individual financial problems may be discussed with the Chairman, Student Loans, Main Building, Room 102.

The total Student Loan Fund is composed of the following individual loan funds generously contributed by friends of USU:

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 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 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 provides loans up to $200, usually for one year, to deserving students in the College of Forest, Range and Wildlife Management. Application is made to the Dean's Office.

Bureau of Land Management Loan Fund provides loans up to $100 to deserving students in the College of Forest, Range, and Wildlife Management. 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. Israelsen Loan Fund available to senior engineering students only. Application is made in the College of Engineering.
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 133, 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

Employment, Counseling 319

Counseling

In recognition of the fact that students are faced with many problems throughout their University career, a broad program of counseling services has been established to meet individual needs in making and maintaining satisfactory adjustments to the University and life.

Under the supervision of the Coordinator of Counseling Services, the counseling program provides for all students the following services: (1) counseling with educational, vocational, personal, and marital problems; (2) individual and group testing; (3) occupational and educational information; (4) assistance with study skills; and (5) faculty advisement in each of the departments and colleges of the University.

The University strives to give a student the assistance he needs and desires, to help him make wise decisions regarding educational, vocational, and personal problems. Accordingly, at the time of admission to the University, a student is assigned a faculty adviser with whom he will meet and have opportunity to discuss his academic program. If living in a residence hall, a student is also invited to seek his residence counselor, who is in a position to assist with many types of problems or to refer the student to the person who can be of most help.

When problems require the help of specialized counselors, a student will be referred by faculty advisers,
teachers, residence counselors to the office of Coordinator of Counseling Services. One is also encouraged to request these counseling services directly through the counseling office whenever he has problems with which he would like help. Professional counseling is available, on a limited basis, in such problem areas as speech, study skills, religion, personal and social adjustments, emotional conflicts, courtship, and marriage.

Guidance tests related to a student's achievements, abilities, interests and adjustment are also available upon request. Although certain basic tests are given to all new lower division students, upper division students as well may avail themselves of this information. The data from these tests are used as a basis for counseling. If a student has not decided upon a course of study he is especially encouraged to seek such information and assistance.

A file of current occupational literature dealing with job facts and labor market trends in most occupational fields is maintained in the Counseling Service and is available. Counselors help students use this information to investigate and appraise occupations in which they might have an interest.

A close relationship with community and state agencies is maintained so that when a student needs services not provided by the University he can be helped in obtaining such services by referral to these other agencies.

Health

A health service is provided for all registered students on the campus at the Student Health Center located in the Union Building. Facilities consist of reception, consultation, examining and treatment rooms. The staff consists of one full-time physician, two registered nurses and a receptionist. Services are limited to such care as that customarily rendered in a doctor's office.

(1) A medical examination is required of all new students.

(2) The examination should be performed by a private physician of the student's choice and should be accomplished prior to arrival on campus.

(3) New students are encouraged to have their family doctor perform the examination and report on a form provided by the University.

(4) It is highly recommended that students purchase the Voluntary Student accident and sickness Insurance available to them.

A general type of medical care is provided within the limitation of existing facilities under supervision of the University physician.

(1) The following services are available to eligible students without extra cost:

(a) Medical care for minor illnesses.

(b) Medical advice as to the need of further consultations and specialized treatment in the more difficult problems beyond the scope of the Health Service.

(c) Office care for minor emergencies.

(d) Initial care and first aid treatment for serious emergencies.

(e) Inoculations and immunizations.

(2) The service does not include:

(a) Treatment for emergencies occurring off campus.

(b) Treatment for chronic illness originating before entrance to school.
(c) Hospital care for any condition.
(d) Surgery.
(e) Medical care for wives or children of students.
(f) Definitive treatment for fractures, other types of injuries or illnesses of a more serious nature which require specialized types of treatment.
(g) X-ray examinations.
(h) Laboratory tests.
(i) The costs of drugs or medicine ordered on doctor's prescriptions.

(3) House calls will be made by the University physician during doctor's office hours, if requested at the health center and when circumstances justify precedence over office patients waiting to be seen. House calls also will be made at a charge of $2 per call, after office hours by the University physician, when available and when a genuine emergency situation exists.

(4) In case of illness or emergency during office hours call: USU Student Health Service, Telephone SK 2-4100 Extension 435. After hours call: The University physician at his residence, telephone SK 2-2240, or a private physician of the student's choice. If neither physician is available at the time, and the emergency is of an urgent nature, report directly to the Logan LDS Hospital for necessary care. The student not covered by insurance should be aware of the fact that the service of a private physician as well as those of the hospital will be at his own expense.

(5) Office hours
The Health Center will be open from 8:00 a.m. to 5:00 p.m. Monday through Friday.
Doctor's hours are: 9:00 a.m. to 12 noon; 1:30 p.m. to 4:30 p.m.

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 133 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
the Student Directory, available to all regularly registered students. Some campus organizations sponsor publications of their own such as the Forestry Club's *Juniper*, and *Vapor Trails*, a monthly Air Force ROTC newspaper published by Arnold Air Society.

(7) Radio-Television. The University operates radio station KUSU-FM which broadcasts six hours of programs daily, prepared and broadcast by students. KUSU-FM is a member of the National Association of Educational Broadcasters. Television studios on the campus are equipped to produce and record complete television programs which are broadcast by Salt Lake City stations. Students assist in all phases of television production.

(8) Utah State University Lyceum and Cache Valley Civic Music. The Lyceum-Civic Music series presents numerous national and international artists.

(9) Dances and Entertainments. In addition to the above, the Student Body Organizations furnish extensive entertainment in the form of dancing, parties, and athletic events.

(10) Assemblies. These are planned and produced by students to provide entertaining, spiritual and cultural programs.

(11) Committees. Students are members of virtually every university committee. This includes not only Student Body committees, but also committees set up by the administration.

(12) University Forum brings internationally famous speakers to the campus.

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 ASUSU are admitted by activity card.

The Executive Council consists of the five elected major officers of Associated Students; viz., president, vice president-social; vice president-cultural, vice president-finance 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, and an international representative chosen by the foreign students on campus. There are four ex-officio members: president of Panhellenic, president of Interfraternity Council, editor of *Student Life*, and president of Co-Orgs.

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.

Governing Boards and Councils. Boards and councils composed of students and faculty supervise various activities: Women's Intramural Association, Men's Intramural Association, Civic Music, Athletic Council, Publications Coun-
Student Organizations

Departmental and Professional

Agriculture. Ag Clubs Council, Ag Economics Club, Agronomy Club, Alpha Tau Alpha, Alpha Zeta, Block and Bridle Club, Botany Club, Dairy Club, Horticulture Club, Poultry Club, 4-H Club, Vet Science Club.

Bacteriology. Bacteriology Club.

Business. Alpha Kappa Psi, STAT Club (Secretaries Today and Tomorrow).

Chemistry. American Chemical Society.

Education. Phi Delta Kappa, Utah State Education Association.


English. English Club.

Forestry. Forester’s Club, Forestry Wives, Xi Sigma Pi.

Geology. Geology Club.

History. Phi Alpha Theta.

Home Economics. Home Economics Club, Phi Epsilon Omicron.

Landscape Architecture. Landscape Architecture Club.


Music. Alpha Eta Mu, Band, Chansonettes, Meistersingers, Orchestra, ROTC Band.

Physical Education. Badminton Club, Dance Club, PEMM (P. E. majors and minors), Ski Club, Square Dance Club, Swimming Club, Women’s Intramural Association, Men’s Intramural Association.

Political Science. International Club, Pi Sigma Alpha.

Pre-Med. Alpha Epsilon Delta.

Psychology. Psychology Club.

Sociology. Sociology Club.

Speech. Tau Kappa Alpha, Theta Alpha Phi, Utah State University Speech Correction Association.

Zoology. Utahon Club.

Social and Special Interest

Fraternities, Social. Alpha Gamma Rho, Delta Sigma Phi, Kappa Sigma, Pi Kappa Alpha, Sigma Alpha Epsilon, Sigma Chi, Sigma Nu, Sigma Phi Epsilon, Sigma Pi.

Sororities, Social. Alpha Chi Omega, Alpha Omicron Pi, Chi Omega, Delta Delta Delta, Kappa Delta, Sigma Kappa.

Recognition and Honorary. Alpha Sigma Nu, Sigma Xi, Sigma Phi Eta.

Regional. Bear Lake Club, Canadian Club, Dixie Club, Sudags, Weber, Arab Student Organization.


Scholarship. Phi Kappa Phi, Alpha Lambda Delta, Phi Eta Sigma.

Service. Blue Key, Circle K Club, Intercollegiate Knights, Spurs, Sponsors.

Sketch of enlarged Student Union Building, now being constructed
Alumni Association and University Development
USU Alumni Association

Col. Joe E. Whitesides, President

J. Lyn Larson, Executive Secretary

Office in Student Union Building 208

Utah State University Alumni Association now numbers more than 30,000 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, College of Southern Utah, or Snow College are eligible for membership of the Association upon payment of dues. (2) Associate Member: All students who have been regularly enrolled in one of the three 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.

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. 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, Founders' Day, 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**

J. Lyn Larson, Fund Director

**Office in Student Union Building 208**

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; J. K. Wheeler, vice-chairman; Dee A. Broadbent, treasurer; J. Lyn Larson, 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.
In any season Utah State's is a picturesque campus.
University Faculty
and Collaborators
Utah State University 1963-64 Faculty

CHASE, DARYL (1945) President; Professor. BA 1927 U of U, MA 1931, PhD 1938 U of Chicago.

ABRAMS, MILTON C. (1949) Librarian; Asso. Prof. of Library Science. BS 1948, MS 1952 USU.

ACORD, CLAIR R. (1947) Asso. Prof., Extension Services; Utah Co. Agent. BS 1953 USU.

ALLRED, KEITH REID (1957) Asso. Prof. of Journalism. BA Chicago. Extension Services; USU, MS 1956 USU, PhD 1958 Col. State C.


ALLRED, J. R. (1958) University News Editor; Instr. in Journalism. BA 1950 U of U.

ALLRED, KEITH REID (1957) Asso. Prof. of Agronomy. BS 1951 BYU, PhD 1955 Cornell U.

ANDERSEN, LADELL (1961) Head Basketball Coach; Instr. in Physical Education. BS 1951 USU.

ANDERSON, BRUCE (1951) Asst. Prof. of Irrigation Engineering. BS 1950, MS 1954 USU, PhD 1963 U of Calif.


ANDERSON, JAY O. (1951) Prof. of Poultry Husbandry. BS 1943 USU, MS 1948, PhD 1950 U of Maryland.

ANDERSON, ROICE H. (1947) Prof. of Agricultural Economics. BS 1939 U of Wyo., MS 1941, PhD 1943 Cornell U.

ANDERSON, WENDELL B. (1947) Asso. Prof. of Political Science. BS 1935, MS 1940 USU, LLB 1941 George Wash. U.

ANDRA, THEODORE (1962) Instructor in English and Journalism. BS 1961, MS 1962 USU.

ARGYLE, RELL F. (1954) Asst. Prof., Extension Services; San Juan Co. Agent. BS 1940 USU.


BAGLEY, JAY M. (1955) Asso. Prof. of Civil and Irrigation Engineering. BS 1952, MS 1953 USU, PhD 1963 Stanford U.

BAHLER, THOMAS L. (1949) Prof. of Zoology, Physiology. BA 1943 C of Wooster, PhD 1949 U of Wis.

BAIRD, GLENN T. (1946) State 4-H Club Leader; Asso. Prof., Extension Services. BS 1955 USU.

BAKER, DORAN J. (1959) Asso. Prof. of Electrical Engineering. BSEE 1953, PhD 1956 U of U.


BARLOW, JOEL C. (1946) Asst. Prof., Extension Services; Garfield Co. Home Agent. BS 1940 BYU.


BARNARD, JOHN J. (1936) Dairy Specialist and Asso. Prof., Extension Services. BS 1933 USU, MS 1939 U of Wis.


NOTE: Date in parenthesis indicates year the person joined USU staff, not necessarily in present position.
BECKSTRAND, GORDON L. (1950) District Director-Richfield and Prof., Extension Services. BS 1950 USU, MS 1953, PhD 1959, U of Wis.


BELL, WILLIAM HAROLD (1924) Prof. of Business Administration. BS 1923, MS 1931 USU.

BENDERSEN, KAY R. (1952) Asst Prof., Extension Services; Juab Co. Agent. BS 1941, MS 1952 USU.

BENNETT, JAMES A. (1945) Prof. and Head, Dept. of Animal Husbandry. BS 1940, MS 1941 USU, PhD 1957 U of Minn.

BENNETT, WILLIAM H. (1937) Director, Extension Services; Prof. of Agronomy. BS 1936, MS 1948 USU, PhD 1957 U of Wis.


BEUTLER, G. LEON (1954) Asst. Prof. of Education. BS 1950, MS 1959 USU.

BEYERS, JOHN M. (1957) Asst. Prof. of Languages and Philosophy. BA 1949, MA 1963 U of U.

BIGGS, ERNEST O. (1944) Asst. Prof., Extension Services; Tooele Co. Agent. BS 1926 USU.

BILLS, JUDITH C. (1962) Instructor in Business Administration. BS 1960, MS 1961 USU.

BISHOP, A. ALVIN (1946) Prof. of Civil and Irrigation Engineering. BS 1934, MS 1938 USU, PhD 1961 Colo. State U.

BLACK, GEORGE T. (1934) Prof. and Head, Dept. of Agricultural Economics. BS 1930, MS 1931 USU, PhD 1941 Cornell U.

BLACK, THERAL R. (1950) Asso. Prof. of Sociology; Rural Sociologist. BS, MA 1939 BYU, MA 1941 Louisiana State U, PhD 1951 U of Wis.

BLAKE, JOSEPH T. (1956) Asso. Prof. of Veterinary Science. BS 1949 BYU, MS 1950, PhD 1955, DVM 1956 Iowa State C.

BRITE, J. DUNCAN (1938) Prof. 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.


BROWN, FON. (1949) Prof. of Business Administration; Private Co.

BUDGE, PEARL S. (1947) Asst. Prof. of English.

BULLEN, JOHN SAMUEL (1958) Asst. Prof. of English. BS 1950 USU, MA 1955 Stanford U.

BURNETT, NOLAN K. (1958) Athletic Trainer; Instr. 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 1965 U of U.


CAINE, ANN M. (1943) Instr. in Library Science. BS 1945 USU.


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 and Plant Pathology. BS 1935, MS 1937 USU, PhD 1943 Cornell U.

CARLISLE, JOHN C. (1937) Dean, C of Education; Prof. and Head, Dept. of Education. BS 1926 U of U, MA 1935, EdD 1938 U of Calif.


CARTER, WINFRED O. (1961) Asst. Prof. of Civil and Irrigation Engineering. BS 1953 U of Maryland, MS 1959, PhD 1963 Stanford U.

CASTO, GLENDON W. (1962) Asst. Prof. in Counseling and Testing Services. BS 1950, MS 1960 USU.

CAZIER, STANFORD O. (1960) Asst. Prof. in History. BS 1952, MA 1956 U of U.


*CHAPIN, JEANNE CROCKETT (1961) Instr. in Library Science. BS 1945 USU.


CHATELAIN, JACK E. (1957) Asso. Prof. of Physics. BS 1947, MS 1948 USU, PhD 1957 Lehigh U.


CHILD, RAWSON D. (1948) Asso. Prof. of Tool and Manufacturing Engineering. BS 1949, MS 1953 USU.

*On leave.
CHRISTENSEN, PAUL D. (1954) Prof. of Agronomy; Soil Conservationist Extension Services. BS 1937 BYU, MS 1948 USU, PhD 1950 Rutgers U.

CHRISTENSEN, RONDO A. (1957) Asso. Prof. of Agricultural Economics. BS 1954 USU, MS 1955, PhD 1957 Cornell U.


CHRISTIANSEN, JERALD E. (1946) Prof. of Civil and Irrigation Engineering. BS (AE) 1927 USU, MS (CE) 1935 U of Calif.


CLARK, C. ELMER (1952) Asso. Prof. of Poultry Husbandry; Poultry Specialist, Extension Services. BS 1950 USU, MS 1959, PhD 1962 U of Maryland.

CLARK, CLAYTON (1937) Prof. of Electrical Engineering. BS (Physics) 1933 USU, EE 1947, PhD 1957 Stanford U.

CLAYTON, RUTH V. (1961) Instr. in Clothing and Textiles. BS 1947, MS 1953 USU.


COCHRAN, GEORGE W. (1948) Prof. of Botany and Plant Pathology. 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, EE 1956 Stanford U.

COLLIER, ROBERT P. (1958) Dean, C of Business and Social Sciences; Prof. and Head, Dept. of Business Administration. BA 1942 Reed C, PhD 1955 Stanford U.

CONDRON, THOMAS P. (1962) Research Physicist, USU Concord Radiance Laboratory. BA 1941, MS 1946 Boston C.

COOK, C. WAYNE (1940) Prof. of Range Management. BS 1940 Kansas State C., MS 1942 USU, PhD 1950 Texas A. & M.

CORDON, WILLIAM A. (1956) Asso. Prof. of Civil Engineering. BS 1955, MS 1962 USU.


CROCKETT, ZENNA BETH (1959) Instructor in English. BS 1949, MS 1960 USU.

CULMSEE, CARLTON F. (1945) Dean, C of Humanities and Arts; Prof. of American Civilization. BS 1932 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.

DALBY, MAX F. (1957) Director of Bands; Asso. Prof. of Instrumental Music. AB 1942 BYU, MA 1950 San Diego State C, EdD 1962 USU.

DANIEL, T. W. (1944) Prof. of Forest Management. BS 1934, MS 1936, PhD 1942 U of Calif.


DAVIS, LYNN H. (1952) Asso. Prof. of Agricultural Economics. BS 1949, MS 1953 USU, PhD 1961 Ore. State U.


DEVAL, ANN-MARIE (1962) Asst. Prof. of Languages. AB 1957 Grenoble, MA 1959 U of Vermont.

DEWEY, WADE G. (1956) Asso. Prof. of Agronomy. BS 1953 USU, PhD 1956 Cornell U.

DICKSON, WILLIAM M. (1962) Asst. Prof. of Business Administration. BA 1949 U of Minn, MS 1958 USU, PhD 1962 Stanford U.


DOBSON, DONALD C. (1957) Asst. Prof. of Poultry Husbandry. BS 1954 USU, MS 1955 Cornell U.

DOLAN, CHARLES P. (1962) Research Assistant, USU Concord Radiance Laboratory.

DOWNS, LOIS (1949) Asso. Prof. of Health, Physical Education and Recreation. BS 1945, MS 1949 USU.

DRAKE, ELDON M. (1951) Asso. Prof. of Education. BS 1943 USU, MS 1949, PhD 1951 Iowa State C.

DRAFER, C. I. (1945) Prof. and Head, Dept. of Poultry Husbandry. BS 1939 USU, PhD 1943 Iowa State C.


DUNFORD, LEAH (1959) Dean of Women; Asst. Prof. of Business Education and Office Administration. BS 1958 USU, EdM 1959 Oregon State C.

DUNN, CAROLYN H. (1960) Asst. Prof., Extension Services; Consumer Education, Marketing Information Agent; BA 1947 U of U.


EISENSTEIN, IZYDOR (1959) Asso. Prof. of Mechanical Engineering. BS 1940, Dipl. Ing. 1942 Israel Institute of Technology, Haifa.

ELICH, JOE (1946) Prof. of Mathematics. BS 1940 USU, MA 1942 U of Calif.

ELLER, JESSIE (1954) Asst. Prof., Extension Services; Box Elder Co. Home Agent. BS 1940 USU.


ERICSON, SYLVAN (1928) Controller. BS 1928 USU.


ESPLIN, JAMES LYNN (1958) Instr., Extension Services; Juab Co. Agent. BS 1964 USU.

FARNSWORTH, WILLIAM F. (1954) Asst. Prof., Extension Services; Uintah Co. Agent. BA 1952 BYU, MS 1954 USU.


FINCH, RAY H. (1955) Asst. Prof., Extension Services; Box Elder Co. Agent. BS 1958 USU.

FINCHUM, W. ARNOLD (1961) Asst. Prof. of Electrical Engineering BS 1949, MS 1959 USU.

FLAMMER, GORDON H. (1958) Asso. Prof. of Civil Engineering. BS 1952, MS 1953 USU, PhD 1958 U of Minn.

FLETCHER, SAMUEL G. (1962) Asst. Prof. of Speech. BS 1961 USU, MS 1957, PhD 1968 U of U.

FLOYD, J. WHITNEY (1985) Dean, C of Forest, Range and Wildlife Management; Prof. and Head, Dept. of Forest Management. BS 1936 USU, MSF 1942 U of Calif.

FOGELBERG, THELMA (1930) Prof. of Languages. BS 1929 USU, MA 1933 U of So. Calif., PhD 1939 L'Universite' de Paris, France.


FRANCE, EDWARD LEROY (1940) Asst. Prof. of Industrial and Technical Education. BS 1941, MS 1960 USU.

FRANDSEN, ARDEN N. (1936) Prof. and Head, Dept. of Psychology. BS 1927, MS 1929 U of U, PhD 1932 U of Minn.

FREDRICKSON, CARMEN (1945) Asso. Prof. of Sociology. BS 1922, MS 1935 USU, Social work certificate 1958 USU.
University Faculty 337


FULLER, PAULINE (1951) Asst. Prof. of Health, Physical Education and Recreation. BS 1939, MS 1953 USU.


FUNK, C. DENNIS (1953) Asst. Prof., Extension Services; Sampete Co. Agent. BS 1953 USU.


GARDNER, DALE L. (1955) Adm. Asst. of Athletics; Instr. in Physical Education. BS 1953 USU.

GARDNER, ELDON J. (1949) Dean, College of Science; Prof. of Zoology. BS 1934, MS 1955 USU, PhD 1939 U of Calif.


GARDNER, REID J. (1961) Instr. in Electrical Engineering. BS 1961 USU.

GARDNER, RHEA H. (1939) Home Management and Furnishings Specialist, Extension Services; Asso. Prof. BS 1938 USU, MA 1947 Cornell U.

GERBER, ROBERT K. (1943) Asst. Prof. of Horticulture. BS 1932, MS 1935 USU.


GREENWOOD, DELBERT A. (1946) Prof. of Biochemistry and Pharmacology. BS 1926, MS 1930 BYU, PhD 1946 U of Chicago.

GRIMSHAW, PAUL R. (1952) Asso. Prof., Extension Services; Sevier Co. Agent. BS 1948, MS 1949 USU.


GUNNELL, MERRILL H. (1947) Asso. Prof. of Zoology. BS 1930, MS 1948 USU.

HAILES, CHARLES W. (1949) Asso. Prof. of Industrial and Technical Education. BS 1948, MS 1953 USU.

HALL, JAY M. (1956) Asst. Prof., Extension Services; Wayne Co. Agent. BS 1947 USU.

HAMMOND, DATUS M. (1936) Prof. and Head, Dept. of Zoology. BS 1932 USU, MA 1934, PhD 1936 U of Calif.


HAMILTON, ROBERT G. (1956) Asst. Prof. of Mathematics. BS 1948, MS 1952 USU.

HANSON, ALVIN R. (1955) Prof. of Horticulture. BS 1948 USU, PhD 1952 Cornell U.

HANSEN, ARLEN L. (1957) University Photographer; Instr. in Photography. BS 1952, MS 1958 USU.

HANSEN, BURRELL F. (1942) Chairman, Radio and Television; Coordinator of Broadcasting; Asso. Prof. of Speech. BS 1940 USU, MS 1942 Purdue U, PhD 1953 U of Minn.


HARDER, VIRGINIA H. (1956) Asst. Prof. and Head, Dept. of Homemaking Education. BS 1953 BYU, MS 1956 Iowa State C.

HARDY, CLYDE T. (1950) Asso. Prof. of Geology. BA 1943, MS 1948, PhD 1949 Ohio State U.

HARMON, M. JUDD (1951) Asso. Prof. of Political Science BS 1948 USU, MS 1950, PhD 1953 U of Wis.


HARRIS, LORIN E. (1945) Prof. of Animal Husbandry. BS 1937 USU, MS 1938, PhD 1940 U of Ill.

HARRISON, GLADYS L. (1936) Editor, Agricultural Experiment Station; Asso. Prof. AB 1922 BYU, Certificate of Librarianship 1936 U of Calif.
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.

HATCH, HAROLD CARL (1961) Instr., Extension Services; Kane Co. Agent. BS 1960 USU.


HAWS, B. AUSTIN (1957) Asso. Prof. of Entomology. BS 1948, MS 1949 USU, PhD 1955, Iowa State C.

HAWS, FRANK W. (1953) Res. Asst., Civil and Irrigation Engineering. BS 1946 USU.


HENDERSON, GEORGE R. (1944) Prof. of Animal Husbandry; Animal Husbandry Specialist, Extension Services. BS 1929, MS 1930 USU.

HENDRICKS, KING (1935) Prof. and Head. Dept. of English and Journalism. MA 1926, PhD 1941 Stanford U.

*HEYBORNE, ROBERT L. (1957) Asst. Prof. of Electrical Engineering. BS 1949, MS 1960 USU. Graduate Naval Electronics School.


GILL, LEON M. (1957) Instr. in Industrial, Technical Education. BS 1952 USU.

HIMES, ELLVERT H. (1954) Coordinator of Graduate Programs in Education; Prof. of Education. AA 1929 Kansas City Jr. C., BS 1951 U of U, MA 1937 U of Kansas, PhD 1960 U of U.


*HOLDREDGE, RUSSELL M. (1959) Asst. Prof. of Mechanical Engineering. BS (Bus.) 1956, BS (ME) 1956, MS 1959 U of Colo.

HOLMAN, VALERA G. (1951) Head Teacher, Child Development Laboratory. Cooperative Nursery School. BS USU 1933.

HOLMGREN, ARTHUR R. (1943) Asso. Prof. of Botany and Plant Pathology. BA 1936 U of U, MS 1942 USU.

HOWELL, BARBARA ANN (1962) Instr. in Education, Edith Bowen Laboratory Schol. BS 1946 USU.

HUBER, DON (1961) Asst. Prof., Extension Services; Washington Co. Agent. BS 1960, MS 1962 USU.

HUMPHREYS, BOYD (1960) Chief Engineer, Television and Radio. BS 1949 USU.

HUNSAKER, H. B. (1935) Prof. and Head, Dept. of Health, Physical Education and Recreation; Director of Athletics. BS 1930 USU, MS 1932 U of Ore.

HUNSAKER, KENNETH B. (1958) Instr. in English. BS 1957, MS 1959 USU.


INGOLD, KLARA (1961) Asst. in Languages. BS 1961 USU.

ISRAELSON, C. EARL (1959) Asst. Res. Engineer, Civil and Irrigation Engineering. BS 1959 USU.

ISRAELSEN, VERNON L. (1947) Prof. of Economics. BS 1829 USU, MA 1937 BYU, PhD 1942 U of Wis.

IVARIE, THEODORE W., JR. (1962) Asst. Prof. of Business Education and Office Administration; BS 1958, MS 1962 Oregon State U.
JACKSON, ARTHUR D. (1958) Principal, Edith Bowen Laboratory School; Asst. Prof. of Education. BS 1943 Colo. C, MS 1949 USU.

JACOBSN, GENE S. (1957) Director of Summer School; Prof. of Education. BS 1949, MS 1964, USU, EdD 1957 U of Calif.

JAMES, RAYMOND (1959) Asst. Prof. of Business Administration. BA 1948 USU, MS 1952 New York U.


JENSEN, JAY O. (1942) Asst. Prof. of Physics. BS 1940 USU.

JENSEN, LOUIS A. (1946) Agronomy Specialist, Extension Services; Asso. Prof. of Agronomy. BS 1939, MS 1960 USU.

JENSEN, NAOMI (1944) Asso. Prof., Extension Services; Summit Co. Home Agent. BS 1938 USU.

JOHNSON, JOHN C. (1962) Asso. Res. Physicist; USU Concord Radiance Laboratory. MA 1941 Middleburg C., PhD 1948 MIT.

JOHNSON, THETA (1943) Clothing Specialist, Extension Services; Asso. Prof. BS 1938 USU, MA 1963 Columbia U.


JONES, LEWIS W. (1938) Prof. and Acting Head, Dept. of Bacteriology and Public Health. BS 1938, MS 1947 USU, PhD 1953 Stanford U.

JONES, NORMAN B. (1962) Asst. Prof. of Civil and Irrigation Engineering. BS 1949 USU, MS 1951 U of Calif. (Berkeley.)


KEARSLEY, AMY R. (1940) Asso. State 4-H Club Leader; Asso. Prof. BS 1933 USU, MA 1947 Columbia U.

KEETCH, RUSSELL R. (1929) Sheep and Wool Specialist, Extension Services; Asso. Prof. BS 1929 USU, MA 1951 Colo. State U.

KELKER, GEORGE HILLS (1937) Prof. of Wildlife Resources. BA 1928 Hiram C, BSF 1931, MSF 1932, SCD 1946 U of Mich.

*On leave.


KIEFER, FRED W., JR. (1955) Asst. Prof. of Civil and Irrigation Engineering. BS 1950 USU, MS 1953 Colo. State U.


KNOWLTON, GEORGE F. (1925) Prof. of Entomology; Entomology Specialist, Extension Services. BS 1923, MS 1925 USU, PhD 1932 Ohio State U.


LAMBERT, CARROLL CARMEN (1961) Supervisor in Child Development Laboratory; Instr. in Family and Child Development. BS 1960, MS 1961 USU.


LAMBORN, ELLIS W. (1953) Asso. Prof. of Agricultural Economics. BS 1943 USU, MS 1944 U of Ill., PhD 1947 Cornell U.


LARSEN, J. LAMAR (1943) Chief Accountant. BS 1933 USU.

MARSTON, GLEN F. (1964) Asst. Prof. of Economics. BS 1951, MS 1953 U of U.

MARTIN, MAUD (1949) Asso. Prof., Extension Services; Weber Co. Home Agent. BS 1931 U of U.


MATHESON, ALAN (1961) Asst. to President. BA 1953, MS 1957, LLB 1959 U of U.

MATTHEWS, DOYLE J. (1951) Asso. Prof. of Animal Husbandry. BS 1950; MS 1951 USU, PhD 1959 Kansas State U.

MAUGHAN, RALPH B. (1951) Asst. Football Coach; Asst. Prof. of Health, Physical Education and Recreation. BS 1947, MS 1948 USU.

MAUGHAN, WESLEY T. (1955) Asst. Prof., Extension Services; Rich Co. Agent. BS 1951 USU.

McALLISTER, DEVERE R. (1959) Prof. of Agronomy. BS 1939, MS 1948 USU, PhD 1950 Iowa State C.

McARTHUR, J. WAYNE (1962) Res. Astmt. in Agricultural Economics. BS 1961, MS 1963 USU.


McIFF, LYLE H. (1960) Asst. Prof. of Accounting and Business Administration. BS 1948 BYU, MBA 1951 U of Texas.


MERTLEY, CHARLES N. (1947) Asso. Prof. of Industrial and Technical Education. BS 1936 USU, MS 1958 North Texas State C.

MERTLEY, MARGARET B. (1951) Instr. in Homemaking Education, Food and Nutrition. BS 1951, MS 1952 USU, PhD 1960 Texas Women's U.


MERRILL, M. R. (1926) Vice-President of Academic Affairs; Prof. and Head, Dept. of History and Political Science. BS 1925 USU, MA 1932, PhD 1951 Columbia U.


MERRILL, SAMUEL W. (1956) Instr. in Industrial and Technical Education. BS 1942 USU.

OLSEN, JANET M. (1962) Instr. in Mathematics. BS 1959 USU.

OLSON, ARLAND E. (1954) Res. Asso., Veterinary Science. BS 1951, MS 1953 USU.

OLSON, CHARLES P. (1952) Lecturer in Business Administration. BS 1939 USU, JD 1946 Geo. Wash. U.

OLSON, GERALD RAY (1956) Asst. Prof., Extension Services; Emery Co. Agent. BS 1956 USU.

PAHTZ, GEORGE (1946) Instr. in Music.

PALFREYMAN, BERNICE (1944) Asso. Prof., Extension Services; Salt Lake Co. Home Agent. BS 1940 USU.

PARKER, KARL G. (1962) Extension Range Specialist; Prof. of Range Management. BS 1938 Colorado State U, MS 1956 Montana State U.

PARRISH, JOSEPH (1934) Asso. Prof., Extension Services; Salt Lake Co. Agent. BS 1933 USU.


PEARCE, JANICE (1957) Asst. Prof. in Health, Physical Education and Recreation. BS 1952 U of U, MS 1957 State C. of Wash.

PEDERSEN, IVAN (1953) Asst. Prof. of Education. Edith Bowen Laboratory School. BS 1950, MS 1955 USU.

PENNOCK, JOHN ALBERT (1959) Asst. Prof. of Sociology. BA 1949, MS 1951 U of U, graduate certificate of social work 1950 U of U.

PERKES, LAMON (1956) Res. Asst., Dairy Industry. BS 1964 USU.

PETERSEN, ANNETTE B. (1957) Instr. in Business Education and Office Administration. BS 1956 USU.


PETERSON, DEAN F., JR. (1957) Dean, C of Engineering; Prof. of Civil Engineering. BS 1934 USU, MCE 1935, DCE 1939 Rensselaer Polytechnic Institute.

PETERSON, EDWIN L. (1937) ROTC Coordinator; Prof. of Social Science. BS 1937, MS 1941, PhD 1957 USU.

PETERSON, HOWARD B. (1940) Prof. and Head, Dept. of Agronomy. AB, MA 1935 BYU, PhD 1940 U of Neb.

PETERSON, RONALD SKEEN (1959) Counselor, Student Services; Asst. Prof. of Psychology. BS 1952, MS 1961 USU.

PHIPPS, JAY WESLEY (1961) Asst. Res. Physicist, Engineering Experiment Station. BS 1960 USU.


POLLARD, LEONARD H. (1939) Prof. and Head, Dept. of Horticulture. BS 1932, MS 1934 USU, PhD 1939 U of Calif.

POPE, WENDELL L. (1959) Computing Services Supervisor; Asst. Prof. of Mathematics. BS 1956 USU, MS 1958 Stanford U.

*PORTER, GORDON E. (1947) Asst. Prof. of Languages. BS 1943 USU.

*POULSON, JENNIEV J. (1947) District Supervisor of Home Economics Programs; Asso. Prof., Extension Services. BS 1939 BYU, MS 1943 Iowa State U.

PREATOR, FREDERICK (1937) Prof. and Head, Dept. of Tool and Manufacturing Engineering. BS 1935 USU, MS 1947 Wayne State U.


PUGMIRE, DOROTHY JEAN (1956) Asst. Prof. of Elementary Education. BS 1948 USU, MA 1951 U of Mich.


RASMUSSEN, HOWARD DALE (1957) Asst. Prof. of Health, Physical Education and Recreation. BS 1949, MS 1956 USU.

REESE, L. GRANT (1955) Asst. Prof. of Languages. BS 1955, MS 1956 USU, PhD 1962 U of Wash.


RICH, ELLIOT (1956) Asso. Prof. of Civil Engineering. BS 1948 USU, ME 1951 U of U.

*On leave.
RICH, WAYNE R. (1955) Asst. Prof. of Mathematics. BS 1948, MS 1949 USU.
RICHENRACH, RODNEY G. (1945) Asso. Prof., Extension Services; Millard Co. Agent. BS 1945 USU.
RICHARDS, STUART (1961) Res. Asst., Agricultural Economics. BS.
RICHARDSON, STANLEY S. (1960) Prof. and Head, Dept. of Agricultural Education. BS 1925 USU, MS 1938 U of Idaho.
RIETHMANN, OTTO (1959) Instr. in Horticulture. Certificates for training in different specialized fields in Floriculture and Landscaping in Switzerland, France and Holland.
RINGER, WAYNE B. (1958) Agricultural Engineering Specialist, Extension Services; Asst. Prof. of Agricultural Engineering. BS 1961 USU.
ROBERTS, NORMAN KEITH (1957) Asso. Prof. of Agricultural Economics. BS 1948, MS 1949 Iowa State C, PhD 1958 U of Kentucky.
ROBERTS, REED S. (1960) Asst. Prof. of Bacteriology and Public Health. BS 1942, MS 1948 USU.
ROBINSON, D. E. (1961) Special Lect. in Business Administration. BS 1911 USU.
ROBINSON, REX E. (1946) Prof. and Head, Dept. of Speech. BS 1931 Ore. State C, MS 1933 State U of Iowa, PhD 1947 U of Wis.
ROGERS, DEXTER (1960) Asst. Prof. of Food and Nutrition. BS 1944, MS 1946 U of Mich., PhD 1964 Ore. State C.
ROSE, D. WAYNE (1952) Asso. Prof., Extension Services; Salt Lake Co. Agent. BS 1952 USU, MS 1959 U of Minn.
ROSHELLEY, R. WELLING (1947) Prof. and Head, Dept. of Sociology and Social Work. BS, MS 1933 USU, PhD 1938 U of Wis.
ROWLAND, PRISCILLA (1945) Asst. Prof. of Food and Nutrition. BS 1923 USU, MS 1938 Ore. State C.
RUDD, EVAN (1942) Instr., Extension Services; Rich Co. Agent. BS 1956 USU.
SALISBURY, KATHRYN (1960) Instr. in Education, Edith Bowen Laboratory School. BS 1948 USU.
SCHOFIELD, CLARA (1961) Asst. Prof., Extension Services; Carbon Co. Home Agent. BS 1934 BYU.
SCHOLTE, INEZ L. (1960) Asso. Prof. and Head, Dept. of Food and Nutrition. BS 1942 So. Dak. State C, MS 1952 UCLA.
SHARP, HEBER C. (1946) Prof. of Psychology. BS 1944, MS 1945, PhD 1955 U of U.
SHAW, EDITH SMITH (1942) Asso. Prof. of Education. BS 1938 USU, MA 1954 Northwestern U.
SHAW, G. MERRILL (1962) Asso. Prof. of Tool and Manufacturing Engineering. BS 1940, MS 1951 USU.
SILVER, WILLIAM F. (1947) Prof. and Head, Dept. of Wildlife Resources. BS 1940, MS 1941, PhD Iowa State C.
SJOBBLOM, WALLACE D. (1952) Asst. Prof., Extension Services; Iron Co. Agent. BS 1952 USU.
SKABELUND, DEAN O. (1961) Instr. in English. BS 1957, MS 1959 USU.
SKIDMORE, C. JAY (1959) Asso. Prof. of Family and Child Development. BS 1943, MS 1944 U of U, EdD 1949 Columbia U.
SKIDMORE, WILLIAM (1949) Coordinator of Student Housing. BS 1937 USU.

SLAUGH, OWEN (1946) Asso. Prof. of Industrial and Technical Education. BS 1952, MS 1957 USU.


SMITH, ALBERT B. (1952) Asst. Prof. of Mechanical Engineering. BS 1951 USU, M Engr. 1962 Texas A & M.


SMITH, GRANT GILL (1961) Prof. of Chemistry. BA 1943 U of U, PhD 1949 U of Minn.


SMITH, WINSLOW WHITNEY (1946) Prof. and Head, Dept. of Bacteriology and Public Health. BA 1933, MA 1936 U of U, PhD 1939 U of Wis.

SMITH, WILLIAM LLOYD (1954) Asst. Prof., Extension Services; Duchesne Co. Agent. BS 1953 Ricks C, MS 1956 USU.

SNOW, PHYLLIS (1961) Dean, C of Family Life. BS 1934 U of U, MS 1953, PhD 1956 Cornell U.


SPENCE, JACK T. (1955) Asso. Prof. of Chemistry. BS 1961, PhD 1957 U of U.


SPOERRY, VERA (1962) Lecturer in Languages. BA 1947 U of Wash.


STEFFEN, HYRUM (1937) Asso. Prof. of Animal Husbandry. BS 1937 USU, MS 1950 U of Ill.

STENQUIST, LEE B. (1954) Internal Auditor. BS 1947 BYU.

STENQUIST, NORRIS J. (1958) Asst. Prof., Extension Services; Roosevelt Co. Agent. BS 1957, MS 1958 USU.


STEVENS, KENNETH R. (1931) Prof. of Bacteriology and Public Health. BS 1927 BYU, MS 1929, PhD 1932 Rutgers U.

STEVENS, VELYN B. (1945) Asst. Prof., Extension Services; Juab Co. Home Agent. BS 1926 BYU.

STEVENSON, EVAN N. (1955) Manager, Student Union; Coordinator, Student Activities. BS 1951 BYU.

STEWARD, J. J. (1947) Editor of University Publications; Asso. Prof. of English and Journalism. BS 1949 USU, MS 1957 U of Ore.

STEWART, SCOTT P., JR. (1962) Asst. Res. Engineer; USU Concord Radiance Laboratory. BS 1959 USU.


STODDARD, GEORGE E. (1952) Prof. and Head, Dept. of Dairy Industry. BS 1943 U of Idaho, MS 1948, PhD 1950 U of Wis.


STOKER, GOLDEN L. (1948) Asso. Prof. of Agronomy. BS 1932, MS 1933 USU.

STOKES, ALLEN W. (1952) Prof. of Wildlife Resources. BS 1936 Harvard C, MA 1941 Harvard U, PhD 1952 U of Wis.

STOKES, L. DARRELL (1941) Asso. Prof., Extension Services; Davis Co. Agent. BS 1938 USU.

STONE, DAVID R. (1946) Prof. of Psychology. BA, MA 1943 U of U, PhD 1946 U of Chicago.


SUMMERS, LOWELL P. (1946) Asso. Prof. of Industrial and Technical Education. BS 1940, MS 1956 USU.


SWENSON, DAN H. (1948) Asst. Prof. of Mechanical Engineering. BS 1940, MS 1949 USU.

SWINDLE, KARMA P. (1950) Asso. Prof., Extension Services; Davis Co. Home Agent. BA 1929 BYU.

TANNER, HELEN J. (1960) Instr. in Education, Edith Bowen Laboratory School. BS 1949 U of U.

TAYLOR, J. GOLDEN (1955) Asso. Prof. of English. BS 1936, MA 1940 BYU, PhD 1958 U of U.


TAYLOR, MORRIS H. (1945) Prof. of Agricultural Economics; Livestock Marketing Specialist, Extension Services. BS 1937 USU, MS 1940, PhD 1958 U of Wis.

TAYLOR, STERLING A. (1949) Prof. of Agronomy. BS 1941 USU, PhD 1949 Cornell U.

TAYLOR, THOMAS A. (1951) Asst. Prof. of Education, Edith Bowen Laboratory School. BS 1939, MS 1954 USU.


TEW, ORSON (1962) Asst. Prof. and Foreign Student Advisor. BS 1952 Ricks C, MA 1960 BYU.


THOMAS, DON W. (1954) Asso. Prof. of Poultry Husbandry and Veterinary Science; Veterinarian, Extension Services. BS 1949 USU, DVM 1953 Iowa State C.

THOMAS, JAMES ALAN (1952) Asst. Prof. of Veterinary Science. DVM 1946 Colo. State U.

THORNE, D. WYNNE (1939) Director of University Research and Agricultural Experiment Station; Prof. of Agronomy. BS 1933 USU, MS 1934, PhD 1936 Iowa State U.

THORNLEY, GWENDELLA (1947) Asso. Prof. of Speech. BS 1946, MS 1947 USU.

THORPE, EVERETT C. (1936) Asso. Prof. of Fine Arts. BS 1940 USU, MFA 1951 U of U.


TINGEY, WILLIS A. (1946) Asst. Prof. of Civil and Irrigation Engineering. BS 1928 USU.

TIPPETTS, RUTH PARRISH (1944) Asso. Prof., Extension Services; Consumer Marketing Agent, Weber County. BS 1931 USU.

TIPPETTS, TWAIN C. (1956) Prof. and Head, Dept. of Fine Arts. BS 1939, MA 1941 BYU, PhD 1960 UCLA.

TOCHER, STEWART ROSS (1952) Asso. Prof. of Forest Management. BS 1949, MS 1960 U of Calif.


TU, ANTHONY T. (1962) Asst. Prof. of Chemistry. BS 1953 National Taiwan U, MS 1956 U of Notre Dame, PhD 1960 Stanford U.

TUCKER, VEARL R. (1962) Instr. in Civil and Irrigation Engineering. BS 1959 USU.

TUeller, Lamont E. (1931) Asso. Prof., Extension Services; Cache Co. Agent. BS 1931 USU.

TURNER, R. EYRE (1959) Instr., Edith Bowen Laboratory School; Instr. in Education. BS 1954 USU.

TUTTLE, SARAH S. (1947) Asso. Prof., Extension Services; Utah Co. Home Agent. BS 1925 USU.

TYLER, EMILY W. (1958) Asst. Prof., Extension Services; Utah Co. Home Agent. BS 1931 BYU.


VAN EPPS, GORDON A. (1952) Asst. Prof. of Agronomy. BS 1942, MS 1948 USU.

VAN ORDEN, HARRIS O. (1946) Prof. of Chemistry. BS 1938 USU, MS 1942 State C of Wash., PhD 1951 Mass. Institute of Tech.

VENDELL, EDWARD W., JR. (1960) Asst. Prof. of Mechanical Engineering. BSME 1955, MS 1960 U of U.

VIETS, ROBERT L. (1962) Asst. Prof. of Business Administration. BS 1955 Kansas State Teachers C. MBA 1962 Indiana USU.

WACH, DOROTHY (1961) Instr., Extension Services; Uintah Co. Home Agent. BA 1961 BYU.

WADSWORTH, HAROLD M. (1946) Superintendent of Plant Operations and Maintenance. BS 1927 USU.


WALLIS, CARL R. (1957) Asst. Prof. of Industrial and Technical Education. BS 1949, MS 1957 USU.

WAMSLEY, HELEN J. (1946) Asst. Prof., Extension Services; Rich Co. Home Agent. BS 1937 USU.

WARDLE, ALVIN (1959) Asst. Prof. of Instrumental Music. BA 1951 BYU, MED 1955 USU.


WASSERMAN, IRVING (1955) Asso. Prof. of Fine Arts. ML at U of Cracov, Poland.

*On leave.


WENNERGREN, E. BOYD (1959) Asst. Prof. of Agricultural Economics. BS 1951, MS 1953 USU, PhD 1959 Penn. State U.


WILCOX, ETHELWYN B. (1943) Prof. of Food and Nutrition. BS 1931, MS 1937, PhE 1942 Iowa State C.

WILLEY, LYNN R. (1946) Asst. Prof. of Industrial and Technical Education. Trade certificate 1939, BS 1956, MS 1953 USU.


WILLIAMS, J. STEWART (1935) Dean of Graduate Studies; Prof. and Head Dept. of Geology. BS 1923 BYU, MS 1927 Columbia U, PhD 1932 Geo. Wash. U.

WILLIAMS, JOHN A. (1961) Asst. to Dean of Students; Asst. Prof. of Education. BS 1947, MS 1948 BYU.


WILSON, LEMOYNE (1937) Asso. Prof. of Agronomy. BS 1927, MS 1932 USU.


WOOD, JOHN K. (1956) Prof. and Head, Dept. of Physics. BS 1941, MS 1942, PhD 1946 Penn. State U.
YARDLEY, SOFIA ANN (1960) Instr., Extension Services; Beaver Co. Home Agent. BS 1957 BYU.

Emeritus Faculty

Agren, Ellen
Emeritus Professor, Extension Services

*Allen, Bert V.
Emeritus Professor in Photography

*Baker, H. Cecil, BS
Emeritus Professor, Health, Physical Education and Recreation

Barrows, Effie S.
Emeritus Professor, Extension Services

Bastow, Mary L. BS
Emeritus Professor of Art (CSU)

*Bateman, George Q., BS
Emeritus Professor, Dairy Industry

Boswell, Stephen R.
Emeritus Professor, Extension Services

Bowen, Edith, BS, MS
Emeritus Professor, Education

Brown, Almeda P., BS, MA
Emeritus Professor, Home Economics

*Burgoyne, David A., BS, MS
Emeritus Professor, Extension Services, assistant to Director of Agricultural Experiment Station

Caine, George B., BS, MA
Emeritus Professor, Dairy Industry

Carter, Pearl J.
Emeritus Assistant Professor, Library Science

Christensen, A. L., BS, MS
Emeritus Professor, Extension Services

*Dalley, Parley, BS, MS, ScD
Emeritus Professor, Physical Sciences

*Current staff assignment.

Dyer, Dorothy T., BS, MA
Emeritus Dean, College of Family Life

Evans, R. J., BS, PhD
Emeritus Professor, Agronomy

Fletcher, Calvin, BPd
Emeritus Professor, Art

*Frischknecht, Carl, BS, MS, PhD
Emeritus Professor, Extension Services

*Gardner, V. D., BS, MBA
Emeritus Professor, Business Administration

Gardner, Willard, BS, MS, PhD
Emeritus Professor, Physics

Geddes, Joseph A., AB, AM, PhD
Emeritus Professor, Sociology

Guymon, E. Lee, BS, MS
Emeritus Professor, Extension Services

Hansen, Reuben, BS
Emeritus Professor, Extension Services

*Hayward, Ira N., BS, PhM
Emeritus Professor, English

Huber, Thelma, BS MS
Emeritus Professor, Extension Services

*Humphreys, L. R., BS
Emeritus Professor, Agricultural Education

*Hurst, Clyde
Emeritus Instructor, Industrial and Technical Education

Israelsen, Orson W., BS, MS, PhD
Emeritus Professor, Irrigation and Drainage Engineering

Jacobson, E. A., BS, MS, PhD
Emeritus Dean, College of Education

Jennings, D. S., BS, PhD
Emeritus Professor, Agronomy

Jensen, George C., AB, MA
Emeritus Professor, Languages

*Kemp, Antone B.
Emeritus Instructor, Industrial and Technical Education

Lund Nettie B., BS
Emeritus Professor, Extension Services

*Maeser, Sherwin, AB, PhD
Emeritus Professor, Chemistry

Manning, Williams H., AB
Emeritus Professor, Music (CSU)

*McBride, C. D., BS, MS
Emeritus Professor, Business Administration

McClellan, Charles E., AB, MA
Emeritus Professor, Education

*Meyer, George A., BA, STB, PhD
Emeritus Professor, Languages
Miller, Elna, BS, MS
Emeritus Professor, Extension Services

*Morris, A. J., BS, MS
Emeritus Professor, Dairy Industry

*Nelson, George
Emeritus Instructor, Physical Education

Nichols, Delore, BS
Emeritus Professor, Extension Services

*Noble, Lee Grande, BS, MS, EdD
Emeritus Professor, Education

Pedersen, N. Alvin, AB, MA, PhD
Emeritus Dean, College of Humanities and Arts

Pittman, Don W., BS, MS
Emeritus Professor, Agronomy

*Reynolds, H. Reuben
Emeritus Professor, Fine Arts

Rich, Lyman, BS, MS
Emeritus Professor, Extension Services

Richards, B. L., BS, MS, PhD
Emeritus Professor, Botany and Plant Pathology

*Ricks, Joel Edward, BA, MA, PhD
Emeritus Professor, History

Sargent, D. L., BS, MS
Emeritus Professor, Biology (CSU)

Sharp, David, Jr., BS
Emeritus Professor, Extension Services

Smith, Albert E., BS
Emeritus Professor, Extension Services

Sorenson, C. J., BS, MS
Emeritus Professor, Entomology

Stanford, J. Sedley, BS, PhD
Emeritus Professor, Zoology and Entomology

Stewart, Robert H., BS
Emeritus Professor, Extension Services

Swenson, Dan A., BS
Emeritus Professor, Woodwork and Building Construction

Thain, Aldyth, MA
Emeritus Professor, Languages

*Tingey, Delmar C., BS, MS
Emeritus Professor, Agronomy

Tingey, V. H., BS, MS
Emeritus Professor, Mathematics

Vermillion, Una, BA, MA
Emeritus Professor, Food and Nutrition

Welti, Walter, BA, MA, MusD
Emeritus Professor, Fine Arts

Wrigley, R. L., BS
Emeritus Professor, Extension Services

*Current staff assignment.

College of Southern Utah

Braithwaite, Royden C., BS, PhD
Director
Professor, Psychology and Education

Adams, Boyd, BS, MS
Assistant Professor, Physical Education
Head Basketball Coach
Track Coach

Adams, Fred C., BA, MA
Instructor, Dramatics and Speech

Ashcroft, Theron, BS
Professor of Physics and Engineering
Co-Chairman, Division of Engineering and Physical Science

Barrus, George S., BS
Associate Professor, Journalism
Head, Public Information Services
Administrative Assistant, College Development

Carpenter, Ada D., BS
Assistant Professor, Family Life
Chairman, Division of Family Life

Challis, A. Thomas, BA, MS
Assistant Professor, Library Science
Chairman of Library Services & Historian

Clark, Gwyn R., BS, MS
Associate Professor, Elementary Education
Supervisor of Teacher Training

Cloward, McKay, BS, EDM, EdD
Associate Professor, Education and Social Science
Coordinator, Adult Education & Evening School

Cooley, Hazen, BS, MBA
Secretary and Treasurer
Professor, Business

Cooper, Laurence C., BS, MS
Assistant Professor, Physical Sciences

Davis, J. Victor, BS
Assistant Professor, Auto Mechanics

Eggert, Mary M., BS, MS, EdD
Associate Professor, Education

Faux, Franklin J., BS, MS
Instructor, Chemistry and Mathematics

Fillerup, Joseph M., BS, MA, EdD
Professor, Education
Chairman, Division of Education

Gillies, Richard E., BS, MS
Dean of Students
Associate Professor, Social Science

Gordon, D. C., Major
USAF, Associate Professor, Air Science

Halversen, Roy L., BS
Professor, Music and Education
Chairman, Music Department
Hansen, Gerald, BS, MS, PhD
Assistant Professor, Political Science

Hardy, Eugene, BS
Associate Professor, Industrial Education
Chairman, Division of Industrial Education

Hatch, Conrad V., BS, MS, PhD
Professor, Physical Science and Chemistry
Co-Chairman, Division of Engineering and Physical Science

Horning, Priscilla, BS, MS
Instructor, Family Life

Howard, Bruce, BS, BA, MS, MA
Instructor, Education
Acting Coordinator of Health, Counseling and Housing

Johnson, Blaine, BS, MA, EdD
Associate Professor, Music and Education
Coordinator of Military Affairs

Jones, Eulalia B., BA
Assistant Professor, Library Science
Assistant Librarian

Jones, Kim, BS
Instructor, Physical Science and Mathematics
Coordinator, Science Center

*Kupfer, Vern K., BS, MS
Associate Professor, Psychology and Social Science

Larsen, Wesley P., BS, MS, PhD
Associate Professor, Biological Science

LeBaron, George L., BS, MS
Associate Professor, Physics and Physical Science

Leek, Thomas, BFA, MA
Instructor, Humanities and Fine Arts

MacDonald, Mary M., AS
Instructor, Humanities and Fine Arts

Magleby, V. R., BS, MS
Associate Professor, Agriculture and Biology

Matthews, Darrell H., BS, MS
Associate Professor, Animal Husbandry

*McAllister, LeRoy L., BA, MS, CPA
Assistant Professor, Business
Assistant Secretary-Treasurer

Moss, Steven A., BS, MS
Instructor, Mathematics and Physical Science

Myers, Kent, BS, MEd
Assistant Professor, English and Speech
Coordinator of Auditorium Activities

*Ogden, Phil R., BS, MS
Assistant Professor, Range Management

Olsen, Larry A., BS
Instructor, Secretarial Science

Osborne, Bruce H., BS
Assistant Professor, Physical Education
Athletic Coach
Acting Director of Athletics

Petty, Cleo M., BS, MS
Associate Professor, Physical Education
Athletic Director, Coach
Chairman, Division of Physical Education

Plummer, J. H., BA, MA
Professor, English, Language Arts & Humanities
Chairman, Division of Humanities and Fine Arts
Dean of Instruction

Robb, Ward S., BS
Registrar
Assistant Professor

Roper, Melvin J., BS
Assistant Professor, Industrial Education

Rowley, Richard M., BS, MA
Associate Professor, English and Speech
Chairman, Division of English & Language Arts

Schmutz, D. Clarence, BA, MA
Associate Professor, Agricultural Economics
Chairman, Division of Agriculture, Biological Science and Forestry

Shirts, Morris A., BA, MS, EdD
Associate Professor, Education
Chairman, Summer Session

Southwick, Elaine C., BA
Assistant Professor, English and Language Arts
Dean of Women

Stephenson, A. W., BS, MBA
Professor, Business
Chairman, Division of Business and Social Science

Thompson, Lee, BA, MA
Instructor, Dramatics

Thompson, Richard A., BA, MA, PhD
Associate Professor, History and Social Science
Administrative Assistant Academic Affairs

Vorkink, Paul, BS, MEd
Assistant Professor, English and Speech

Wahlquist, A. Glenn, BS, MS
Associate Professor, Agronomy and Biology

Walsh, David J., BS, MS
Instructor Physics & Mathematics

Watson, James, BS, MBA
Instructor, Business Administration

Whetten, LaVeve, BS
Assistant Professor, Physical Education

Wolsey, Heber G., BS, MA
Assistant Professor English

*Woolf, Eugene T., BA, MA
Assistant Professor, English and Speech

*On leave.
350 University Faculty

Other Members of Staff—CSU

Bushnell, Van L.
Cashier

Bybee, Chloean C.
Supervisor, Women's Residence Hall

Cox, Carl T.
Valley Farm Assistant

Cox, R. Reid
Chairman of Plant Operations

Daniels, Paul
Bookkeeper

Davis, Sherrill
Manager of Food Services

Dover, Bessie, BS
Receptionist, Information Services

Draper, Carol, RN
Nurse, Health and Counseling Center

Duncan, Audrey
Secretary, Administrative Services

Each, Frederick, BS, T/Sgt. USAF
Administrative Assistant

Grant, Sheldon
Superintendent of Gardens & Groves

Grimshaw, Arlen
Business Manager of Student Center

Jackson, Douglas
Assistant Superintendent, Building and
Maintenance

Kelsey, Verl
Assistant Superintendent of Gardens &
Groves

Matheson, Edward G.
Superintendent of Heat Plant

McCraeken, Vanice
Secretary to the Director

Nelson, Barbara, B.
Assistant Registrar

Reber, Mary Lynn
Secretary, Division of Education

Rigby, Eldro
Assistant, Buildings

Roberts, Joseph W.
Assistant, Buildings

Slack, F. Gordon
Purchasing Agent

Stratton, H. Arwin
Assistant, Buildings

Wilde, Coral
Supervisor, Women's Residence Hall

Associated Instructors

Boyce, Harold, BS, MS
Band Director

Day, Frank D., BS, MS
Director, LDS Institute of Religion

Gleave, Ray H., BA, MA
Associate Director, LDS Institute of
Religion

Gentry, Leland H., BA, MA
Psychology

Harman, Rev. E. R.
Director, Newman Study Hall (Catholic
Center)

Johnson, Mrs. Blaine
Special Instructor in Music

Jones, Bernella
Special Instructor in Music

Thorley, Max J.
Special Instructor in Music

Emeritus Faculty

Mary L. Bastow, BS
Professor Emeritus in Art

Parley Dalley, BS MS, ScD
Former Head of Physical Science Department
Professor of Geology

William H. Manning, BS
Professor Emeritus in Music

D. L. Sargent, BS, MS
Professor Emeritus in Biology

Snow College Faculty

Holm, Floyd S., BS, MS
Director
Associate Professor of Education

Allred, Fred L., BS, MEd
Assistant Professor of English

Armstrong, Milton G., BS, MS
Assistant Professor of Chemistry

Aston, James, BA, MA
Assistant Professor of Art

Reacham, Garth, BS, MS
Chairman, Division of Education and Social
Science
Assistant Professor of Education and
Psychology

Bradley, Merrit E., BS, MS
Chairman, Division of Industrial and
Vocational Education
Assistant Professor of Building Trades
Christensen, H. Reed, BS, MS, PhD
Chairman, Division of Physical Sciences and Mathematics
Professor of Mathematics and Physics

Clark, Winnie W., BS
Women's Counselor
Instructor in Women's Physical Education

Crane, Joseph W., BA, MA
Chairman, Division of Humanities
Associate Professor of Speech

Dean, H. A., BS, MS
Professor Emeritus of Music

Ericksen, McLoyd, BA
Instructor in Music

Findlay, Ross P., BS, MS
Dean of Students, Registrar
Assistant Professor of Sociology

Gray, A. Russell, BS, MS
Associated Professor of History and Modern Languages

Hansen, Afton, BS, MS, PhD
Chairman, Division of Agriculture and Life Sciences
Associate Professor of Biological Science

Jennings, Bruce, BA, MA
Assistant Professor of English

Jensen, Halbert, MBA
Assistant Professor of Business Administration

Jensen, LaVar
Piano Instructor

Kay, J. Gwendolyn, BS
Instructor, Home and Family Living

Mangelson, Farrin L., BS, MS
Associate Professor of Chemistry

Moore, Blain, AB, MA
Acting Chairman, Division of Agriculture and Life Sciences
Assistant Professor of Biological Science

Olsen, Ruth, BS, MA
Librarian
Instructor in Library Science

Peterson, Rulon, BS
Instructor in Mathematics

Phillips, Lucy A., AB, MA
Professor Emeritus of English

Ray, Nellie, BS, MA
Acting Chairman, Division of Business
Associate Professor of Secretarial Science

Ryan, Duane, AB, MA
Instructor in Speech

Stoddard, Robert, BS, MS
Instructor in Agriculture and Physical Education

Stout, Clayton
Instructor in Automotive Technology

Thompson, Lee R., BS
Business Manager
Assistant Professor of Physical Education

Woodbury, Darwin, BS, MS
Assistant Professor of Physical Education

Wright, Carol Lynn
Instructor in English and Speech

Other Members of Staff

Stout, Fonda
Manager of Bookstore

Olsen, Goldie
Manager of Cafeteria

Peterson, Hillmer
Supt. of Buildings and Grounds

Larsen, Doris
Secretary to Director

Bailey, Fred
Custodian

Alden, Ivan
Maintenance Supervisor

Shuffler, Betty
Clerk-stenographer

Federal Collaborators at USU

Anderson, Melvin J., BS, MS, PhD
Agricultural Research Service

Apt, Walter J., BS, MS, PhD
Agricultural Research Service

Barkley, Paul W., BS, MS, PhD
Economic Research Service

Binns, Wayne, MS, DVM
Agricultural Research Service

Bleak, Alvin T., BS
Agricultural Research Service

Bohart, George E., BS, MS, PhD
Agricultural Research Service

Burnett, John E., BS
Agricultural Research Division

Cronin, Eugene Hyrum, BS, MS, PhD
Agricultural Research Service

Dewey, Douglas R., BS, MS, PhD
Agricultural Research Service

Dorst, Howard Earl, AB, MS, PhD
Agricultural Research Service

Erickson, Austin J., BS
Soil Conservation Service

Fitzgerald, Paul Ray, BS, MS, PhD
Agricultural Research Service
352 University Faculty

Franklin, Donald F., BS, MS, PhD
Wildlife Research Unit

Haddock, Jay Lamar, BS, MS, PhD
Agricultural Research Service

Hull, Alvin C., Jr., BS, MS, PhD
Agricultural Research Service

James, Lynn F., BS, MS
Agricultural Research Service

Johnson, A. Earl, BS, MS
Agricultural Research Service

Jorgenson, Edsel C., BS, MS, PhD
Agricultural Research Service

Krebil, R. G., BS, MS, PhD
Forest Service

Kopland, David V., BS
Agricultural Research Service

Lauritzen, Cyril Walker, BS, MS, PhD
Agricultural Research Service

Leininger, Lester N., BS, MS, PhD
Agricultural Research Service

Low, Jessop Budge, BS, MS, PhD
Wildlife Research Unit

Martin, Mark W., BS, MS, PhD
Agricultural Research Service

Meeuwig, Richard O., BS, MS
Forest Service

Murphy, Albert M., BS, MS
Agricultural Research Service

Nye, William Preston, BS, MS
Agricultural Research Service

Owen, Forrest Vern, BS, MS, PhD
Agricultural Research Service

Packer, Paul, BS, MS, PhD
Forest Service

Pedersen, Marion Walter, BS, MS, PhD
Agricultural Research Service

Peterson, Roger S., BS, MS, PhD
Forest Service

Ryser, George K., BS
Agricultural Research Service

Schneider, Charles L., BS, MS, PhD
Agricultural Research Service

Schultz, John D., BS, MF
Forest Service

Shupe, J. LeGrande, BS, MS, DVM
Agricultural Research Service

Smith, Clifton H., BS, MS
Agricultural Research Service

Stewart, Clyde Everett, BS, MS, PhD
Economic Research Service

Stout, Myron, BS
Agricultural Research Service

Stuart, Darrel M., BS, MS
Agricultural Research Service

Theurer, J. Clair, BS, MS, PhD
Agricultural Research Service

Thorne, James Parry, BS, MS
Soil Conservation Service

Thornley, Heber F., BS, MS
Agricultural Research Service

Urie, Lee, BS
Agricultural Research Service

Vincent, Robert S., BS, MS, PhD
Forest Service

Wadley, Bryce Nephi, BS, MS, PhD
Agricultural Research Service

Wagar, Allan, BS, MS, PhD
Forest Service

Willardson, Lyman S., BS, MS
Agricultural Research Service

Williams, M. Coburn, BS, MS, PhD
Agricultural Research Service

Woodward, Rollo William, BS, MS, PhD
Agricultural Research Service

Zimmer, David E., BS, MS, PhD
Agricultural Research Service

Guest Lecturers in Department of Bacteriology, Public Health

Index

Academic Departments, 8
Accreditation, University, 11
Accounting, 61
Activities, Student, 307, 323
Administration
Business, Department of, 60
Business Education and Office, Department of, 66
Officers of University, 7
Admission to University, 18
Admissions and Records, 15
Adult Education Services, 288
Advanced Degrees, 271
Adviser, 29
Aeronautical Technology, 162
Agricultural Business, 35
Economics, Department of, 37
Education, Department of, 103
Engineering, 142
Experiment Station, 297
Science, 35
Agriculture College of, 31
Curricula in, 35
General, 36
Two-year Program in, 36
Agronomy, Department of, 39
Air Force ROTC, 89
Air Science, Department of, 89
Alumni Association, 319
American Studies, 205
Animal Husbandry, Department of, 43
Applied Statistics and Computer Science, Department of, 240
Army-Air Force Courses and Activities, 87
Art, 219
Arts
Fine, Department of, 211
Industrial, 156
Language, 227
Music, 211
Theater, 217
Visual, 219
Assemblies, 324
Assistantships, 275
Associated Students, 324
Women Students, 324
Athletics, 328
Auditing Classes, 22
Automotive Technology, 164
Awards, Honors, and Scholarships, 311, 315
Bachelor of Arts Degree, 29
Bachelor of Science Degree, 29
Bacteriology and Public Health, Department of, 243

Band
ROTC, 88
University, 215, 323
Basic Communication, 25, 207
Biochemistry and Nutrition, Curriculum in, 278
Biology, 201, 250, 245
Blue Book, Student Handbook, 323
Board of Trustees, 6
Boards and Councils, Student, 324
Botany and Plant Pathology, Department of, 247
Branch Colleges, 281
Bureau of Educational Research, 304
Business Administration, Department of, 60
Agricultural, 35
Education and Office Administration, Department of, 66
Management, 62
and Social Sciences, College of, 57
Buzzer, Yearbook, 323
Cafeteria, 310
Campus Map, Inside Back Cover
Organizations, 325
Certificates of Completion, 28
Terminal, 28
Chemistry, Department of, 249
Child Development, Department of Family and, 174
Choir, 215
Chorus, 215
Civil and Irrigation Engineering, Department of, 135
Class
Auditing, 22
Standing, 20
Clinic, Speech, 233, 322
Clinical Technology, 246
Clothing and Textiles, Department of, 172
Collaborators, 351
Colleges
Agriculture, 31
Branch, 281
Business and Social Sciences, 57
Education, 99
Engineering, 129
Family Life, 169
Forest, Range and Wildlife Management, 185
Humanities and Arts, 199
Science, 237
Snow, 253
Southern Utah, 282
Combination Major in Family Life and Office Administration, 72, 183
Commissions, Army and Air Force, 86, 90
Committees, Student, 324
Communication
Basic, 25, 207
Mass, 209
Completion Certificates, 28
Computer Science, Department of Applied Statistics and, 240
Contents, Table of, 3
Cooperative Extension Service, 287
Correspondence
Classes, 289
To USU, Opposite Inside Back Cover
Counseling Services, 319
Costs, 4
Credits
By Examination, 24
Explanation of, 20
Crop Science, 40
Crucible, literary magazine, 323
Curriculum in
Family Life and Office Administration, 72, 183
General Education, 201
Liberal Studies, 202
Library Science, 121
Animal Nutrition and Biochemistry, 276
Food Science and Technology, 54, 277
Plant Nutrition and Biochemistry, 278
Dairy
Industry, Department of, 46
Manufacturing, 47
Production, 46
Dances, 324
Debate and Public Speaking, 323
Degrees
Bachelor of Arts, 29
Bachelor of Science, 29
Civil Engineer, 273
Doctor of Education, 274
Doctor of Philosophy, 274
Irrigation Engineer, 273
Master of Arts, 271
Master of Business Administration, 272
Master of Education, 272
Master of Forestry, 272
Master of Industrial Education, 273
Master of Science, 271
Dentistry, Pre-, 264
Departments, List of, 8
Development Fund, University, 329
Diesel Technology, 165
Distributive Education, 69
Directory, Student, 323
Division of
Military and Air Sciences, 86
University Research, 295
Doctor of
Education Degree, 274
Philosophy Degree, 274
Dormitories, 308
Drama, 217, 323
Duplicating Center, 292
Economics
Department of, 73
Agricultural, Department of, 37
Education
Adult, 288
Agricultural, Department of, 103
Business, 66
College of, 99
Department of, 104
Elementary, 105
General, 201
Homemaking, Department of, 179
Industrial and Technical, Department of, 154
Off-Campus, 288
Secondary, 106
Technical, 161
Vocational (see Agricultural, Industrial and Homemaking)
Educational Research Bureau, 304
Electrical Engineering, Department of, 144
Elementary Education, 106
Emeritus Faculty, 347
Employment, 319
Engineering
Aeronautical, 162
Agricultural, 142
Civil and Irrigation, Department of, 135
College of, 129
Drainage, 136
Electrical, Department of, 144
Experiment Station, 300
Irrigation, 135
Mechanical, Department of, 148
Tool and Manufacturing, Department of, 152
English and Journalism, Department of, 204
Entomology, 262
Entrance Requirements, 18
Expenses, 4
Experiment Station
Agricultural, 297
Engineering, 300
Explanation of Symbols Used, 13
Extension
Agricultural Agents, 286
Classes, 288
Home Agents, 286
Services, 285
Specialists, 286
Faculty
College of Southern Utah, 348
Collaborators, 351
Emeritus, 347
Snow College, 350
Utah State University, 331
Family and Child Development, Department of, 174
Family Life
and Office Administration, Combination
Major in, 72, 183
College of, 169
Master of
Arts Degree, 271
Business Administration Degree, 272
Education Degree, 272
Forestry Degree, 272
Industrial Education Degree, 273
Science Degree, 271
Mathematical Statistics, 256
Mathematics, Department of, 254
Mechanical Engineering, Department of, 148
Medical Technology, 246
Merchandising, 60
Microfilming Thesis, 270
Military and Air Sciences, Division of, 86
Military Science, Department of, 94
Minor Subjects, 27
Monograph Series, 291
Music, 211
Musicals, 323
Newspaper, Student Life, 269, 323
Non-Resident Fees, 4
Numbering System, Explanation of, 13
Nursing, 265
Nutrition
Animal, 276
Food and, 177
Plant, 278
Objectives of University, 9
Office Administration, Department of
Business Education and, 66
Officers of Administration, 7
Orchestra, 323
Orientation, 321
Parttime Employment, 319
Pershing Rifles, 87
Philosophical Literature, 232
Philosophy, 232
Photographic Journalism, 296
Photography, 296
Physical Education, 113
Physics, Department of, 257
Physiology, 263
Plant Pathology, 247
Political Science, 78
Portuguese, 231
Poultry Husbandry, Department of, 51
Pre-
Dentistry, 264
Law, 80
Medicine, 265
Veterinary, 52
Private Instruction
in Music, 211
in Speech, 234, 322
Probation, 23
Psychology, Department of, 122
Publications
Student, 323
University, 291
Public Health, 243
Quarter, Academic, 13
Radio
Courses (see Electrical Engineering,
Journalism, Speech)
Station, KUSU, 324
Range Management, Department of, 193
Records, Office of Admissions and, 15
Recreation, 113
Registration
and Credits, 20
Change of, 21
Fees, 4
General, 23
Late, 20
Maximum, 22
Minimum, 22
Normal, 22
Religion, 307
Requirements
Entrance, 18
Graduation, 28
Group, 25
Lower Division, 25
Upper Division, 27
Research
Assistantships, 275
Bureau of Educational, 304
Division of University, 295
Programs, 293
Reserve Officers Training Corps (ROTC), 86
Resources, Wildlife, Department of, 196
ROTC Band, 88
Russian, 231
Scabbard and Blade, 88
Schedule Bulletins, 14
Scholarship, Low, 23
Scholarships, Awards, Honors, Assistantships,
Fellowships, Grant-in-Aid, 275, 276, 311, 313
School
of Graduate Studies, 267
Summer, 279
Science, College of, 237
Secondary Education, 106
Secretarial Science, 66
Senate, Student, 324
Services
Adult Education, 288
Extension, 285
Information, 291
Student, 305
Snow College, 284
Social
Science, 81
Sciences, College of Business and, 57
Work, 84
Sociology and Social Work, Department of, 82
Soil Science, 41
Sororities, 325
Southern Utah, College of, 283
Spanish, 231
Special Fees, 4
Speech:
Clinic, 322
Department of, 233
Sponsor Corps, 87
Sports, 113, 323
Station
Agricultural Experiment, 297
Engineering Experiment, 300
Statistics
Applied, 240
Mathematical, 256
Student
Activities, 305
Boards and Councils, 324
Directory, 323
Employment, 319
Government, 324
Handbook, Blue Book, 323
Health Service, 329
Housing, 307
Loans, 318
Magazine, Crucible, 323
Newspaper, Student Life, 323
Organizations, 325
Publications, 323
Radio Station, KUSU, 324
Senate, 324
Services and Activities, 307, 323
Television Studios, 324
Union Building, 324
Union Board, 324
Yearbook, Buzzer, 323
Studies
American, 205
Institute of Utah, 76
Liberal, 202
Study, Home, 288
Summer Camp
Forestry, 188
ROTC, 90, 95
Symbols Used, Explanation of, 13
Table of Contents, 3
Teacher
Certification, 102
Education, 101
Placement Service, 102
Teaching Assistantships, 275
Technical Education, Programs in, 161
Technology
Aeronautical, 162
Automotive, 164
Industrial, Program in, 162
Welding, 166
Terminal Certificate, 28
Thesis, 270
Theater Arts, 217
Theatricals, 217, 323
Tool and Manufacturing Engineering,
Department of, 152
Trade and Industrial Education, 156
Transfer Students, 19
Trustees, Board of, 6
Tuition, 4
Union
Board, 324
Building, Student, 324
University
Board of Trustees, 6
Collaborators, 351
Departments of Instruction, List of, 8
Development, 329
Faculty, 331
Forum, 324
General Information, 9
Lecture Series, 288
Library, 12
Monographs, 291
Officers, 7
Publications, 291, 325
Research Division, 295
Upper Division Requirements, 27
Utah
Agricultural Experiment Station, 297
Cooperative Extension Service, 287
Cooperative Fishery Research Unit, 304
Cooperative Wildlife Research Unit, 303
Scientific Research Foundation, 302
Studies, Institute of, 76
Vegetable Crops, 48
Veterinary Science, Department of, 52
Visitor’s Permit, 22
Visual
Aids, 12
Arts, 219
Vocal Music, 211, 323
Vocational
Counselors, 319
Education (see Agricultural, Home
Economics, or Industrial Education)
Welding Technology, 166
Wildlife
Research Unit, 303
Resources, Department of, 196
Withdrawal from Class, 21
Writing and Mass Communications, 206
Yearbook, Buzzer, 323
Zoology, Department of, 260
Photographs by Arlen L. Hansen
Cover Design and Photos by Gaell Lindstrom
Please bring this Catalog with you when you come to register.

A Class Schedule Bulletin is available a few days prior to the beginning of Fall Quarter.

When Writing to Utah State University

Concerning any of the following matters, please address letters as follows:

**University Policy**: President Daryl Chase.

**University Business Matters**: Vice President Dee A. Broadbent.

**Requests for Programs, Speakers, Music, Tours or Literature on USU**: Director of Information Services, LeRoy A. Blaser.

**Requests for Films, Movies**: Audio Visual Aids Librarian, G. Leon Beutler.

**Admission, or Transcript of Credits**: Dean of Admissions and Records, L. Mark Neuberger.

**Housing, Scholarships, Costs, or Student Affairs**: Dean of Students, Claude J. Burtenshaw.

**Extension Classes or Home Study**: Director of Extension Services, William H. Bennett.

**Alumni**: Executive Secretary of Alumni Association, J. Lyn Larson.

John J. Stewart, Editor
Utah State University Publications

Printed by
Deseret News Press
in the United States of America