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UTAH
STATE
Catalog
1955 • 56



Utah State Agricultural College

BULLETIN

Vol. 55

April, 1955

No. 4

COLLEGE CALENDAR 1955-56

1955
SEPTEMBER

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1956
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Fall Quarter

Sept. 19, Mon.	First Faculty Meeting
Sept. 22, 24, T. S.	Orientation, new students
Sept. 23, Fri.	Registration, new students
Sept. 24, Sat.	Registration, former students
Sept. 26, Mon.	Instruction begins
Oct. 15, Sat.	Homecoming
Nov. 23, Wed.	Thanksgiving Recess begins 12 noon
Dec. 13, Tues.	Examination Period begins
Dec. 16, Fri.	Fall Quarter ends

Winter Quarter

Jan. 3, Tues.	Winter Registration
Jan. 4, Wed.	Instruction begins
Mar. 13, Tues.	Examination Period begins
Mar. 16, Fri.	Winter Quarter ends

Spring Quarter

Mar. 19, Mon.	Spring Registration
Mar. 20, Tues.	Instruction begins
May 12, 13, 14	Agathon
May 28, Mon.	Examination Period begins
May 30, Wed.	Memorial Day (holiday)
June 1, F. noon	Examination Period ends
June 1, F. eve	Baccalaureate Service
June 2, Sat.	63rd Commencement

Summer Quarter, 1956

June 11, Mon.	Registration for first or both sessions
June 12, Tues.	Instruction begins
July 4, Wed.	Independence Day (holiday)
July 20, Fri.	First Session ends
July 25, Wed.	Second Session begins
July 28, Sat.	All Monday scheduled classes meet regularly. (Registration for second session at any available hour during first week.)
Aug. 24, Fri.	Second Session ends

1956
MARCH

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1956
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1956
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1956
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1956
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25	26	27	28	29	30	31

**UTAH STATE
AGRICULTURAL COLLEGE
BULLETIN**

**Catalog Issue
1955-56**

**When You Come to Register
Please Bring This Bulletin With You**

COLLEGE BULLETINS, Published by Utah State Agricultural College, at Logan, Utah. Issued Monthly. Vol. 55, No. 4, April 1955. Entered as second class matter September 10, 1918, at the post office at Logan, Utah, under the act of August 14, 1912. Acceptance for mailing at special rate of postage provided in Section 1103, Act of October 3, 1917. Authorized August 22, 1918.

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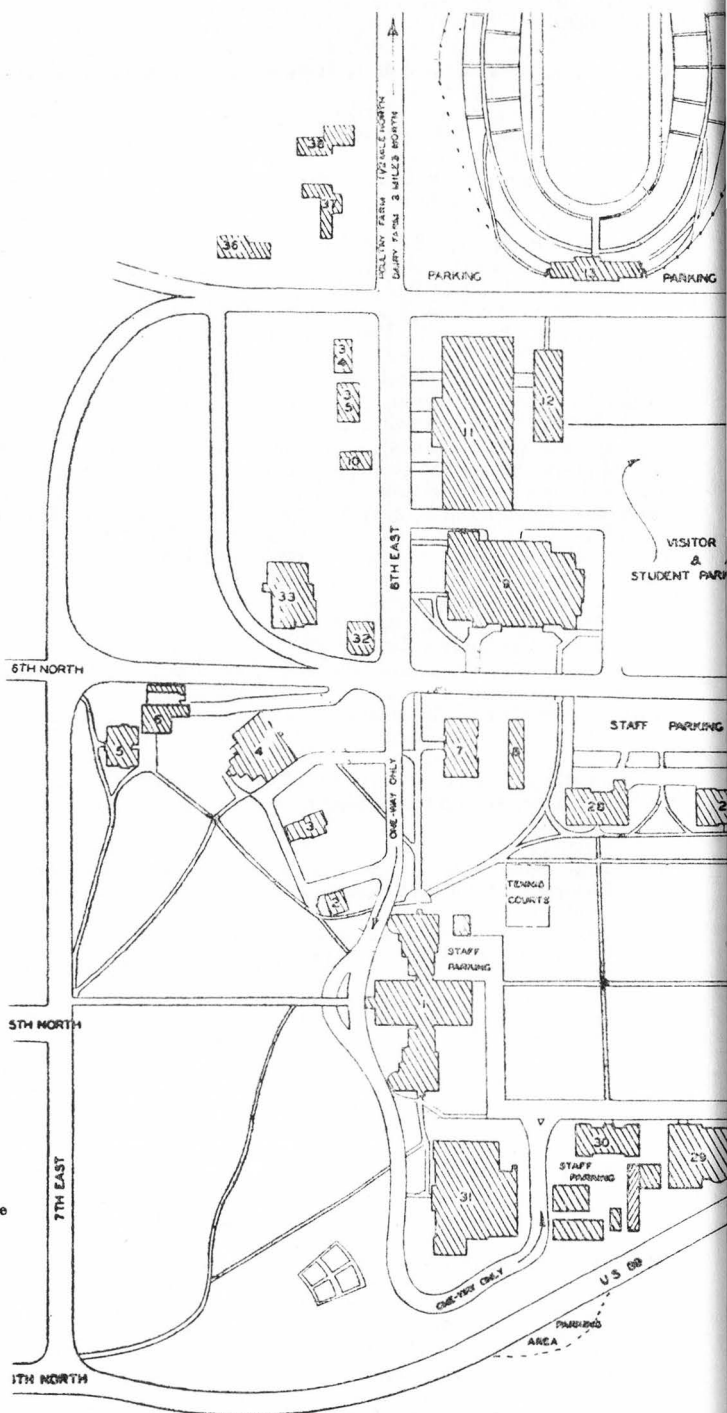
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1. Main Bldg.
2. Extension Bldg.
3. President's Home
4. Smart Gym
5. Forestry Bldg.
6. Boiler House
7. Widtsoe Hall
8. Chem. Class Rooms
9. Union Bldg.
10. Music Bldg.
11. Field House
12. Military Bldg.
13. Stadium
14. Vet. Sci. Bldg.
15. Maintenance Bldg.
16. Co-op House
17. Nursery
18. O.R.C. Bldg.
19. U.S.F.S. Equip. Shed
20. Technology Bldg.
21. Judging Pavilion
22. Rural Arts Bldg.
23. Ag. Sci. Bldg.
24. Lund Hall
25. T-J Bldg.
26. Library
27. Plant Industry Bldg.
28. Animal Industry Bldg.
29. Commons Bldg.
30. Engineering Bldg.
31. Mechanic Arts Bldg.
32. Commercial Est.
33. L.D.S. Institute
34. Alpha Chi Omega House
35. Kappa Delta House
36. Pi Kappa Alpha House
37. Sigma Chi House
38. Chi Omega House



SOFTBALL FIELD

STUDENT COURTS

COLLEGE HOUSING
AREA

7TH NORTH

TURKEY FARM 1/2 MILE EAST 100.00000000

18 TH EAST

VISITOR
&
STUDENT
PARKING

TO LIBRARY ARTS

CAMPUS EXIT

STUDENT COURTS

STAFF

POUNCE

STUDENT
PARKING

CAMPUS ENTRANCE

U.S. 50

PARKING
AREA

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Head, Agricultural Economics and Marketing Department
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Assistant Professor, Veterinary Science Department.
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Assistant Professor, Extension Editor
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Assistant Professor, Piute County Extension Agent
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Instructor in English and Education
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Special Assistant Professor of Public Health
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Instructor in English
- Buntine, Hugh A., B.E.E.**
Associate Professor of Aeronautics
Head, Aeronautics Department
- Burgess, J. Paul, M.D.**
Special Assistant Professor of Public Health
- Burgoyne, David A., B.S., M.S.**
Assistant to the Director, Agricultural Experiment Station
- Burke, Caseel D., B.S., M.S., Ed.D.**
Associate Professor of Education
- Burningham, Melvin S., B.S.**
Associate Professor, Weber County Extension Agent
- Burns, Ann, R.N.**
College Nurse, Student Health Center

Burtenshaw, G. Ray, B.S.

Assistant Professor, Juab County Extension Agent

Burton, Theodore M., A.B., M.A., Ph.D.

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Caine, Ann M., B.S.

Instructor, Head of Circulation, Library

Caine, George B., B.S., M.A.

Professor of Dairy Industry

Call, Anson B., Jr., B.S., M.S.

Associate Professor, Extension Horticulturist

Cannon, Melvin C., B.S., M.S., Ph.D.

Professor of Chemistry

Cannon, Norman S., B.S., M.S., C.P.A.

Associate Professor of Accounting and Business Administration

Carlisle, John C., B.A., M.S., Ed.D.

Professor of Education

Head, Secondary Education Department

Dean, School of Education

Acting Head, Fine Arts Department

Carlquist, John H., M.D.

Special Professor of Clinical Technology L.D.S. Hospital, Salt Lake City

***Carpenter, G. Alvin, B.S., M.S., Ph.D.**

Professor, Agricultural Economics and Marketing

Assistant Extension Director

Carson, J. David Jr., B.S., Ph.D.

Assistant Professor of Poultry Husbandry

Carter, Don C., B.S., M.S.W.

Associate Professor of Sociology

Carter, Pearl J., B.S., M.S.

Instructor, Moore Librarian

Castro, Jose T. M/Sgt.

Drill NCO, Department of Air Science

Cawley, Helen L., A.B., B.S., M.S.

Associate Professor of Home Economics Education

Head, Home Economics Education Department

Child, Rawson D., B.S., M.S.

Assistant Professor of Tool Engineering

Christensen, Paul D., B.S., M.S., Ph.D.

Extension Soil Conservationist

Christensen, L. Clair

Instructor, Assistant County Agricultural Agent, Davis County

Christiansen, Jerald E., B.S., M.S., C.E.

Professor of Civil Engineering

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Director, Engineering Experiment Station

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13

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Assistant Extension Poultryman
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Instructor in Clothing, Textiles and Related Arts
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Assistant Professor, Associate County Agent, Uintah County
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Assistant Professor, Home Demonstration Agent, Piute County
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Associate Professor of Botany and Plant Pathology
- Cole, Larry S., B.S., M.S., E.E.**
Professor of Electrical Engineering
Head, Electrical Engineering Department
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Associate Professor of Range Management
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Professor of Art
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Professor of Woodwork and Building Construction
Head, Woodwork and Building Construction Department
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Instructor, Home Demonstration Agent, Millard County
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Special Assistant Professor of Public Health
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Assistant Director, Agricultural Experiment Station
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Dean, School of Humanities and Sciences
Civilian Coordinator, ROTC
- Daines, Spencer H., B.S., M.S.**
Associate Professor of Agricultural Engineering
Head, Agricultural Engineering Department
Extension Agricultural Engineer
- Dalby, John Philip, A.B., M.S.**
Assistant Professor of Music

- Daniel, T. W., B.S., M.S., Ph.D.
Professor of Forest Management
- Daniels, Paul Rogers, B.S.
Instructor, County Extension Agent, Box Elder County
- Darley, Elizabeth S., B.S.
Assistant Professor, Home Demonstration Agent, Tooele County.
- Davis, Donald, B.S., Ph.D.
Associate Professor of Entomology
- Davis, Lynn H., B.S., M.S.
Instructor in Agricultural Economics
- Davis, Russell, B.S., M.S.
Assistant Professor of Library Science
- DeHart, William A., B.S., M.A., Ph.D.
Assistant Professor of Sociology and Extension Sociologist
- Diver, Roxy Belle, B.S., A.M.
Assistant Professor of Physical Education and Recreation
- Doty, Ina, B.S., M.S.
Associate Professor of Business Administration and Accounting
- Downs, Lois, B.S., M.S.
Associate Professor of Physical Education
- Drake, Eldon M., B.S., M.S., Ph.D.
Assistant Professor of Agricultural Education
- Draper, Carroll I., B.S., M.S., Ph.D.
Professor of Poultry Husbandry
Head, Poultry Department
- Eames, Ruby G., B.S.,
Instructor Child Development
- Eastmond, Jefferson, B.S., M.S., Ed.D.
Associate Professor of Education
- *Edwards, Maxwell D., B.A., M.A.
Assistant Professor of English
- *Elich, Joe, B.S., M.A.
Associate Professor of Mathematics
- Eller, Jessie M., B.S.
Assistant Professor, Home Demonstration Agent, Uintah County
- Ellsworth, S. George, B.S., M.A., Ph.D.
Associate Professor of History
- Embry, Bertis L., B.S., M.S., E.E.
Associate Professor of Electrical and Agricultural Engineering
- Erickson, Sylvan, B.S.
Controller
- Eskelson, Ross W., B.S.
Instructor in Welding
- Eyre, H. Dean, B.S.
Purchasing Agent

*On Leave

- Farnsworth, William T., B.A., M.S.**
Instructor, Assistant Agricultural Agent, Weber County
- Faunce, Everette, B.A.**
Assistant Professor, Head Football Coach.
- Floyd, J. Whitney, B.S., M.S.**
Professor of Forest Management
Head, Forestry Department
- Fogelberg, Thelma, B.S., M.A., Ph.D.**
Associate Professor of Modern Languages
- Frandsen, Arden, B.S., M.S., Ph.D.**
Professor of Psychology
Head, Psychology Department
- Fraser, Russell S., B.S.**
Special Assistant Professor of Public Health
Director of Laboratories, Utah State Department of Health
- Frederick, Harold H., B.S., M.S.**
Assistant Professor, Rich County Extension Agent
- Fredrickson, Carmen D., B.S., M.S.**
Associate Professor of Sociology
- Frischknecht, Carl, B.S., M.S., Ph.D.**
Professor of Agriculture
Director of Extension Service
- Fuller, Pauline, B.S., M.S.**
Assistant Professor of Physical Education
- Funk, Charles Dennis, B.S.**
Assistant Professor, County Agent, Sanpete County
- Gardner, Bruce, B.S., M.S., Ph.D.**
Associate Professor of Child Development
Head, Child Development and Parent Education Department
- Gardner, Eldon J., B.S., M.S., Ph.D.**
Professor of Zoology
- Gardner, Rhea H., B.S., M.S.**
Associate Professor
Extension Housing and Home Management Specialist
- Gardner, V. D., B.S., M.B.A.**
Professor of Accounting and Business Administration
Head, Accounting and Business Administration Department
- Gasser, George W., M.D.**
Special Assistant Professor of Public Health
- Gates, L. K., B.S., M.D.**
Special Assistant Professor of Public Health
- Gerber, Robert K., B.S., M.S.**
Assistant Professor of Horticulture
- Gilmore, Florence R., B.S., M.S.**
Head of Clothing, Textiles, and Related Arts Department
Associate Professor of Clothing, Textiles and Related Arts

- Greaves, Ethelyn O., B.S., M.S., Ph.D.**
Professor of Foods and Nutrition
Head, Foods and Nutrition Department
Dean, School of Home and Family Living
- Greaves, Melvin J., B.S., M.C.E.**
Professor of Civil Engineering
- Greenwood, Delbert A., B.S., M.S., Ph.D.**
Professor of Biochemistry
- Grimshaw, Paul R., B.S., M.S.**
Assistant Professor
Associate Agricultural Agent, Sanpete County
- Gunn, Richard C., Sgt.**
Instructor in Military Science and Tactics
- Gunnell, Merrill H., B.S., M.S.**
Assistant Professor of Zoology
- Guymon, E. Lee, B.S., M.S.**
Associate Professor, Sevier County Agricultural Agent
- Hailes, Charles W., B.S., M.S.**
Assistant Professor of Industrial Education
- Hammond, Datus M., B.S., M.A., Ph.D.**
Professor of Zoology
Head of Zoology Department
- Hansen, Basil C., A.B., M.A., Ed. D.**
Associate Professor of Education
- Hansen, Bessie, B.S.**
Assistant Professor, Home Demonstration Agent, Box Elder County
- Hansen, Blair I., B.S., M.S.**
Assistant Professor of English
- Hansen, Burrell F., B.S., M.A., Ph.D.**
Assistant Professor of Speech
- Hansen, Vaughn E., B.S., M.S., Ph.D.**
Associate Research Professor of Irrigation and Drainage Engineering
- Hardy, Clyde T., B.S., M.S., Ph.D.**
Associate Professor of Geology
- Hardy, Leonard J., M/Sgt.**
Administrative NCO, Department of Air Service
- Harmon, M. Judd, B.S., M.S., Ph.D.**
Assistant Professor of Political Science
- Harris, Grant A., B.S., M.S.**
Assistant Extension Forester and Range Management Specialist
- Harris, Joseph R., B.S.**
Research Instructor in Animal Husbandry
- Harris, Leone, B.S., B.L.S.**
Assistant Professor, Head of Serials in Library

- Harris, Lorin, E., B.S., M.S., Ph.D.**
Professor of Animal Husbandry
Chairman, Institute of Nutrition
- Harrison, Gladys L., A.B.**
Assistant Professor
Bulletin Editor, Agricultural Experiment Station
- Hart, Philip J., B.S., Ph.D.**
Associate Professor of Physics
- Hartwell, Wm. V., B.S., M.S., Ph.D.**
Research Assistant Professor, Animal Husbandry
- Haslem, Dean, B.S.**
Book Store Manager
- Hassell, Robert L., B.S.**
Assistant Professor, Carbon County Extension Agent
- Hatch, La Prele S.**
Instructor, Head Cataloguer
- Hatch, Terrance, B.S., M.S., Ed.D.**
Assistant Professor of Education
- Hayward, J. Clare, B.S., M.D.**
Special Assistant Professor of Public Health
- Hayward, Ira N., B.S., Ph.M.**
Professor of English
- Heaton, Israel C., B.S. M.S.**
Associate Professor of Physical Education
- Henderson, George R., B.S., M.S.**
Professor, Extension Animal Husbandman
- Hendricks, King,, B.S., M.A., Ph.D.**
Professor of English
Head, English Department
Acting Librarian
- Henry Charles Howard, B.S., M.S.**
Instructor in Vegetable Crops
- Hess, Alvin, B.S., M.S.**
Collaborator in Teacher Training
- Himes, Ellvert H., B.S., M.A., Ph.D.**
Dean of Students
Professor of Education
- Holcomb, Harvey J., M/Sgt.**
Instructor in Military Science and Tactics
- Holman, Valera Guyman, B.S.**
Instructor in Child Development
- Holmgren, Arthur H., B.A., M.S.**
Associate Professor of Botany
Curator, Intermountain Herbarium
- Hooper, Eldon B., 1st Lt.**
Assistant Professor of Air Service

Horne, Ralph H., B.S.

Instructor

Assistant County Agent, Millard County

Huber, Thelma, B.S., M.S.

Associate Professor

Supervisor, Extension Home Economics Programs

Hughes, John Keith, B.S.

Assistant Professor, Washington County Extension Agent

Humphrey, Ellen S.

Instructor in Elementary Training School

Hunsaker, H. B., B.S., M.S.

Professor of Physical Education

Head, Physical Education and Recreation Department

Director of Athletics

Hunsaker, Lloyd R., B.S., M.S.

Associate Professor of Dairy Industry

Extension Dairyman

Hunsaker, Neville C., B.A., M.A., Ph.D.

Professor of Mathematics

Hurst, Clyde,

Instructor in Automotive Technology

Hurst, Rex L., B.S., M.S., Ph.D.

Supervisor Statistical Laboratory

Assistant Professor of Statistics

Israelsen, Vernon L., B.S., M.A., Ph.D.

Professor of Agricultural Economics and Marketing

Jacobsen, Ernest A., A.B., M.A., Ed.D.

Professor of Education

Dean, Summer School

James, Garth A., B.S., M.S.

Instructor in Bacteriology and Public Health

James, Lynn F., B.S.

Instructor, Assistant County Extension Agent, Utah County

Jarrett, Von H., B.S.

Instructor in Agricultural Engineering

Jensen, J. O., B.S.

Assistant Professor of Physics

Jensen, Louis A., B.S.

Assistant Professor, Extension Agronomist

Jensen, Myrtle R., B.S.

Instructor in Elementary Training School

Jensen, Naomi, B.S.

Assistant Professor, Home Demonstration Agent, Summit County

Johnson, Stanford L., B.S., M.S.

Assistant Professor in Accounting and Business Administration

Johnson, Theta, B.S., M.S.

Assistant Professor and Extension Clothing Specialist

FACULTY

19

- Jones, Lewis W., B.S., M.S., Ph.D.**
Associate Professor of Bacteriology
- Jones, William L., B.S., M.S.**
Assistant Professor of Electrical Engineering
- Kearsley, Amy R., B.S., M.A.**
Associate Professor
Assistant Supervisor of Youth Programs
- Keck, Carolyn, B.A.**
Instructor in Library Science
- Keck, Wendell M., B.A., M.A., Ph.D.**
Professor of English
- Keetch, Russell R., B.S., M.E.**
Associate Professor of Animal Husbandry
Extension Sheep and Wool Specialist
- *Kelker, George Hills, A.B., B.S.F., M.S.F., D.Sc.**
Professor of Wildlife Management
- Kemp, Anton B.**
Instructor in Welding
Head, Welding Department
- Kennington, Sigrid S., B.S., M.S.**
Instructor in Chemistry
- Kepner, Harold R., A.B., S.B., S.M.**
Professor of Civil Engineering
- Klein, Louis, Jr.**
Instructor in Aeronautics
- Knowlton, George F., B.S., M.A., Ph.D.**
Professor of Entomology
Extension Entomologist
- Krieger, Chester J., Major**
Assistant Professor of Air Science
- Lacey, Peter J. Jr., Lt. Col.**
Assistant Professor of Military Science and Tactics
- Lamborn, Ellis W., B.S., M.S., Ph.D.**
Associate Professor of Agricultural Economics and Marketing
- Larsen, Jessie, B.S., M.F.A.**
Associate Professor of Art
- Larson, Paul B., B.S., M.S.**
Associate Professor of Dairy Industry
- Lee, Garth L., B.S., M.S., Ph.D.**
Associate Professor of Chemistry
- Lee, Ivan E., B.S.**
Instructor in Automotive Technology
- Leeper, Donald G., Major**
Assistant Professor of Military Science and Tactics

*On Leave

Lemon, Bessie K., B.S.

Assistant Professor, Home Demonstration Agent, Cache County

Lewis, Dorothy B., B.S., M.S.

Assistant Professor in Child Development and Parent Education

***Lewis, Evelyn Hodges, B.S., A.M.**

Assistant Professor of Sociology

Lillywhite, Fern, B.S.

Instructor, Home Demonstration Agent, Emery County

Linford, Gene H., B.S., M.S.

Assistant Professor of Zoology

Locke, James H., M/Sgt.

Instructor in Military Science and Tactics

Logan, Ida M., B.S.

Instructor, Reference Librarian

***Loll, Leo M., Jr., A.B., M.B.A.**

Assistant Professor of Economics

Loveless, Austin G., B.S., M.S.

Head, Engineering Drawing Department

Associate Professor of Engineering Drawing

Low, J. B., B.S., M.S., Ph.D.

Special Professor of Wildlife Management

Leader, Utah Cooperative Wildlife Research Unit

Lund, Kirk, B.S.

Research Assistant in Poultry Husbandry

Lundstrom, Helen, B.S.

Instructor in Business Administration and Secretarial Science

Madsen, Milton A., B.S., M.S.

Associate Professor of Animal Husbandry

Martin, Maud, B.S.

Associate Professor, Home Demonstration Agent, Weber County

Mason, Herbert B., Sgt.

Instructor in Military Science and Tactics

Matthews, Doyle J., B.S., M.S.

Assistant Professor of Animal Husbandry

Maughan, Ralph, B.S., M.S.

Assistant Professor of Physical Education

Assistant Coach

McAllister, DeVere R., B.S., M.S., Ph.D.

Associate Professor of Agronomy

McBride, C. D., B.S., M.S.

Assistant Professor of Industrial Education

Director of Evening School

*On Leave

- McCormick, Charles F. Jr., Capt.**
Assistant Professor of Military Science and Tactics
- McKinney, Alice J., B.S.**
Assistant Professor, Home Demonstration Agent, Grand County.
- Merkley, Charles N., B.S.**
Acting Head, Woodwork and Building Construction Department
Associate Professor of Woodwork and Building Construction
- Merkley, Margaret B., B.S., M.S.**
Instructor in Home Economics
- Merrill, David K., Capt.**
Assistant Professor of Air Science
- Merrill, Milton R., B.S., M.A., Ph.D.**
Professor of Political Science
Head, History and Political Science Department
Dean, School of Business and Social Sciences
- Meyer, George A., B.A., S.T.B., Ph.D.**
Professor of Modern Languages
Head, Modern Languages Department
- Michaelson, Leon, B.S., M.S.**
Assistant Professor
Extension Farm Management Specialist
- Miller, Elna, B.S., M.S.**
Professor, Extension Nutritionist
- Milligan, Cleve H., B.S., M.S.**
Professor of Irrigation and Drainage Engineering
Head, Irrigation and Drainage Engineering Department
- Miner, Merthyr L., B.S., D.V.M.**
Professor of Veterinary Science
Head, Veterinary Science Department
- Mobley, John C., M/Sgt.**
Assistant Supply NCO, Department of Air Science
- Moody, Howard A., Col.**
Professor of Air Science
- Moore, James Reed, B.S.**
Assistant Professor, Summit County Extension Agent
- Moore, Oleta P., A.B., M.S.**
Instructor in Clothing, Textiles and Related Arts.
- Moore, Raymond R., B.S., M.S.F.**
Associate Professor of Forest Management and Extension Forester.
- Morgan, Floyd T., B.S., M.A.**
Associate Professor of Speech and Drama
- Morris, Arthur J., B.S., M.S.**
Professor of Dairy Manufacturing
Extension Dairy Manufacturing Specialist
Assistant Dean, School of Agriculture
- Morris, Laval S., B.S., M.S., M.L.A.**
Professor of Landscape Architecture and Planning
Head, Landscape Architecture and Planning Department

Morrison, Earnest M., B.S., M.S.

Associate Professor of Agricultural Economics and Marketing

Mortensen, J. Lynn, B.S., M.S.

Assistant Professor of English

Mortimer, William E., B.S., M.S.

Professor of Industrial Education

Head, Industrial Education Department

Murdock, Robert Scott, B.S.

Assistant Professor, Duchesne County Extension Agent

Murray, Beatrice Edwards, B.S.

Instructor in Elementary Education

Murray, Evan B., B.S., M.S.

Professor of Economics

Head, Economics Department

Murray, Guy, B.S.

Special Lecturer in Business Administration

Myers, Chester J., B.S., M.A., Ph. D.

Professor of Speech

Head, Speech Department

Nelson, Dale O., B.S., M.S.

Assistant Professor of Physical Education

Nelson, George

Trainer, Wrestling Coach

Instructor in Physical Education

Nelson, Jesse G., A.B.

Assistant Professor of Languages

Nelson Mary, B.S., M.S.

Associate Professor of Mathematics

Neuberger, L. Mark, B.S., M.S.

Executive Assistant to the President

Professor of Accounting and Business Administration

Newman, Parley, B.S., M.S.

Assistant Professor of Speech Correction

Nichols, DeLore, B.S.

Professor, Davis County Extension Agent

Nichols, Fern S., B.S.

Instructor in Elementary Training School

Nielsen, Emma Cynthia, B.S.

Assistant Professor, Home Demonstration Agent, Iron County

Nielsen, Harold M., B.S., M.S.

Research Assistant Professor of Chemistry

Nielsen, Marion L., B.S., M.A., Ph.D.

Professor of Modern Languages

Nielsen, Veneta L., B.S., M.S.

Instructor in English

Nielson, Rex F., B.S., M.S.

Assistant Professor of Agronomy

- Noble, Lee Grande, B.S., M.S., Ed.D.**
Professor of Education
Coordinator, Off-Campus Instruction
- Norton, Robert A., B.S., M.S., Ph.D.**
Assistant Professor of Horticulture
- Nyman, Ross A., B.S.**
Instructor in Engineering Drawing
- Olsen, Alice, B.S.**
Instructor in Elementary Education
- Olsen, Floris, B.S., M.S.**
Assistant Professor of Accounting and Business Administration
- Olson, Charles P., B.S., J.D.**
Special Lectures in Political Science
- Pahtz, George**
Instructor in Instrumental Music
- Palfreyman, Bernice, B.S.**
Assistant Professor, Home Demonstration Agent, Salt Lake County
- Parrish, Joseph F., B.S.**
Associate Professor, Salt Lake County Extension Agent
- Partin, Calvin L., Col.**
Professor of Military Science and Tactics
- Payne, Clair L., M.D.**
Special Assistant Professor of Public Health
- Pedersen, Ivan, B.S.**
Instructor in Elementary Education
- Perry, Mignon, B.S., M.S.**
Assistant Professor of Clothing, Textiles and Related Arts
- Perry, Rolland, A.B., Ph.D.**
Professor of Physics
Head, Physics Department
- Peterson, Howard B., B.A., M.A., Ph.D.**
Professor of Agronomy
- Pittman, Don W., B.S., M.S.**
Professor of Agronomy
- Plummer, Harry W., Maj.**
Assistant Professor of Air Science
- Pollard, Leonard H., B.S., M.S., Ph.D.**
Professor of Vegetable Crops and Horticulture
Head, Horticulture Department
- *Porter, Gordon E., B.S.**
Assistant Professor of Modern Languages
Tennis Coach
- Poulsen, Jenniev J., B.S.**
Associate Professor, Home Demonstration Agent, Utah County

- Preator, Frederick, B.S., M.Ed.**
Professor of Tool Engineering
Head, Tool Engineering Department
- Raleigh, Robert, B.S., M.S.**
Instructor, Research Associate in Animal Husbandry
- Reichert, Mary Lois, B.S.**
Assistant Professor, Home Demonstration Agent, Duchesne County
- Reynolds, H. Reuben, Graduate, Chicago Art Institute**
Professor of Art
- Rice, Moyle Q., B.S., M.A.**
Associate Professor of English
- Rich, Lyman H., B.S., M.S.**
Professor, Extension Dairyman
- Richardson, Stanley S., B.S., M.S.**
Professor of Agricultural Education
Head, Agricultural Education Department
- Richards, Ralph J., B.S.**
Manager of Student Union
- Rickenbach, Rodney G., B.S.**
Associate Professor, Millard County Extension Agent
- Ricks, Joel E., A.B., A.M., Ph.D.**
Professor of History
- Riethmann, Otto**
Instructor in Floriculture
- Robinson, Max E., B.S., M.S.**
Assistant Professor of Range Management
- Robinson, Rex E., B.S., M.A., Ph.D.**
Associate Professor of Speech
- Robinson, Wilford H., B.A., M.S.**
Research Assistant in Chemistry
- Rogers, Lehi S., B.S.**
Assistant Professor, County Agent, Wayne County
- Rose, D. Wayne, B.S.**
Assistant Professor, Kane County Extension Agent
- Roskelley, R. Welling, B.S., M.S., Ph.D.**
Professor of Sociology
Head, Sociology Department
Director, Division of Social Work
- Rowland, Priscilla, B.S., M.S.**
Assistant Professor of Foods and Nutrition
- Rudd, Oris C., B.S.**
Assistant Professor, San Juan County Extension Agent
- Salunkhe, Dattajeera K., B.S., M.S., Ph.D.**
Assistant Professor of Horticulture
- Shaffer, Elwood Charles, B.J.**
Assistant Professor, Extension Editor

- Sharp, Heber Cannon, B.S., M.S.**
Associate Professor of Psychology
- Shaw, Edith Smith, B.S., M.A.**
Associate Professor of Education
Supervisor of Elementary Teacher Training
- Shaw, Richard J., B.S., M.S.**
Instructor in Botany
- Shideler, Robert W., A.B., M.A.**
Instructor in Art
- *Shiozawa, Kenji, B.S., M.S.**
Assistant Professor of Landscape Architecture and Planning
- Shupe, LeGrand, B.S., M.S., D.V.M.**
Assistant Professor of Veterinary Science
- Sigler, William F., B.S., M.S., Ph.D.**
Professor of Wildlife Management
Head, Wildlife Management Department
- Sjoblom, Wallace, B.S.**
Instructor, County Agricultural Agent, Iron County
- Skidmore, C. Jay, B.S., M.S., Ed.D.**
Assistant Professor of Sociology
- Slaugh, Owen, B.S.**
Assistant Professor of Automotive Mechanics
Head, Automotive Technology Department
- Smith, Albert B., B.S.**
Instructor in Agricultural Engineering
- Smith, Anna Marie, A.B., B.S.L.S.**
Instructor in Library Science
- Smith, Arthur, B.S., M.S.**
Associate Professor of Range Management
- Smith, Hubert W., B.A., M.S., Ph.D.**
Professor of English
- Smith, William Lloyd, B.S.**
Instructor, Assistant Agricultural Agent, Cache County
- Smith, Winslow Whitney, A.B., A.M., Ph.D.**
Professor of Bacteriology and Public Health
Head, Bacteriology and Public Health Department
- Stanford, J. Sedley, B.S., Ph.D.**
Associate Professor of Zoology and Entomology
- Steffen, Hyrum, B.S., M.S.**
Associate Professor of Animal Husbandry
- Stenquist, Lee B., B.S.**
Internal Auditor
- Sterne, Kenneth, Capt.**
Assistant Professor of Air Science

Stevens, Kenneth R., M.S., Ph.D.

Professor of Bacteriology and Public Health

Stevens, Velyn B., B.S.

Assistant Professor, Home Demonstration Agent, Juab County

Stewart, John J., B.S.

Assistant Professor of Journalism

Head, News Bureau

Stock, Eldon M., B.S., M.S., C.E.

Professor of Civil Engineering

Stoddard, George E., B.S., Ph.D.

Associate Professor of Dairy Husbandry

Stoddard, Lawrence A., B.S., M.S., Ph.D.

Professor of Range Management

Head, Range Management Department

Stoker, Golden L., B.S., M.S.

Associate Professor of Agronomy

Stokes, Allen W., B.S., M.A., Ph.D.

Assistant Professor of Wildlife Management

Stokes, L. Darrell, B.S.

Associate Professor, Wasatch County Extension Agent

Stone, David R., B.A., M.A., Ph.D.

Associate Professor of Psychology

Storey, Lorraine, B.S.

Instructor in Child Development

Strasser, Richard C., M/Sgt.

Training NCO, Department of Air Science

Stringham, Ned M., B.S., M.S.

Extension Recreation Specialist

Instructor in Physical Education

Summers, Lowell P., B.S.

Assistant Professor of Aeronautics

Swenson, Dan H., B.S., M.S.

Assistant Professor of Woodwork and Building Construction

Swilley, Jack W., M/Sgt.

Instructor in Military Science and Tactics

Swindle, Carma P., B.S.

Associate Professor, Home Demonstration Agent, Davis County

Tanielian, Beatrice S., B.S., M.S.

Associate Professor

Consumer Education Agent, Salt Lake County

Tanner, George, B.F.A., M.A.

Instructor, Technician in Drama

Taylor, Morris H., B.S., M.S.

Assistant Professor, Extension Livestock Marketing Specialist

FACULTY

27

- Taylor, Ralphena T., B.S.**
Instructor, Home Demonstration Agent, Sevier County
- Taylor, Sterling A., B.S., M.S., Ph.D.**
Associate Professor of Agronomy
- Taylor, Thomas, B.S.**
Instructor in Elementary Training School
- Thain, Aldyth, B.S., M.A.**
Assistant Professor of Languages
- Thatcher, Ray A., B.S.**
Assistant Professor, Morgan County Extension Agent
- Thomas, Don W., B.S., D.V.M.**
Associate Professor, Extension Veterinarian
- Thomas, J. Alan, D.V.M.**
Assistant Professor of Veterinary Science
- Thorne, D. Wynne, B.S., M.S., Ph.D.**
Professor of Agronomy
Director, Experiment Station and Research
- Thorne, Joseph L., B.S., D.V.M.**
Assistant Professor of Veterinary Science
- Thornley, Gwendella, B.S., M.S.**
Assistant Professor of Speech
- Thorpe, Everett C., B.S., M.F.A.**
Associate Professor of Art
- Tibbetts, Ted, B.S., M.S.**
Instructor, Agricultural Agent, Grand County
- Timmerman, Carl J., Jr., M/Sgt.**
Sergeant Major, Department of Air Science
- Tingey, D. C., B.S., M.A.**
Professor of Agronomy
- Tingey, V. H., B.S., M.S.**
Professor of Mathematics
Head Mathematics Department
- *Tingey, Willis A., B.S.**
Assistant Professor of Civil Engineering
- Tippetts, Ruth P., B.S.**
Associate Professor, Consumer Education
Extension Agent, Ogden City
- Tocher, Stewart Ross, B.S., M.S.**
Assistant Professor of Forestry
- Tolman, James, B.S., M.S.**
Assistant Professor
Reference Librarian
- Tueller, Lamont E., B.S.**
Associate Professor, Cache County Extension Agent

*On Leave

- Turner, Lewis M., B.S., M.S., Ph.D.**
Professor of Forest Management
Dean, School of Forest, Range, and Wildlife Management
- Tuttle, Sarah S., B.S.**
Associate Professor, Home Demonstration Agent, Sanpete County.
- Van Orden, Harris O., B.S., M.S., Ph.D.**
Associate Professor of Chemistry
- Vermillion, Una, A.B., M.A.**
Professor of Institutional Management
Manager of Cafeteria
- Vincent, Josie E.**
Assistant Professor, Home Demonstration Agent, Utah County
- Wadsworth, Harold M., B.S.**
Superintendent of Buildings and Grounds.
- Wadsworth, J. Donald, B.S., M.S.**
Assistant Professor of Agricultural Engineering
- Walker, R. H., B.S., M.S., Ph.D.**
Professor of Agriculture
Dean and Director, Division of Agricultural Sciences
- Walker, Ralph H., B.A., M.A., Ed.D.**
Assistant Professor of Education
- Wamsley, Helen J., B.S.**
Assistant Professor, Home Demonstration Agent, Rich County
- Watkins, Bruce O., B.S., M.S., Ph.D.**
Associate Professor of Electrical Engineering
- Watkins, Reynold K., B.S., S.M.**
Associate Professor of Civil Engineering
- *Watters, Ray, B.S., M.S.**
Associate Professor in Physical Education
- Welling, Mae, B.S., M.S.**
Assistant Dean of Students and Dean of Women
- Welti, Walter, B.A., M.A., Mus. D.**
Professor of Vocal Music
- West, Willard J., M.D.**
Special Assistant Professor of Public Health
- Wiebe, Herman H., B.A., M.S., Ph.D.**
Associate Professor of Botany and Plant Pathology
- Wilcox, Ethelwyn B., B.S., M.S., Ph.D.**
Professor of Nutrition
- Willey, Lynn R., B.S., M.S.**
Assistant Professor of Automotive Technology

Willhite, Bennett O., B.S., M.S.
Assistant Professor of Engineer Drawing

Williams, J. Stewart, B.S., M.A., Ph.D.
Professor of Geology
Head, Geology Department
Dean, Graduate School

Williamson, David O., B.S.
Research Instructor in Animal Husbandry

Wilson, LeMoyne, B.S., M.S.
Associate Professor of Agronomy

Federal Collaborators

Ball, Orville P., A.B.
U. S. Fish and Wildlife Service, Fishery Research

Binns, Wayne, M.S., D.V.M.
Agricultural Research Service

Bohart, George Edward, B.S., M.S., Ph.D.
Agricultural Research Service

Cannon, Orson Silver, B.S., M.S., Ph.D.
Agricultural Research Service

Carlson, John Wilford, B.S., M.S., Ph.D.
Agricultural Research Service

Cope, Oliver B., B.A., M.A., Ph.D.
U. S. Fish and Wildlife Service, Fishery Research

Cronin, Eugene Hyrum, B.S., M.S.
Agricultural Research Service

Dorst, Howard Earl, A.B., A.M.
Agricultural Research Service

Fitzgerald, Paul Ray, B.S., M.S.
Agricultural Research Service

Haddock, Jay Lamar, B.S., M.S., Ph.D.
Agricultural Research Service

Haws, Frank Willmore, B.S.
Agricultural Research Service

Hawthorn, Leslie Rushton, B.S., M.S.
Agricultural Research Service

Hugie, Vern Keam, B.S., M.S.
Soil Conservation Service

Hull, Alvin C., Jr., B.S., M.S.
Agricultural Research Service

Jansen, Leonard Leroy, B.S., M.S., Ph.D.
Agricultural Research Service

Kaloostian, George Hagop, A.B., M.S.
Agricultural Research Service

- Keller, Wesley, B.S., M.S., Ph.D.
Agricultural Research Service
- Kitterman, Stanford J., B.S., M.S.
Soil Conservation Service
- Laakso, M., B. Ed., M.S.
U. S. Fish and Wildlife Service, Fishery Research
- Lauritzen, Cyril Walker, B.S., M.S., Ph.D.
Agricultural Research Service
- Levin, Marshall David, A.B., M.S.
Agricultural Research Service
- Lieberman, Frank V., B.S.
Agricultural Research Service
- Linton, Denton Coolidge, B.S.
Agricultural Research Service
- Low, Jessop Budge, B.S., M.S., Ph.D.
Wildlife Research Unit
- Metcalf, John W., A.B.
Soil Conservation Service
- Mielke, James Leroy, B.S.F., M.S., Ph.D.
Forest Service
- Nye, William Preston, B.S., M.S.
Agricultural Research Service
- Pearson, Gregory Leslie, B.S., M.S.
Soil Conservation Service
- Pedersen, Marion Walter, B.S., M.S., Ph.D.
Agricultural Research Service
- Stewart, Clyde Everett, B.S., M.S., Ph.D.
Agricultural Research Service
Production Economics Research Branch
- Thorne, James Parry, B.S., M.S.
Soil Conservation Service
- Wadley, Bryce Nephi, B.S., M.S., Ph.D.
Agricultural Research Service
- Woodward, Rollo William, B.S., M.S., Ph.D.
Agricultural Research Service

Consultants

U. S. PUBLIC HEALTH SERVICE COMMUNICABLE DISEASE CENTER, TECHNOLOGY BRANCH LOGAN FIELD STATION SECTION

Hess, Archie D., B.S., M.S., Ph.D.
Chief of Section
Senior Scientist

Rainey, Marshall B., B.S.
Assistant Chief
Public Health Engineer

Brookman, Bernard, A.B., Ph.D.
Scientist

Dow, Richard P., A.B., M.S., Ph.D.
Scientist

Harmston, Fred C., B.S.
Sanitarian (R)

Mail, G. Allen, B.S., M.S.
Entomologist

Ogden, Louis J., B.S., M.S.
Sanitarian

Spence, Howard W., B.S., M.P.H.
Senior Sanitary Engineer

COLLEGE OF SOUTHERN UTAH

Braithwaite, Royden C., B.S., Ph.D.
Director

Anderson, Homer, Lt. Col., USAF
Associate Professor
Chairman, Division of Air Science

Ashcroft, Theron, B.S.
Associate Professor of Physics and Engineering
Chairman, Division of Engineering and Mathematics

Bastow, Mary, B.S.
Professor Emeritus of Art

***Clark, Gwyn R., B.S., M.S.**
Associate Professor of Elementary Education and English
Supervisor, Teacher Training

Cloward, McRay, B.S.
Instructor in Business and Education
Housing Manager and Coordinator of Student Employment

Cooley, Charles B., B.S., Ed.M.
Professor of Industrial and Vocational Education
Chairman, Division of Industrial and Vocational Education

Cooley, Hazen, B.S., M.B.A.
Professor of Business
Assistant Secretary and Treasurer

*On Leave

- Dalley, Parley, B.S., M.S., ScD.**
Professor Emeritus of Physical Sciences
- Davis, Victor**
Instructor in Auto Mechanics
- Duncan, Audrey**
Head of Stenographic Bureau
- Halverson, Roy L., B.S.**
Professor of Music and Education
- Hardy, Eugene, B.S.**
Assistant Professor of Industrial Education
- Hatch, Conrad V., B.S., M.S.**
Assistant Professor of Physical Sciences and Chemistry
Chairman, Division of Physical Sciences
- Hruska, Thomas J., M/Sgt, USAF**
Administrative NCO
- Johnson, Blaine, B.S., M.A.**
Assistant Professor of Music and Education
- Johnson, Carol D., B.S., M.A.**
Instructor, Secretarial Science
- Jones, Eulalia B., B.A.**
Librarian, Instructor in Education
- Kupfer, Vern K., B.S., M.S.**
Assistant Professor of Psychology and Social Science
- LeBaron, George L., B.S., M.S.**
Assistant Professor of Physics and Physical Science
- Lindstrom, Gaell, B.A.**
Instructor in Art
- Magleby, V. R., B.S.**
Assistant Professor of Agriculture and Biology
- Manning, William H., A.B.**
Professor Emeritus of Music
- Matthews, Darrell H., B.S.**
Assistant Professor of Animal Husbandry
- Maughan, Reese P., B.S., M.A., Ed.D.**
Professor of Education
Chairman, Division of Education
- *Moore, Lanice, B.S., M.A.**
Assistant Professor of Foods
- Osborne, Bruce H., B.S.**
Instructor in Physical Education
Athletic Coach
- *Peterson, Edwin L., B.S., M.A.**
Assistant Professor of History and Social Science
Chairman, Division of Social Science
- Petty, Cleo M., B.S.**
Assistant Professor of Physical Education
Athletic Coach

- Plumber, J. H., B.A., M.A.
Assistant Professor of English
Dean of Students
- Protratz, Paul W., T/Sgt., USAF
Supply Sergeant
- Reeves, Jeniel, B.A.
Instructor in Physical Education
- Robinson, Max E., B.S., M.S.
Assistant Professor of Range Management
- Rowley, Richard M., B.S., M.A.
Assistant Professor of English and Speech
- Sargent, David L., B.S., M.S.
Professor Emeritus of Biology
- Schmutz, Clarence, B.S., M.A.
Associate Professor of Agricultural Economics
Chairman, Division of Agriculture
- Stephenson, A. W., B.S., M.B.A.
Associate Professor of Commerce
Chairman, Division of Commerce
- Stevens, Raymond A., CWO, USAF
Assistant Professor of Air Science
- Tippets, Twain, B.A., M.A.
Assistant Professor of English and Speech
Chairman, Division of English
- Wahlquist, A. Glenn, B.S., M.S.
Assistant Professor of Agronomy and Biology
Chairman, Division of Biological Science
- Winters, Jayne L., B.A.
Instructor in Textiles

The elementary teachers of Iron County School District serve as critic teachers in the Division of Education.

OTHER MEMBERS OF STAFF

- Matheson, Edward G., Superintendent of Heat Plant and Grounds
- Cox, R. Reid, Superintendent of Maintenance
- Rigby, Eldro, Manager of Campus Farm
- Roberts, Joseph, Superintendent of Buildings
- Robb, Ward S., Registrar, and Veteran's Coordinator

ACCREDITED INSTRUCTORS COOPERATING WITH C. S. U.

- Felt, Paul E., Director, L. D. S. Institute of Religion
- Helland, Eugene, Director, C.S.U. Band
- Johnson, Mrs. Blaine, Special Instructor in Music
- Jones, Bernella, Special Instructor in Music
- Thorley, Max J., Special Instructor in Music

SNOW COLLEGE

OFFICERS OF ADMINISTRATION

Whetten, Lester B., B.S., M.S.
Director

Thompson, Lee R., B.S.
Treasurer

Allred, Fred L., B.S., M.Ed.
Registrar

Richardson, Jed, B.S., M.S.
Dean of Men

Gassman, Alta, B.S.
Dean of Women

Hartshorn, Robert Jr., B.S., M.S.
Librarian

Hermansen, Jean
Manager of Bookstore

Jorgensen, Delphia P.
Manager of Cafeteria

Jensen, J. Edwin
Supervisor, Buildings and Grounds

Bailey, Fred
Superintendent Heating Plant and Maintenance

FACULTY

Allred, Fred L., B.S., M.Ed.
Assistant Professor of English

Benson, A. Ammon, B.S.
Instructor in Vocational Education
Head, Trades and Industries, and Night School

Carpenter, J. Gerald
Instructor in Woodwork

Christensen, H. Reed, B.S., M.S., Ph.D.
Professor of Mathematics and Physics
Chairman, Division of Natural Sciences and Mathematics

Clark, Glen, B.S.
Assistant Professor of Physical Education
Head, Department of Physical Education

Clark, Winnie H., B.S.
Instructor in Women's Physical Education

Cook, W. Blaine, B.S., M.S.
Assistant Professor of Agriculture
Chairman, Division of Farm and Home Science

Crane, Joseph W., B.A., M.A.
Associate Professor of Speech

Dean, H. A., B.S., M.S.
Professor of Music

Gassman, Alta, B.S.
Assistant Professor of Home Economics

Gray, A. Russell, B.A., M.A.
Associate Professor of Social Science and Modern Languages
Chairman, Division of Social Science

Groutage, Harrison, A.B.,
Instructor in Art

Hanson, Afton, B.S., M.S.
Assistant Professor of Biology

Hartshorn, Robert, Jr., B.S., M.S.
Instructor in Library Science

Jensen, LaVar
Piano Instructor

Mangelson, Farrin L., B.S., M.S.
Assistant Professor of Chemistry

Marsden, Ralph D., B.S., M.S.
Instructor in Music

Marston, Glen, B.S., M.S.
Assistant Professor of Business Administration

Peterson, Rulon, B.S.
Assistant Professor of Mathematics

Phillips, Lucy A., A.B., M.A.
Professor of English
Chairman, Division of Humanities

Ray, Nellie, B.S., M.A.
Associate Professor of Secretarial Science
Chairman, Division of Commerce

Richardson, Jed, B.S., M.S.
Associate Professor of Education and Speech
Chairman, Division of Education

Stoddard, Robert, B.S.
Instructor in Physical Education

Stout, Clayton
Instructor in Automotive Technology

Thompson, Lee R., B.S.
Treasurer
Assistant Professor of Physical Education

Whetten, Lester B., A.B., M.A.
Director
Professor of Sociology

Willardson, George, B.S., M.S.
Instructor in Agriculture

SPECIAL INSTRUCTORS

Fitzgerald, H. Alvah, B.S., M.S.

Director of L.D.S. Institute of Religion

Judkins, L. N., B.S.

Instructor in L. D. S. Seminary

McQuarrie, Harlow B., B.S., M.S., M.D.

Lecturer in Public Health

Mortenson, Roy, B.S., D.V.M.

Lecturer in Veterinary Science

Van Epps, Gordon, B.S., M.S.

Assistant Professor

Research in Agronomy

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GENERAL INFORMATION

LOCATION

UTAH State Agricultural College is in Logan, Cache County, a typical college town of 16,000 inhabitants. Highways 89 and 91 intersect at Logan, and the town is served by the Greyhound bus lines, Western Air Lines, and the Union Pacific Railroad for freight service. The College is located one mile east of the business section of Logan on a hill overlooking the valley.

POLICY

Utah State Agricultural College in its fundamental policy has always considered the main function of education to be the preservation and improvement of the democratic way of life.

The College, in its seven schools of instruction provides a liberal, thorough, and practical education. In addition to the strictly practical courses, students are given excellent training in the sciences, mathematics, history, English, art, music, speech, modern languages, and related subjects.

Under this general policy, the special purpose of the College is to serve in building the State and the great West to which it belongs.

The Constitution of Utah establishes Utah State Agricultural College and the University of Utah as the two State institutions of higher learning. These institutions are independent in government, but each is part of the public school system. Each, under the Constitution and the Statutes of Utah and in harmony with the ruling of its governing board, offers undergraduate and graduate studies leading to the Bachelor's and Master's degrees. The College, in addition to this high status given it in Utah under the Constitution, is one of the fifty-one Land-Grant institutions in the United States designated by the Federal Government as the institutions of higher learning in the respective states for the development of the Federal program of education included in the Morrill and Nelson Acts of the Federal Congress.

HISTORY

Utah State Agricultural College, the Experiment Station, and the Extension service exist today because of far-sighted legislation that created, stated the purposes, and set forth the fields of activity of these divisions. The Morrill Act (1862) provided for establishment of Land-Grant Colleges by the grant of Federal lands to provide a material basis for these institutions. Utah received 200,000 acres. The Second Morrill Act (1890) carried an annual appropriation to each college, the sum to be spent for instruction in designated subjects. Additional Federal legislation that increased financial aid to the institution includes the Hatch Act (1887), for experimental purposes; the Smith-Lever Act (1914), to aid in beginning and developing extension work; more recently, the Bankhead-Jones Act, which supports all three divisions in some degree. All these acts constituted the basis of Federal participation in the extension of college education and rural agricultural development to the masses of American people. Participation by the Territory of Utah in this Federal program came through passage of an act "to establish an Agricultural College and an Agricultural Experiment Station," introduced into the legislature by Representative Anthon H. Lund on February 27, 1888, and signed by Governor Caleb West, March 8, 1888.

The college was chartered as the Utah Agricultural College, but the name was changed in 1929 to Utah State Agricultural College. It is accredited by the Northwest Association of Secondary and Higher Schools and is on the accepted lists of the Association of American Universities and of the American Association of University Women.

The Federal Land Grant Act of 1862 explained that the colleges were, "without excluding other scientific and classical studies and including military

tactics, to teach such branches of learning as are related to Agriculture and the Mechanic arts, in such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life." The Territorial Act of 1888 confirmed these purposes and defined the fields of instruction offered by the college to include "the English language and literature, mathematics, civil engineering, agricultural chemistry, animal and vegetable anatomy, physiology, the veterinary art, entomology, geology, and such other natural sciences as may be prescribed, technology, political, rural and household economy, horticulture, moral philosophy, history, bookkeeping, and especially the application of science and mechanical arts to the practical agriculture in the field."

Since its beginning in 1890 ten presidents have guided the destinies of the college. Following President J. W. Sanborn came President J. H. Paul in 1894, President J. M. Tanner in 1896, President W. J. Kerr in 1900, President John A. Widtsoe in 1907, President E. G. Peterson in 1916, Dr. Franklin S. Harris in 1945, Dr. Louis Linden Madsen in 1950, Dr. Henry Aldous Dixon in 1953, and Dr. Daryl Chase in 1954. From one building in 1890, the number of major buildings has reached forty, plus many smaller and temporary buildings.

The Branch Agricultural College of Utah was established in 1897 as the Branch Normal School of the University of Utah. Growing need for agricultural development in southern Utah resulted in a change of administration whereby the normal school became a branch of the Agricultural College. The name of this Branch was changed to College of Southern Utah by action of the Board of Trustees in June 1953.

Since 1936, CSU has been authorized to offer Senior Division courses in agronomy, animal husbandry, and agricultural economics and related studies. This provision enables students in agriculture to complete studies for the B. S. degree in these departments with one year of additional work on the campus at Logan. In 1948, additional courses in elementary teacher training leading to the B. S. degree in Education were authorized by the Board of Trustees.

Both the Extension Service and the Agricultural Experiment Station are closely connected with CSU. Certain members of the resident staff at Cedar City are also members of the staffs of these two divisions. Deans of the parent institution supervise the work of the corresponding divisions at the Branch, and course offerings closely parallel those offered on the Logan campus.

Snow College, established in 1888 by the Latter-day Saint Church as an academy, officially became part of the Utah State Agricultural College by action of the Utah state legislature in 1951. It had been accredited as a state junior college in 1932.

Courses offered on the campus at Ephraim generally parallel similar courses offered by the Lower Division at Logan, and co-operative effort is steadily increasing the integration of these offerings. Deans of the parent institution at Logan supervise work in the corresponding divisions at Snow College.

PHYSICAL PLANT

The physical plant of the College, built over a period of half of a century, comprises one of the most beautiful college campuses in America. It occupies nearly one hundred acres on a large delta at the mouth of Logan Canyon, which cuts through the Bear River range of the Wasatch Mountains. The views from College Hill in every direction afford pleasing vistas.

BUILDINGS AND FACILITIES

To house its varied and growing educational and research activities, the College now has more than 70 buildings on the campus.

Main building, a three-story brick structure, is the prime landmark in the history of the institution. Its halls and classrooms have resounded to classes

coming and going for more than 60 years. In it are located the administrative and the business offices of the College and Experiment Station, the departments of Agricultural Economics, Art, Education, Geology, Landscape Architecture, Mathematics, Modern Languages, Music, Psychology, Sociology, Speech, Zoology and the schools of Arts and Sciences and Commerce. The Main Auditorium in the East wing of the building has been completely remodeled. New theatre seats of the best type obtainable have been installed, along with a completely new sound system. Provisions have been made for proper ventilation. Thus it affords excellent facilities for student gatherings, assemblies, and the presentation of College plays. A studio theatre, used by the Speech department, and the broadcasting studios of radio station KVSC are on the second floor, north wing.

The combination Home Economics and Commons building located at the southeast corner of the quadrangle provides facilities for social and cultural activities of both faculty and students. It also houses the Home Economics Library, with nutrition research laboratory in the basement. Additional Home Economic research laboratories, kitchen, and nursery school are planned for the area formerly occupied by the Cafeteria. Educationally, this structure functions as the quarters of the School of Home Economics and the department of Physiology. These departments both have modern, well-lighted classrooms and laboratories, all equipped with standard, scientific equipment.

The Thomas Smart gymnasium is the center of much athletic activity. It houses offices of the department of Physical Education for men and women, indoor and intramural sports, and a swimming pool.

The Field House, a spacious steel and brick structure, 356 feet long by 137 feet wide, completed in 1939, is used for many activities. It is the center of College competitive athletics, and is used for other large college and public gatherings, including commencement activities, numerous concerts, and military functions. It is equipped with an excellent basketball playing floor and a seating capacity of 6,500. For indoor tennis, track, softball and football practice, the building is ideal.

A companion building to the Field House is the Military Science building. This brick-concrete structure is provided with excellent offices, classrooms, rifle ranges, gun and equipment supply rooms. The gun shed now houses four modern classrooms, security room for arms and equipment, and additional supply rooms. The combination of this building and the Field House makes possible military training the year around.

The Extension Service building is now the headquarters of the statewide Utah Cooperative Extension Service, maintained by the College and Federal Government jointly.

Widtsoe Hall is wholly occupied by the departments of Chemistry, Physics and Experiment Station laboratories. Chemical and physical laboratories are furnished with ample facilities and scientific equipment for student training and research.

The Animal Industry building is occupied by the departments of Animal Husbandry, Poultry Husbandry, Dairy Industry, Horticulture. Besides laboratory and classroom facilities for the study and teaching of dairy manufacturing, animal and poultry nutrition, breeding and wool technology, this building houses a modern cheese, and ice cream manufacturing plant, and a dairy bar, used for practical training in dairy products manufacturing.

The Plant Industry building houses the departments of Agronomy, Bacteriology and Public Health, Botany and Plant Pathology, and the large Intermountain Herbarium.

The Engineering building is headquarters for the School of Engineering and Technology. In this building, all the college courses in Civil Engineering including Surveying, Mechanical Drawing, Hydraulics, Irrigation and Drainage, Municipal and Agricultural Engineering, are taught. This building houses the Hydraulics, Irrigation, Soil Mechanics, Agricultural Engineering and drafting and design laboratories.

The Mechanic Arts building houses shops of the School of Engineering and Technology, laboratories for work in the technology of Forging, Industrial Education, Radio, Machine Practice, Electronics, Sheet Metal, Welding,

Woodwork and Building Construction. Much new equipment has been added to the shops during the past five years.

The Library building, academic and cultural center of the College, is located on the east side of the quadrangle. The departments of English and History use the top floor for their classes because of convenient access to library stacks. It houses the Hatch Memorial library. Much of the furnishings of this Library are of old English origin which came directly from England with the original coat of arms. The material deposited in this Library is divided in four sections as follows: Hatch, Utahnia, Art Books, and Rare Books. This makes a very fine contribution to our library offering.

The Forestry building contains classrooms, laboratories and specimen museums provided with equipment and all facilities for complete training in Forestry, Range, and Wildlife management. In connection with the Forestry School, the College conducts a forestry Summer School at its own camp, located in Logan Canyon about 20 miles northeast from the college.

The Child Development laboratory, located on the east side of the campus, is provided with outdoor space well supplied with playground equipment. The School of Home Economics has a Home Management house just west of the campus.

The new Student Union building has fulfilled a great need on the campus. The social and recreational center of the campus, it is a very spacious building housing the student body offices and publications, cafeteria, College book store, coffee shop, barber shop, photo shop, bowling alleys, game rooms with pool and tennis tables. There are two large ballrooms for dancing and movie projection. The cafeteria and coffee shops are equipped with the most modern equipment.

An Agricultural Science building was erected on the campus to house the Administrative offices of the Agricultural Experiment Station and Utah Extension Service. It also has classrooms and laboratories equipped with the finest of equipment.

Five new tennis courts have been built just east of the stadium. These courts will satisfy the growing need for such facilities on the campus.

The college barns and livestock will be moved from the campus to the modern farm located approximately two miles north of the campus, with the Turkey farm approximately two miles north and east of the campus. A new modern milking parlor is being built on the dairy farm north of the campus where the most modern facilities for handling milk will be installed.

The new Poultry Plant is now north of the campus adjacent to the dairy farm. It is built on the colony plan, is equipped for class and experimental research work in poultry husbandry. College flocks include all important breeds of domestic fowls. The plant is equipped and extensively used for study and research on the best methods of feeding, housing, and disease control to obtain the most economical production.

The Veterinary Science building has office space, a well-equipped dispensary, operating rooms, stalls for animals, and modern equipment for training and scientific work in Veterinary Science and Medicine. A veterinary clinic is periodically conducted.

An extensive Technology building with shops and facilities for Aeronautics, Automotive and other technical training was completed in 1948.

In 1949 a well-equipped Maintenance building was completed to house the Buildings and Grounds department. This building houses the maintenance shops of the College including plumbing, carpentry, electricians, painting, and automotive repair as well as storage rooms and offices of the department.

LABORATORIES

The numerous College laboratories are provided with satisfactory working conditions. The equipment is generally complete, and extensive experimental research is carried on by both faculty and advanced students. Recent important acquisitions include an electron microscope, a spectograph, and an ultracentrifuge.

LIBRARIES

The College Library system consists of the Main Library and ten branches: Home Economics, Engineering, Commerce, Forestry, Hatch Memorial Library, Claypool Map, Moore Children's Library (temporarily housed with the Home Economics), Whittier, Browsing, and Audio-Visual Aids Library. All are centrally administered and centrally cataloged; that is, all the material in all the branch libraries is recorded in the master catalog of the main library; thus all material, regardless of form, is readily accessible. Each branch is located in the same building as the school it serves.

Holdings of the libraries include the necessary tools for communication and study. These include books, periodicals, public documents, pamphlets, maps, films, micro-films, and recordings. For all forms, a generous loan policy is in effect, limited only by those restrictions that are necessary to insure the preservation and continued use of the materials.

The Library is a depository with the U. S. Superintendent of Documents to receive all publications printed on the condition that they be made available to the public. Further, the documents division is on the mailing list of the important federal bureau and agencies for additional series not available through the Superintendent of Documents. It also has an exchange agreement with universities, experiment stations, and extension services of all states to receive their publications.

Patrons interested in music find the Music Library, established by a Carnegie grant and maintained in the Browsing Library in the Union Building, a worthwhile feature. The collection of some 4,500 records has made music for every taste, classic and popular. Speakers and headphone sets are maintained for library users.

The new picture collection is a special feature of library service. It has more than 12,000 pictures of plant and animal life, famous persons, pictorial histories, famous paintings, and many other interesting pictures, many of which are mounted and laminated for use in display and teaching.

Bibliophiles and persons interested in rare books find many interesting items in the Hatch Memorial Library located in the Main Library. Here, books are available for use in the room, but are not subject to loan.

The Claypool Map Library, located in the Geology Museum, now has a collection of 13,000 maps. These maps were obtained from several governmental agencies and from commercial firms. The Library now has about 8,000 maps in the Topographical Quadrangle Series, one of the largest collections in the state.

The Audio-Visual Aids Library, housed in the Main building, includes films, filmstrips, microfilms, and other audio and visual materials. This library serves as a depository for USDA and other governmental agency films. Projection and recording equipment, as well as recreational films, are available for use by students, faculty, extension workers, research personnel, and social, civic, and church groups.

Interlibrary loan facilities are available for persons doing advanced research that necessitates the study of dissertations, books, or foreign publications unavailable through other means.

The Library maintains a bindery to bind its own books and periodicals.

The Library is open to students, faculty, and residents of the State of Utah practically every day in the year except legal holidays. Books, films, filmstrips, or microfilms may be borrowed directly from the library or, upon request, by mail.

HERBARIUM

The Intermountain Herbarium was established in 1932 by action of the Board of Trustees. Its function is largely to serve as the repository of plant materials obtained by field exploration, gifts, and exchanges with other institutions; materials that constitute the basis upon which the rich native vegetation of Utah and the Intermountain Region is receiving scientific, economic, and

popular investigation and descriptive treatment. The results of the herbarium researches are published as technical articles in scientific journals and economic and popular bulletins and circulars released by the Utah Agricultural Experiment Station. Most plant species that grow in Utah and the Intermountain Region are represented in the herbarium.

The herbarium is the depository of a branch of the College Library; it receives literature dealing with floristic botany and descriptive taxonomy.

Graduate study in plant taxonomy offered by the Department of Botany utilizes the extensive facilities of the herbarium. These graduate studies may entail thesis researches of a phytographic, revisionary, or floristic nature.

The herbarium facilities are available, by arrangement with the curator, for consultation and research by qualified members of the College Staff, students, collaborating agencies, institutions and members of the community.

Identification of and information concerning native or introduced plants are provided by the herbarium staff. Requests for information or plant identification should be addressed to the Curator of the Herbarium.

USAC ALUMNI ASSOCIATION

R. O. Porter, President

LeRoy A. Blaser, Executive Secretary

The Utah State Agricultural College Alumni Association now numbers more than 20,000 members. These members constitute the graduates and former students who have been in attendance here at Utah State, and who are now making an effort to keep in touch with the college and support its activities through the work of the Association. Many of these members now hold important positions in industry and government.

Purpose. It is the purpose of the Alumni Association to promote the interests and welfare of Utah State Agricultural College.

Membership. (1) **Regular Member:** All persons receiving degrees, diplomas or terminal vocational certificates from Utah State Agricultural College, College of Southern Utah, or Snow Branch are members of the Association upon payment of dues. All graduating students of USAC receive a paid-up, two-year membership in the Alumni Association. (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 College 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 \$2.00 per year and joint annual dues (husband and wife) \$2.50 per year. Life membership may be obtained singly at \$25.00 or \$35.00 for a joint membership, both payable in \$5.00 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 Student 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 Agricultural College 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 the 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, a magazine published nine months a year, full of Aggie news and reports on the College. 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 College 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 College and its program after leaving the campus.

The Alumni Association takes the leadership in sponsoring campus events such as Homecoming, Founders' Day, and the Senior Reception, as well as aiding in other athletic and 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 funds are given to the College library to aid it in the purchase of books which ordinarily could not be bought from the regular library budget.

"A" MEN'S ATHLETIC ASSOCIATION

Cluff Snow, President. Glen Worthington, Secretary

The purpose of this organization is to foster a sound and healthy spirit of co-operation between the former letter-winning athletes of Utah State Agricultural College and the College, and to promote the spirit of good fellowship among the former letter winners.

The "A" Men's organization sponsors a banquet-dinner meeting for all its members in connection with the annual Homecoming game.

PROFESSIONAL RELATIONS AND FACULTY WELFARE COMMITTEE

The Professional Relations and Faculty Welfare committee, authorized by the Board of Trustees and the Administration and elected by the Faculty, represents the Faculty on matters pertaining to professional relationships and welfare. Members of this committee at present are Carroll I. Draper, Chairman, Melvin Cannon, Glenn T. Baird, William H. Bennett, C. Wayne Cook, T. M. Burton, M. J. Harmon, Delbert Greenwood, Marden Broadbent, Clayton Clark, Israel Heaton, Una Vermillion, Ina Doty, Secretary.

Academic Regulations

For purposes of administration, the College is divided into the following major divisions: (1) the Academic, which is administered through seven schools; (2) the Graduate School; (3) the Research, administered through two Experiment Stations; (4) the Division of Off-campus Instruction, including the Correspondence and off-campus classes; (5) the Summer Session; and (6) the College of Southern Utah at Cedar City; (7) the Snow College branch at Ephraim. The academic regulations apply to all instructional work at regular session, summer session, correspondence and off-campus classes.

Admission

Prospective students are urged to send official transcript of their credits to the Registrar at least four weeks before the opening of school.

Entrance with college standing is based upon (a) graduation from an accredited high school or (b) if applicant is over 18 years of age, and upon presentation of fifteen approved high school units of work or (c) by examination of those students 18 years of age or older who have had other training.

Students who have not been graduated from high school and who are presenting fifteen approved units for entrance may include one unit of credit for military science or one unit of physical education, but not more than one unit in combination.

Entrance by examination is based upon two types of tests developed by the U. S. Armed Forces Institute or other comparable tests approved and recommended by the American Council on Education. First, the tests of general educational development which are designed to measure the extent to which all of the educational experiences of the applicant for admission have contributed to his ability to "carry on" in a program of general education, or to his educational development to the type which might otherwise have resulted from attendance in a regular high school. Second, Subject Examinations: Each of these subject examinations may be used to determine whether the achievement of the applicant for admission is the equivalent of that expected of regular high school students for satisfactory completion of a corresponding course of classroom instruction.

Students who do not otherwise meet the entrance requirements are required to take the General Achievement Test. A student who fails this test because of extenuating circumstances prevailing at the moment may, upon recommendation of the Examiner, be admitted conditionally and permitted to take an alternative test sometime during the first quarter and thereby establish college standing as of date of original entry.

No credits obtained prior to the time at which college standing was established can be used toward a degree, except that where the amount of high school deficiency is so small that it requires but part of the student's time to carry courses to remove high school deficiencies, the remainder of the student's time may be spent on college courses and the credit so earned may be accepted to satisfy degree requirements. Students under 18 years of age may not enter with a high school deficiency.

The following suggestions emphasize the desirability of including various studies in the high school program of the student who plans to enter college:

1. **English.** Since the ability to write clearly and to read with understanding and appreciation is essential, it is highly desirable that the student complete three or four units in English.

2. **Mathematics.** Not only as a tool to further learning, but as a means of providing basic education, mathematics has much to offer. Two years of such study would be profitable. Students planning to specialize in the sciences or in engineering should complete two or more units in mathematics in high school.

3. **Social Studies.** Social studies—such as history, civics, government, economics, sociology and geography—are basic to the understanding and solution of contemporary problems in the community, in the nation, and in the world. From two to four units may well be devoted to this area by the prospective college student.

4. **Natural Sciences.** This field is rich in possibilities for understanding the modern world. Two units in science might well be completed. For those who plan to emphasize science or engineering in college, three units are helpful.

5. **Foreign Languages.** The prospective college student might well develop a basic reading or speaking knowledge of a modern foreign language. Some background in one of the classical languages would also be desirable.

6. **Fine Arts.** This field offers opportunity for development in an area of general education which can contribute much toward individual growth.

7. **Other Subjects.** None of the foregoing statements should be interpreted as meaning that other subjects—agriculture, commercial subjects, home economics, industrial arts, speech, etc.—should be avoided by the student who is planning to attend college. Such subjects, when properly studied, contribute materially to the educational growth of the individual and prepare him for continued study as well as for more general activities of living.

Students who expect to become candidates for any degree or diploma from any of the schools of the College must include among the units presented those

preparatory courses specified as prerequisite to beginning college courses in the various fields. Such students are urged to give serious thought to the selection of a major field of interest. Each student in cooperation with his parents, high school principal or other high school advisor should plan the high school program of students so as to meet the requirements for admission to his chosen field of interest. Students who fail to do this may expect to be delayed in starting their college work until the prerequisite courses are made up. Not all of the schools and departments of the College have specified prerequisites, but those which do have, list them in their school and departmental section in this College catalog. This information should be used in planning the high school course.

Transfers from Other Colleges (Advanced Standing). The College does not grant collegiate credit for excess high school work. Advanced standing for work of satisfactory grade done in some other accredited college, after the completion of 15 units of high school work, may be granted by the Committee on Advanced Standing, provided the student presents satisfactory evidence that the work offered is equivalent to the work for which he wishes to substitute it.

Advanced standing credits, when evaluated, are accepted on a provisional basis only, and are not included on a transcript of college credits until after the requirements for the degree toward which the credits are to be applied have been completed. Transcripts submitted for valuation become the property of the Institution, and are not returned. Transcripts should be sent to the Registrar four weeks in advance of registration. It is necessary to have them evaluated before registration, to arrange the course of study properly.

Provisions for Education of Veterans. Utah State Agricultural College has a broad and diverse curriculum. This makes possible the training of ex-service men and women for many occupations and at the same time provides ample opportunity for general education.

The College has made special provision for entrance, vocational advisement, acceleration, and curriculum adjustments for these men and women.

It is possible, on the basis of evidence of educational growth since leaving high school and by the demonstration of aptitude for college work on tests for this purpose, for students to enter the College without completing all high school requirements.

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 rank; and 136 credits for Senior rank. The foregoing figures include the required credits in Physical Education or Military Science.

Registration: On each registration day, students will be 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 the 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 student has presented his fee card at the cashier's window, office of the Controller, and has paid his fees and filed his registration cards with the Registrar's office.

Penalties for Late Registration: Late Registration fee: A fee of one dollar per day will be charged those who register late with a maximum fee of five dollars. The late fee will be assessed (a) for late registration resulting from late filing of application and credentials for admission or for readmission; or (b) for late registration resulting from failure to begin registration on scheduled registration dates; or (c) for delay in completion of registration, including payment of fees and filing of registration cards with the Registrar's office, beyond the first week of each quarter.

Reduction in load: The amount of work for which any student will be allowed to register will be reduced by one and one-half credits for each week, or fraction thereof, that he is late in registering.

Final deadline: No student will receive credit for resident work unless he is officially registered for the specific courses involved. Registration, including any changes in registration, must be completed not later than two weeks before the end of the quarter or session at which time final class lists will be prepared. No registration, either in the form of withdrawing from or adding of classes to original registration, or original registration will be accepted for the quarter or session after that date.

Changes in Registration: The program of courses listed on the student's registration card, approved by his dean and filed in the Registrar's office, is considered to be the student's official registration for the quarter. A student is held responsible for the satisfactory completion of the entire program. Unless an official change-of-registration form is filed with the Registrar's office before the deadline (two weeks before the end of the quarter or session), an "F" grade will be recorded in case of failure to obtain a passing grade or an incomplete in any course for which the student has registered, regardless of the reason for the failure.

Regulations Pertaining to Withdrawal From Classes: Partial withdrawal: During the first three weeks of any academic quarter a student may withdraw from a class on his own initiative with the consent of his adviser and the instructor of the class.

Between the beginning of the fourth week of any academic quarter and the deadline specified above, withdrawal from a class is not permitted except when circumstances beyond the control of the student exist. The dean of the school in which the 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 Registrar's office.

In the event that students register for a class which is later cancelled out, it is the responsibility of the teacher to notify the Registrar's office and to return the class roll cards to the Registrar's office so that the students concerned can be properly withdrawn from the class.

Complete Withdrawal: If for any reason the student finds it necessary to leave the campus before the end of the quarter, he should take the necessary steps to cancel out his registration. The procedure to be followed in canceling out the registration are as follows: (1) Call at the Registrar's office for the necessary blank forms. (2) Go to the office of the Dean of Students to obtain approval for withdrawal. (3) Obtain from each instructor the class enrollment card and present at the Registrar's office the withdrawal permit form signed by the Dean of Students, together with the class cards for all classes in which enrolled. (4) Obtain authorization from the Registrar's office for any refunds which may be available. (5) Present refund authorization to the cashier's window, office of the Controller.

Unless the student is doing passing work in all of his classes at the time of withdrawal he may be denied the privilege of canceling out his registration. In case a student leaves the campus without obtaining permission for cancellation of registration, "F" grades will be recorded if sufficient work has not been completed to warrant the reporting of passing grades.

Additions to Registration: An addition to the original registration can be effected on the official change-of-registration form. The approval of the teacher concerned and the student's adviser must be obtained and indicated by signatures on the change-of-registration form before the card will be accepted in the Registrar's office. Between the beginning of the fourth week of any academic quarter and the deadline after which no changes can be effected, any additions to the original registration must be approved by the dean of the school in which the student is registered as well as by the instructor of the class and the student's adviser.

Change-of-Registration Fee: No charge will be made if change cards are filed within the first week of each quarter. After the first week a fee of fifty cents will be charged for each change card.

Visitor's Permit: Students who wish to attend regularly any class for which they are not registered must obtain a visitor's permit from the Registrar's office. No credit will be allowed for such attendance. A fee of \$5.00 per class is charged for the privilege of auditing. Visitor's permit forms may be obtained from the Registrar's office. These forms include an authorization to the instructor for admitting the students to the class. These forms, properly executed, must be submitted to the Registrar's office before attendance at a class should be permitted.

Importance of Submitting Forms to the Registrar's Office: The special change-of-registration form, properly executed, must be filed at the Registrar's office 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 Registrar to record an "F" grade! Attendance at classes without proper approval and without official registration as defined above, and before the 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 herein prescribed for admission to classes.

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

Maximum Registration without approval for excess credit is set at seven-teen quarter hours exclusive of one credit in basic Military Science or basic Physical Education. Only the dean of the school 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. The registration is construed to include any extension, correspondence, institute, or other work carried by the student for credit, or for removal of high school deficiencies during the period of the school year.

Minimum Registration: The minimum registration for a full-time student load is usually considered to be twelve credit hours. To be eligible for student body offices a student is 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 maintain an average of fifteen credits per quarter.

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 the student may be registered on the residence registration fees. Incomplete grades can be granted by an instructor only when permission is granted by the Attendance and Scholarship Committee before the close of the quarter. The necessary petition form may be obtained at the Registrar's office. Incomplete work must be finished, and a passing grade be given in the course, within one year of the close of the quarter; otherwise the credit is forfeited.

Low Scholarship and Probation: Students who have not maintained an average grade of "C" or better, and students failing to obtain passing grades in twelve or more credits during the preceding quarter are 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 student body organization. Students in the low scholarship group may be placed on probation for poor scholarship. Students on probation who violate the terms of their probation are subject to immediate suspension from the college. When in doubt regarding any of the regulations affecting them, students on probation should consult with the Attendance and Scholarship Committee. This committee alone

has authority to waive or modify terms of probation. Students in the low scholarship group may not register for more than 15 credits per quarter exclusive of one hour of Physical Education or Military Science.

All classes are conducted as scheduled until 5 p.m. on the day preceding a holiday. Likewise all classes are conducted as scheduled the day following a holiday.

Credit by Examination: In special cases, students may be permitted to obtain college credit by passing examinations in subjects not taken in course. Credit for a subject taken in 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 college.

A maximum of 18 quarter hours' credit can be acquired by special examination. None of the last 30 credits presented for a B.S. 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 student's load for the quarter.

Credits earned by special examination are accepted on a provisional basis only, and are not included on a transcript of college credits until after the requirements for the B.S. degree toward which the credits are to be applied have been completed. Credits earned by special examination cannot be used for satisfying the requirements for the Master's degree nor for certification.

Request for permission to take special examinations should be made to the Committee on Special Examination on forms to be obtained at the Registrar's office.

A student may earn as much credit in the two-week Christmas holiday period as in a similar period in residence, without having it added to his load the preceding or following quarter.

Numbering of Courses: The collegiate work of the Institution is divided into three divisions: Lower Division, Upper Division and Graduate. Courses numbered from 1 to 99, inclusive, are Lower Division courses. Those listed from 100 to 199, inclusive, are Upper Division courses. All courses with number 200 or over are graduate courses.

Qualified students may enter courses in any quarter unless a statement to the contrary appears in the description of the courses.

Lower Division students are not allowed to enter Upper Division courses except upon approval of the Dean or Adviser and the instructor of the course.

LOWER DIVISION

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 students for the major work upon which they 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.

Students who expect to become candidates for the Bachelor's degree should plan their courses with great care through consultation with their faculty advisers, major professors, and deans, to insure the best choice of courses for filling the groups and to provide the proper foundation for their advanced work. Failure to do this may necessitate an extra year to complete the work for the desired degree.

Students should satisfy the following requirements, in order to complete the work of the Lower Division:

1. Remove any deficiencies that may exist in the entrance requirements.
2. Complete 96 credits, or quarter hours of work (including Military Science and Physical Education) with an average of 75% 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 and Physical Education requirements as follows:

A. English Composition.

1. A placement examination in English is required of all freshmen.
2. Freshman students in the School of Engineering and Technology and in the School of Forest, Range, and Wildlife Management are required to complete English 17, 18, and 19. Students who start this series should continue throughout the three quarters, even if they transfer from Engineering or Forestry to other schools.

Note: For graduation all students must present nine credits in English Composition (See Paragraph 6 under "Summary of Requirements for Graduation.")

GROUP REQUIREMENTS

B. Groups. A total of 40 credits must be selected from the following four groups with not less than eight credits nor more than 12 credits being counted in any one group.

1. Biological Science. This group requirement may be satisfied by taking any one of the following combinations of courses:

- A. Biology 1 and either 5 hours of lower division Bacteriology or Physiology 4.
- B. When more technical courses are required they may be used to satisfy this group requirement if taken in any of the following sequences:
 1. Botany 24 and 25.
 2. Zoology 3 and 4.
 3. Any two of the following three series:
 - a. Bacteriology 10 or 70 and 71.
 - b. Botany 24 or 25.
 - c. Zoology 2.

Students who already have a satisfactory knowledge of general biology, as demonstrated by examination, may satisfy this group requirement by taking Bacteriology 10 or 70 and 71 and Physiology 4.

2. Exact Science.

Chemistry—any course of Lower Division grade.
Geology—1 or 3, 4, 5; Geography 41.
Mathematics—any course of Lower Division grade.
Physics—any course of Lower Division grade.

3. Language and Arts.

Art 1, 2, 3, 4, 22, 26, 32, 33, 36.
English—any literature course of Lower Division grade.
Landscape Architecture 3.
Language—any beginning course in French, German, Portuguese, Spanish or Latin. (A minimum of 14 credits must be earned in a beginning course in language before credit is applied toward graduation.)
Music 1, 80, 81, 90.
Speech—any course of Lower Division grade.

4. Social Science.

Agricultural Economics 53.
Economics 51, 52.
History—any course of Lower Division grade.

Psychology 53.

Political Science 1, 10, 70.

Sociology 10, 70.

Majors in departments in the School of Arts and Sciences should see the introduction to the Arts and Sciences section of this catalog for suggested courses with which to fill group requirements.

C. Physical Education. Six quarters of work in Physical Education activity classes are required of all women students, and also of all men students who do not take the required courses in Military Science or Air Science.

Students in divisions that prescribe the curriculum for a full four-year course (as Forestry, Smith-Hughes teacher training, Engineering, and Technology) are exempt from group requirements listed above. If a student transfers from one of these divisions, he is responsible for fulfilling all of the course requirements of the new division.

UPPER DIVISION

Ninety-six credits (quarter hours of credit) with an average grade of 75% or higher are required for admission to the Upper Division. Graduates of standard normal schools and junior colleges, and students from other colleges who present at least 90 credits of acceptable college work, in addition to the courses in Physical Education or Military Science required at the Institution from which they are transferring, may be registered in the Upper Division.

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. Students who change from a prescribed course to a major under the group elective system must complete the basic group requirements as specified in the section on the Lower Division. Transfer students who continue on in a prescribed course will be held for the completion of the Lower Division courses as prescribed at this institution, except as equivalent courses may be accepted as substitutes for our own courses.

Major Subjects: The student should select a major subject upon entering, or early the first year, but not later than entrance in the Upper Division. As soon as the major subject has been selected, the student should consult the head of the department in which he has decided to major. The head of the department will thereafter act as the student's adviser. The student's registration in each succeeding quarter should be carefully checked and approved by this adviser (called the major professor) in order to insure proper selection and sequence of courses for satisfying institutional and departmental requirements.

The Major Department has the authority to prescribe not less 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). The Major Department and the Dean shall also prescribe such other related courses as may be considered desirable, provided always that the student's 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 College. If they pursue further prescribed work in their field for an additional year at an approved institution, they may be granted a Bachelor of Science degree by this College. They need not comply with general major-minor requirements as previously outlined.

Minor Subjects: The student is permitted to choose his own minor. The minor consists of 18 credits either in one department or in two departments closely related in subject matter, provided that minor in more than one department must have the approval of the Dean and the Major Professor.

Courses used to satisfy the English composition, the basic groups, military science or physical education, and freshmen 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

The College offers Certificates of Completion for two years of study in certain departments; the degrees of Bachelor of Science, Master of Science, and Doctor of Philosophy; and gives work to fulfill the requirements for all professional certificates issued by the State Board of Public Instruction.

IMPORTANT: The College reserves the right to change at any time the requirements for graduation, and every candidate for a certificate, a diploma, or a degree shall be held to compliance with such changes, as far as the uncompleted part of his course is affected.

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

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

Terminal Certificate

The Schools of Agriculture, Home Economics, and Engineering and Technology 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 the Schools of Agriculture and Home Economics the courses are arranged so that the student may, at a later date, complete the four-year course 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 this Certificate, the student must:

1. Satisfy the entrance requirements.
2. Complete 96 credits, including the required work in Physical Education or Military Science.
3. Complete a Major of 30 credits in one or more closely related departments of the School 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 school.
5. Complete 24 credits in the basic groups, as follows: Language, nine, which must include English 10; Exact Science, five; Biological Science, five; and Social Science, five.
6. Complete 21 credits of elective work.

For additional information, see descriptions of work in the school concerned.

In the School of Engineering and Technology, 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 section entitled "School of Engineering and Technology."

Requirements for the Degree of Bachelor of Science

The College confers the degree of Bachelor of Science in Agriculture; Forest, Range and Wildlife Management; Arts and Sciences; Agricultural Engineering; Civil Engineering; Commerce and Business Administration; Home Economics; Education; Industrial Education, or Technology upon students who meet the requirements specified herewith:

Before a student can become a candidate for a baccalaureate degree, the abstract of his record in College 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 and Military Science as prescribed for his class.

Regular students who are planning to graduate at the next Commencement should consult their major professor and jointly prepare the "Admission to Candidacy" form not later than the fourth week of the Fall Quarter. Students are admitted to candidacy when the plan of course work presented is found to fulfill all remaining requirements for graduation.

Summary of Requirements for Graduation

For students who will graduate in the spring of 1955, the following requirements must be met after the requirements for admission have been met. Responsibility for satisfying the requirements for graduation rests upon the student concerned.

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

2. Six quarters of work in Military or Air Science for men unless officially excused from this requirement. Students are normally required to complete the basic military course of six credits during the Freshman and Sophomore years. Men exempt from Military Science are required to substitute one quarter of Physical Education for each quarter of Military Science from which they are exempt. If exempt from both Military Science and Physical Education, candidates must present one credit of other work for each quarter they have been exempt.

The advanced course consists of the third and fourth year of Military Science. Entrance upon the advanced course is elective, but once entered upon, the course becomes a prerequisite for graduation, unless the student shall be discharged in accordance with the provisions of Army Regulation 145-350 or Air Force Manual 45-2.

3. One hundred eighty credits of acceptable collegiate work, exclusive of the required credits in Physical Education or Military 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 the English composition requirements, English 110 or its equivalent, as explained under Lower Division requirements.

Paragraphs 5 and 6 above do not apply to students who are pursuing a prescribed course of study such as in Forestry, George-Barden Teacher Training, Engineering and Technology.

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 in the Extension Division are subject to the regular college instruction requirements and must file transcripts of credit with the Registrar's Office.

9. Candidates for a Bachelor's degree must complete at least 45 credits in residence or off-campus course work from Utah State Agricultural College, exclusive of any home study credit as provided in No. 7 above. Of these 45 credits, a minimum of 15 must have been earned in residence at the Logan campus within one quarter or two Summer School sessions, not necessarily consecutive.

10. Four passing grades, "A," "B," "C," and "D" are employed in reporting

credit. No credit with grade lower than "D" can count toward satisfying credit requirements.

Grade points have been assigned to grades as follows: 3 grade points for each credit of "A," 2 for each credit of "B," 1 for each credit of "C," zero for credit of "D." A deduction of one grade point is made for each hour of failure. For graduation, a student must have 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.

11. The candidate must file an "Application for Admission to Candidacy" not later than the fourth week of the Fall Quarter preceding graduation. 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 school in which the major work is done.

12. The candidate should file an "Application for Graduation" as soon as possible after the first day of the winter quarter. Any candidate who fails to file his application for graduation by the first day of May will be held over to the next year's commencement.

13. The candidate must have discharged all College fees.

14. Attendance at Commencement Exercises is expected of all candidates. Those unable to attend must notify the Graduation Committee in advance.

Requirements for High School Teacher's Certificate

Students graduating with majors in Elementary and Secondary Education must meet the requirements for a Utah State Teacher's Certificate. Majors in other departments may also earn a certificate by meeting the requirements for one of the various certificates granted by the State Department of Public Instruction. For details of the requirements for the various teaching certificates see "School of Education."

GRADUATE SCHOOL

J. STEWART WILLIAMS, DEAN

Organization

Graduate study is supervised by the Dean of the Graduate School, assisted by the Graduate Council. This council consists of one representative from each of the seven schools of the college, and the Libraries. Members of the council are appointed by the President in December and each year to serve a one-year term commencing the first of July following.

The graduate Council for 1955-56 is as follows:

School of Agriculture—Professor Leonard H. Pollard
 School of Arts and Sciences—Professor Eldon J. Gardner
 School of Commerce—Professor Evan B. Murray
 School of Education—Professor Arden Frandsen
 School of Engineering—Professor M. Greaves
 School of Forest, Range and Wildlife Management—Professor
 Laurence A. Stoddart
 School of Home Economics—Professor Ethelwyn B. Wilcox
 Libraries—Professor King Hendricks

Admission to Graduate School

A graduate with a Bachelor's degree from Utah State Agricultural College or from any other accredited college or university may be admitted to the Graduate School. Seniors in this college who have an average of "B" or better in all their courses in the junior and senior years, and who at the beginning

of any quarter lack not more than five quarter credits to complete all requirements for the Bachelor's degree, may be allowed to register in the Graduate School.

An application for admission accompanied by transcripts of all previously earned credits and letters of recommendation should be presented as far in advance of the day of registration as possible. The applicant must be approved by the department in which he proposes to work.

Students who cannot qualify for the degree program in a particular field may be admitted to the Graduate School as non-candidate students. Admission to the Graduate School does not imply admission to candidacy to a higher degree.

Master's Degree

General: The Master of Science degree is offered in most of the basic biological, physical, and social sciences and in various educational, industrial, and professional divisions of the college. The specific departments in which the Master of Science degree is given, together with the courses provided by the departments, may be determined by consulting the departmental statements provided in this catalogue under the various undergraduate schools of the College.

Qualifying Examinations: A qualifying examination is required by the Graduate School and may be taken prior to registration. If not taken, this examination and any qualifying examination required by the student's 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 a student is found to be deficient in the work basic to the field in which he proposes to study, he may be required to take undergraduate courses, which do not count in the minimum requirements for the Master's 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 the student's program and in conducting necessary additional qualifying examinations and the final examination. When the student's program has been determined and approved by his committee, he will be advanced to candidacy for a degree. Advancement to candidacy must be accomplished before the end of the winter quarter if the student is to graduate at the following commencement. When the student's 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.

Student Program: The student program for the Master of Science degree must include:

1. At least 15 credits taken on the Logan campus;
2. At least 45 credits in courses numbered 100 or above which are approved for graduate credit;
3. At least 10 credits, exclusive of thesis, in courses numbered 200 or above;
4. A thesis with 9 to 15 credits, or thesis alternate as described below.

Thesis: Each candidate for a Master of Science degree, usually must present a thesis on a topic within the field of his major subject which must represent from 9 to 15 hours of the credit presented for his degree. The thesis must be a contribution to the field of knowledge, based on 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 student's Advisory and Examining Committee at least two weeks before the date of his final examination. After approval by the committee and the department, and after the student has successfully passed the final examination, four

copies of the final draft of the thesis must be deposited in the graduate office. Two of these copies will be deposited in the library, another sent to the department, and the fourth returned to the student.

Thesis Alternate: The supervisory committee may permit the substitution of three advanced reports, valued at 6 to 10 credits, for the regular thesis. These are known as "Plan B" reports. The Master's program is otherwise the same under "Plan B."

For students working under "Plan B" in general agriculture, the Dean of the School of Agriculture will select a major professor to be the chairman of the supervisory committee. The student's program must include a minimum of 6 credits each in the fields of Plant Science, Animal Science, and Agricultural Economics.

Final Examination: Each candidate for a Master of Science degree is required to pass a comprehensive final examination on the subjects of his graduate study and on his thesis. This examination may be oral or written or both as his committee may decide, and is open to all faculty members and officials of the Graduate School. Arrangements for the time and place of the examination are made by the Dean of the Graduate School. A member of the Advisory and Examining Committee, other than the major professor, or a 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. For candidates who are to receive their degree at the June Commencement, the date of the final examination should be not later than May 10.

Time Limit: Work for a Master of Science degree must be completed within six years from the date of matriculation as a regular student in the Graduate School 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 or off-campus credit to be allowed will be determined in consideration of the student's entire course program. In no case will more than nine quarter hours of extension credit be allowed as counting toward a degree, and the total of off-campus credit may not exceed 15 hours, exclusive of thesis. All extension courses for which graduate credit is sought must be regularly registered for through the Graduate School, and must have the sanction of the head of the department in which the student is doing his graduate work. Credit toward a Master of Science degree is not granted for correspondence study.

Transfer Credit: A maximum of 9 quarter credits of graduate work satisfactorily completed at another approved Graduate School may be allowed toward a Master of Science degree. The extent to which such credit may reduce either the course or the residence requirements will be determined by the student's committee.

Credit Load: Maximum load for full-time graduate students is 16 credits. Maximum for assistants engaged in teaching or research is 12 credits.

Degree of Civil Engineer and Irrigation Engineer

The School of Engineering and Technology offers a two-year graduate program in Civil Engineering and Irrigation Engineering leading to the degrees of Civil Engineer and Irrigation Engineer. The plan of study for those degrees is similar in many respects to plans at other western institutions for degrees of Civil Engineer, Mechanical Engineer, etc.

Special Requirements: The student program for these degrees include:

1. A minimum of 6 quarters of study, of which at least 3 quarters must be in residence at Utah State Agricultural College.
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 3 quarters in residence.
2. Completion of a suitable program of study of not less than 45 credits, of which
 - (a) at least 30 credits must be graduate courses (200 series), and which
 - (b) a maximum of 20 credits for thesis.

The suggested curriculum for these degrees is detailed in the section on engineering.

Degree of Doctor of Philosophy

General: The degree of Doctor of Philosophy (Ph.D.) is awarded by the Utah State Agricultural College in recognition of high attainment and productive scholarship in a special field of learning.

Admission to the Graduate School to work toward the degree of Doctor of Philosophy is obtained in the same manner as for the Master's degree. Qualifying examinations are similarly required, and the student's program is likewise directed by a supervisory committee.

Student Program: The student program for the Doctor of Philosophy degree must include:

1. Three years of full-time graduate study above the Bachelor's degree. If the student has a Master's degree, then two years will be required. The student's supervisory committee may recommend that part of this program be taken at other schools, but the last year must be spent in residence at Utah State Agricultural College;

2. A minimum of 135 credits of approved graduate study beyond the Bachelor's degree, 90 credits beyond the Master's degree;

3. A major field to which approximately two-thirds of the time is devoted. 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 thesis will be presented. Credits for this thesis may not exceed 45, and work on the thesis 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 foreign language is required of all candidates. The particular language required will be that which meets best the applicant's needs. Requirement of a second language will be optional with the department in which the student is taking his major. The degree of proficiency of the applicant to use the required language in his chosen field and his knowledge of the grammar and structure of the language will be determined by a committee appointed by the Dean of the Graduate School from members of the Language department.

The language examination should be taken before the beginning of the third year of study.

Comprehensive Examination and Candidacy: Written and oral examinations are conducted by the supervisory committee and the departments concerned, usually in the last quarter of the second year of the student's work, to determine his fitness for admission to candidacy for the degree of Doctor of Philosophy.

Thesis: 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 will 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 the candidate's thesis will be conducted by the supervisory committee not later than two weeks before the date of commencement.

Teaching and Research Assistantships

A number of teaching and research assistantships in various departments of the college are available each year to graduate students. Teaching assistantships carry a stipend of \$850 for one-third teaching service on a nine-month basis. Remuneration for research assistantships may vary from \$850 to \$1,500 dependent upon the time of service involved. Generally assistantships are arranged so as to allow the student to complete work for his Master's degree in two years. At present, assistantships are available in the following departments: Animal Husbandry, Accounting and Business Administration, Agricultural Economics and Marketing, Agronomy, Art, Bacteriology and Public Health, Botany and Plant Pathology, Chemistry, Child Development and Parental Education, Civil Engineering, Dairy Industry, Economics, Education, English, Entomology, Forest Management, Foods and Nutrition, Geology, Horticulture, History, Irrigation and Drainage, Instrumental Music, Mathematics, Modern Languages, Physiology, Physics, Physical Education, Psychology, Range Management, Sociology, Speech, Vegetable Crops, Veterinary Science, Wildlife Management, and Zoology. Research fellowships are available in: Animal Husbandry, Agricultural Economics and Marketing, Agronomy, Chemistry, Entomology, Irrigation and Drainage, Physiology, Range Management, Wildlife Management, and Zoology.

Graduate Programs in Education

The following degrees are offered in the field of Education:

Master of Science. The Master of Science degree is awarded to those students completing a full year of graduate work in specified courses and writing a research thesis for which 9 to 15 credits is allowed. The thesis requirement may be fulfilled by the writing of two field studies.

Master of Education. The Master of Education degree is granted in each of the following areas:

- Master of Education in School Administration and Supervision
- Master of Education in Secondary Education
- Master of Education in Elementary Education
- Master of Education in Vocational Education

The course of study leading to the Master of Education degree in each of the above areas has for its purpose the preparation of thoroughly prepared teachers, supervisors, and administrators. It aims at providing 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 designed to meet the specific needs of the individual student. This professional degree emphasizes proficiency in the interpretation and application of research.

Doctor of Education. The professional 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 a high degree 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 supplementary field other than professional education.

Detailed requirements for the above degrees may be obtained at the office of either the Dean of the Graduate School or the Dean of the School of Education.

Graduation

Requirements for graduation in the various schools and departments of the College are listed in the general catalog. In most cases students can complete many of these requirements by attendance during summer quarter. In every department, one or more advisers are assigned to guide the student's work leading toward graduation. Students planning to attend during the summer are invited to write to the departments in which they are interested for evaluation of credits and other such guidance services.

STUDENT FEES

Resident Students

	Student's First Quarter	Student's Second Quarter	Student's Third Quarter
Registration	\$10.00	\$	\$
Tuition	30.00	30.00	30.00
Building	7.00	7.00	6.00
Student Body	6.00	3.00	3.00
Athletic	2.00	2.00	2.00
Class Fee	1.00		
Total Fees	\$56.00	\$42.00	\$42.00

Non-Resident Students

	Student's First Quarter	Student's Second Quarter	Student's Third Quarter
Registration	\$10.00	\$	\$
Non-resident	35.00	35.00	35.00
Tuition	30.00	30.00	30.00
Building	7.00	7.00	6.00
Student Body	6.00	3.00	3.00
Athletic	2.00	2.00	2.00
Class Fee	1.00		
Total Fees	\$91.00	\$77.00	\$76.00

SPECIAL FEES

Change of Registration Fee (applies after first week of each quarter)	\$.50
Special Students—Registration fee	10.00
Plus \$2.50 per credit hour (maximum 6 credits)	
Visitor Fee—Registration as listener or visitor in lecture course in which no credit is desired, per quarter, per subject	5.00
Qualifying Examination—Graduate School	
1 part	5.00
2 parts	6.00
Graduation Fee	10.00
Social Work Certificate	5.00
Teacher Placement Fee	2.00
Teacher Placement re-registration	1.00
Locker Rental—Fall, Winter and Spring	1.50
Fifty cents of this fee is refunded to students upon returning key accompanied by receipt, prior to the first Friday following Commencement exercises.	
Transcript of Credits. Each student is entitled to one transcript free. Additional transcripts .....	.25 to .50
Progress Report. Adviser furnished one copy free. Additional copies .....	.25 to .50
Note fee	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
School of Forest, Range, and Wildlife Management—Senior Field Prob- lems:	
Forestry 146	35.00
Range Management 196	30.00
Wildlife Management 171	35.00

Chemistry Laboratory Breakage Deposit (per quarter)	5.00
Military Uniform Deposits	5.00

The above deposits are refundable, except for breakage, upon presentation of clearance slip from department concerned—accompanied by receipt showing that payment was made.

Late Registration per day (maximum \$5.00)	1.00
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The late fee will be assessed:

- (a) For late registration resulting from late filing of application and credentials for admission or for readmission; or
- (b) For late registration resulting from failure to begin registration on scheduled registration dates; or
- (c) For delay in completion of registration.

Registration is not complete until student has presented his fee card at the Cashier's Window, office of the Controller and has paid his fees, and filed his registration cards with the Registrar's Office.

Special Examination—for credit—Special examinations may be taken in subjects not registered for, on approval of a special examinations committee, and upon payment of \$2.00 per credit hour.

Thesis Credit—Graduate students not in residence and wishing to file thesis credit not to exceed 15 hours shall pay a fee of \$27.00.

Private Instruction Fees

Music—The charge is on the basis of 1½ credit hours per quarter, consisting of 10 private lessons. Authorized instructors are as follows:

Christiansen, N. W.	\$35.00	Pahtz, George	\$30.00
Christiansen, Mrs. N. W.	30.00	Poznanski, Mischa	30.00
Clark, S. E.	30.00	Thatcher, Patience	35.00
Dalby, John Philip	30.00	Torbensen, Eldon	30.00
Dalby, Max	30.00	Wasserman, Irving	30.00
Greenwood, Maxine	25.00	Welti, Walter	35.00
Lundquist, Thelma	20.00	Welti, Mrs. Walter	30.00
Odd, Mrs. Wallace	20.00		

Speech—The fee for Speech 12 and 112 is \$20.00 per credit hour per quarter, consisting of 10 private lessons. Authorized instructors are as follows:

Hansen, Burrell	Myers, Chester J.	Thornley, Gwendella
Morgan, Floyd T.	Newman, Parley	Robinson, Rex E.

Refunds—All fees paid, with the exception of the \$10.00 registration fee, will be refunded to any student in residence who withdraws from school before the end of the quarter, 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. No refund of the \$10.00 registration fee is made.

According to the constitution of the Associated Students, every regular 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., and, in addition, give him a copy of the annual yearbook and a subscription to the College paper. This system has been found to be a great saving to the students and a most excellent means of fostering proper interest in student activities.

Since all women students are required to take Physical Education, they must provide themselves with gymnasium suits and gymnasium shoes. The cost is about \$6.00.

Each student in Foods and Dietetics, Home Nursing and Household Administration 150, must provide herself with two washable white uniforms.

The fee for Household Administration 150, required for all Home Economics majors, is \$1.00 per day for the one-half quarter residence in the Home Management House. This fee is to be paid when entering the residence.

The College maintains a modern, well-equipped cafeteria, where students may eat at cost.

Good board and room in private homes cost from \$12.00 to \$15.00 a week. By renting rooms and boarding themselves, students are able to reduce considerably the cost of room and board.

Students are held responsible for damage done by them to College property.

STUDENT PERSONNEL SERVICES

Ellvert H. Himes Dean of Students	Mae Welling Associate Dean of Students Coordinator of Student Activities
C. Jay Skidmore Coordinator of Counseling Services	Don E. Jones Chairman, Student Employment
George A. Meyer Foreign Student Adviser	H. B. Hunsaker Chairman, Student Health Services
W. W. Skidmore Coordinator, Student Housing	Stanford L. Johnson Chairman, Student Loans
Bruce Gardner Chairman, Orientation	Evan B. Murray Chairman, Scholarships and Grants-in-Aid.

The student personnel program consists of the directed activities of a group of competent professional services designed to assist individual students in adjusting to college life. These services are so organized and coordinated with the academic offerings as to become an integral part of the broad educational program of the institution. The principal services provided include high school cooperation, broad orientation procedures, admissions, registration, and records, personalized counseling, coordinated student organizational activity, student health services, supervision of campus and off-campus housing arrangements, financial aids in the form of scholarships, awards, grants-in-aid and loans; student employment for part time, full-time and post-graduate needs; special assistance to students from abroad; opportunities for meeting religious needs and development.

The administration and coordination of the entire program of student personnel services is the responsibility of the Dean of Students. He is assisted by an Associate Dean who serves as counselor and adviser to women and administrator of several personnel areas. Each of the various services is under the direction of student personnel specialists and qualified faculty members who have been carefully selected to consider each student in regards to his or her particular needs.

In addition, the Deans and chairmen of each of the services receive valuable advisory assistance from well organized committees consisting of representatives of administration, faculty and students. Thus, unusual attention is given to the welfare of every student, his needs, potentialities, and self-realization.

The Student Personnel Office, Main Building, Room 133, invites inquiry from students on campus and prospective students and others off campus who wish to obtain information concerning student personnel services.

STUDENT ACTIVITIES

Students may participate in the following activities:

1. Intercollegiate athletics.
2. Intramurals. This program includes all seasonal sports, for which awards are given.
3. Musicals. Performances are given by band, orchestra, choral groups, and music clubs. These organizations present several concerts during the year, and each group tours some part of the surrounding area.
4. Theatricals. Numerous productions are staged each year by student groups. Students participate in the lighting, staging, directing, and managing, as well as the acting.
5. Opera. Each year the Music Department produces an opera. Such operas as "Rigoletto," "Faust," "Aida," and "Il Trovatore." have been presented.
6. Debating and Public Speaking. The College is a member of the Rocky Mountain Forensic League, and each fall meets schools of this group in discussion. Participation in debate tournaments in the Intermountain and Pacific Coast Region provides opportunity for experience in tournament debating. Utah State is noted for its Mid-Winter Speech Meet.
7. Student Publications. Students publish a weekly paper, "Student Life"; a yearbook, "The Buzzer"; and a quarterly magazine, "Scribble"; "Blue Book" and Student Directory, which are distributed to all regularly registered students. Some campus organizations sponsor publications of their own such as the Forestry Club's "Juniper."
8. KVSC. The College FM radio station operates as the "Voice of the State College." Four hours of radio programs daily are prepared and broadcast by students. KVSC is a member of the National Association of Educational Broadcasters.
9. USAC Lyceum and Cache Valley Civic Music. The Lyceum-Civic Music series presents numerous national and international artists.
10. Dances and Entertainments. In addition to the above, the Student Body Organizations furnish extensive entertainment in the form of dancing, parties, and athletic events.
11. Assemblies. These are planned and produced by students to provide entertaining, spiritual and cultural programs.
12. Committees. Students are members of virtually every college committee. This includes not only Student Body committees, but also committees set up by the administration.

STUDENT GOVERNMENT

Associated Students. All students, upon payment of student body fees, become members and are therefore entitled to participate in and attend all activities sponsored by the association, such as athletic events, musicals, dramas and dances.

The Executive Council consists of the five elected major officers of Associated Students, viz., student body president, first and second vice-presidents, secretary, and business manager. The Council is responsible for the supervision of 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 include: the Executive Council, the president of each of the four classes, a representative of each of the seven schools, A. W. S. president, two representatives of independent students, and an international representative chosen by the foreign students on campus. There are three ex-officio members: president of Panhellenic, president of Inter-fraternity Council, and editor of Student Life.

Associated Women Students. Every woman student properly registered and enrolled in the College is a member of A. W. S. This organization fosters greater interest and participation in campus activities. It is governed by its own elected officers and board.

Governing Boards and Councils. These boards and councils composed of students and faculty supervise various activities: Women's Intramural Association, Men's Intramural, Civic Music, Athletic Council, Publications Council, Union Board, Inter-fraternity Council and Panhellenic Council.

STUDENT ORGANIZATIONS

Departmental and Professional

Agriculture. Ag Club, Ag Economics Club, Agronomy Club, Alpha Tau Alpha, Alpha Zeta, Block and Bridle Club, Dairy Club, Horticulture Club, Poultry Club, Sears Roebuck Scholarship Club, 4-H Club.

Business. Alpha Kappa Psi.

Chemistry. American Chemical Society.

Education. Association for Childhood Education International, Phi Delta Kappa.

Engineering. Engineering Council, American Society of Agricultural Engineers, American Society of Civil Engineers, American Welding Society, Industrial Arts Club, Institute of Radio Engineers, Sigma Gamma Epsilon, Sigma Tau, Society of Automotive Engineers, Tool Engineers Club.

Forestry. Foresters' Club, Forestry Wives, Xi Sigma Pi.

Geology. Geology Club.

History. History Club, Phi Alpha Theta.

Home Economics. Home Economics Club, Phi Upsilon Omicron.

Landscape Architecture. Landscape Architecture Club.

Military. Arnold Air Society, Pershing Rifles, Scabbard and Blade, Sponsors.

Music. Alpha Eta Mu, Band, Chansonettes, Meistersingers, Orchestra.

Physical Education. Dance Club, Modern Dance Group, P E M M Club (P. E. majors and minors) Ski Club, Square Dance Club, Women's Intramural Association.

Political Science. International Relations Club, Pi Sigma Alpha.

Pre-Med. Alpha Epsilon Delta.

Psychology. Psychology Club.

Sociology. Sociology Club.

Speech. Tau Kappa Alpha, Theta Alpha Phi.

Zoology. Utazoa Club.

Social and Special Interest

Fraternities, Social. Kappa Sigma, Pi Kappa Alpha, Sigma Alpha Epsilon, Sigma Chi, Sigma Nu, Sigma Phi Epsilon, Sigma Pi.

Sororities, Social. Alpha Chi Omega, Chi Omega, Kappa Delta, Sigma Kappa, Theta Upsilon.

Recognition and Honorary. Alpha Sigma Nu, Alpha Lambda Delta.

Regional. Bear Lake Club, Canadian Club, Weber Club.

Religious. Beta Pi, Delta Phi, Lambda Delta Sigma, Mutual Improvement Association, Newman Club, Westminster Fellowship, Religious Council.

Scholarship. Phi Kappa Phi, Sigma Xi.

Service. Blue Key, Intercollegiate Knights, Spurs.

Miscellaneous. Cosmopolitan Club, Dames Club, Independent Students Association.

AWARDS AND HONORS

(Presented principally to students already enrolled)

Students who are interested in applying for scholarships and other awards should contact the Dean of Students Office, Room 133, Main Building, on or before March 1, unless otherwise specified.

The Johansen Scholarship Fund of \$5,000, a gift of the late Mrs. Johana Johansen, provides scholarships annually, worth in the aggregate from \$125 to \$150, for help of worthy students of Junior and Senior rank.

The Lieutenant Clyde Parker Baugh Memorial Fund of \$10,000, a gift of Mr. and Mrs. Wilford F. Baugh, provides four scholarships annually for deserving students of high scholarship and leadership.

KSL Meritorius Scholarships. KSL awards two scholarships, one in technical radio work and one in script writing or broadcasting.

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 College library.

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 combination of these, are the most important requirements. The present value of the scholarships is £500. Seniors or graduate students are generally chosen as candidates. It is suggested, however, that students would do well to begin preparing for the candidacy in earlier years. Information and application blanks may be obtained from Dr. Sherwin Maeser, college representative, Rhodes Scholarship Committee.

The Danforth Summer Fellowship is awarded jointly by the Danforth Foundation and Ralston Purina Mills to an outstanding Junior in the School of Agriculture. The award covers expenses for two weeks in St. Louis and vicinity, and two weeks of leadership training at the American Youth Foundation Camp on Lake Michigan. Forty students from as many colleges are awarded this fellowship. Additional information and application blanks may be obtained from the Dean's office.

The Rollo M. Rich Memorial Scholarship is awarded annually to an outstanding student in the Upper Division who is a major in the School of Agriculture and who has filled a mission for the L. D. S. Church or has otherwise participated in activities of the L. D. S. Church.

First Security Foundation. Two scholarships of \$500 each awarded to students of business and finance at the end of their sophomore year.

Joseph E. Greaves Memorial Scholarship. An award of \$100 given each year by Dr. Ethelyn O. Greaves in memory of Dr. Joseph E. Greaves to a student who gives evidence of superior performance in some field of basic science and is in need of financial assistance.

Louisa Y. Robinson National Woman's Relief Society Scholarship. A gift of \$5,000 from 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. The scholarship is paid in full when the student completes her registration for the fall quarter. Applications 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.

Borden Agricultural Scholarship Award of \$300 is given to the student who in all college work preceding his senior year has achieved the highest average grade among students in agriculture completing two or more dairy subjects.

The Burpee Award in Horticulture is an annual award of \$100 made possible through a grant from the W. Atlee Burpee Company, seed growers, Philadelphia, Pa., and Clinton, Iowa. It is made on the basis of scholarship, practical experience, and interest in flower and vegetable seed growing.

The W. Atlee Burpee Award in Floriculture is an annual award of \$100, made possible through a grant from the W. Atlee Burpee Company, seed growers, Philadelphia, Pennsylvania, and Clinton, Iowa. It is made on the basis of scholarship, practical experience and interest in floriculture.

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.

U. S. A. C. Horticultural Club Scholarship in General Horticulture. An annual award of \$25 to a sophomore student; based on scholarship and interest in horticulture demonstrated during the freshman year.

U. S. A. C. Horticultural Club Scholarship in General Floriculture. An award of \$25 to a sophomore student; based on scholarship and on interest in floriculture demonstrated during the freshman year.

U. S. A. C. Horticultural Club Scholarship in Pomology. An award of \$100 made at the beginning of the senior year to a student majoring or minoring in pomology. The award is based on demonstrated interest in pomology, participation in school activities, and scholastic ability.

Home Economics Scholarship Award. An award of \$100 given in 1952 to an outstanding high school graduate who plans to enter college and to receive a degree in some phase of Home Economics. The recipient will receive \$50 at the beginning of Fall quarter and \$25 at the beginning of Winter and Spring quarters. Award is based on scholarship, citizenship, and need.

Swift and Company Essay Contest. Each year Swift and Company conducts an essay contest. The winner is awarded a trip to the International Livestock show, Chicago, where he spends approximately a week studying meat packing. All essays must be submitted to the Dean, School of Agriculture on or before November 1.

The Leadership Challenge Cup is awarded each year to a Senior student in Agriculture who has exhibited the greatest measure of constructive organization and leadership in the School of Agriculture through his College course.

The American Rambouillet Sheep Breeders' Association Challenge Cup was donated to the Animal Husbandry Department by the American Rambouillet Sheep Breeders' Association, to be presented each year to the student showing the greatest efficiency in fitting and showing Rambouillet sheep.

The Ogden Union Stock Yards Challenge Cup, a gift of the Union Stock Yards Company, Ogden, is awarded each year to the student who shows the most proficiency in judging beef cattle.

The Hawaiian Steamship Company's Challenge Cup, a gift of the Hawaiian Steamship Company, is to be awarded each year to the student who shows the most proficiency in judging wool.

The Salt Lake Union Stock Yards Company Challenge Cup, a gift of the Union Stockyards Company, Salt Lake City, is awarded each year to the student who shows the greatest proficiency in judging hogs.

The John K. Madsen Challenge Cup, a gift of John K. Madsen, Mt. Pleasant, Utah, is awarded each year to the student who shows the most proficiency in judging sheep.

The Phi Upsilon Omicron Scholarship of \$25 is given annually by the Kappa Chapter of that organization to the Freshman girl in the School of Home Economics 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.

Danforth Foundation Home Economics Fellowships. The first is awarded jointly by the Danforth Foundation and the Ralston Purina Company to an outstanding junior in the School of Home Economics. 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 two weeks' leadership training at the American Youth Foundation Camp.

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, 50 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 two or better.

Chi Omega Fraternity Scholarship 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.

Associated General Contractors Scholarship Award. A gift of the Intermountain Chapter, A. G. C., provides a scholarship grant of \$200 to a Junior Engineer 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.

A. S. C. E. 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.

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 School of Engineering by December 1.

The Eric W. Ryberg Memorial Scholarship in Commerce, sponsored by Eric C. and Maridean M. Ryberg, is awarded annually to a Junior, Senior, or graduate student in the School of Commerce (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.

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 basis of scholarship, and promise of success in engineering. Selection is made by the Engineering Faculty.

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.

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 American Society of Tool Engineers Awards. Two \$100 scholarships are awarded to engineering students who show interest, ability and scholarship in pursuing tool engineering curriculum. Donors are Eimco, and McGhee & Hogan Machine Works, Salt Lake City. Application should be made to the Salt Lake City Chapter 85 or the Tool Engineering Department, U. S. A. C., not later than February 10 each year.

Deseret News Professional Internship. The News offers the outstanding junior student in journalism a scholarship including one year's tuition at the College 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 U. S. A. C. 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 in college.

Cache Valley Chapter of the Utah State Historical Society Award. The Cache Valley Historical Society offers annually an award of \$25 to the U. S. A. C. 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.

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 (R. O. T. C.) achievement, (4) adjustment to meet the daily demands in character, social and general culture.

The American Legion Military Medal, a gift of the Logan American Legion Post, is awarded each year to the letterman who maintains the highest scholastic record during the year, and who exhibits the most wholesome attitude towards Military training.

The R. O. T. C. 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) College activity, 15 points; (d) Leadership, 20 points; (e) Aptitude for and interest in Military Science, 20 points; (f) Physique and bearing, 10 points.

The Utah State Agricultural College Science Medal, a gift of 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.

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.

Alpha Kappa Psi Scholarship Award. Alpha Kappa Psi Fraternity, Alpha Theta Chapter of which is established at the Utah State Agricultural College, awards annually the Alpha Kappa Psi Scholarship Medallion to the male senior in Commerce with the highest scholastic average for four years of study in this College.

Alpha Kappa Psi Scholarship Award. Alpha Kappa Psi Fraternity, Alpha Theta Chapter of which is established at Utah State Agricultural College, awards annually the Alpha Kappa Psi Medallion to the male senior student in Commerce who possesses the highest scholastic average for three years of work taken in this College.

Delta Beta Chi Award. Ten dollars is awarded annually by the Delta Beta Chi Chemistry Fraternity to the Freshman or Sophomore chemistry student who writes the best essay on some subject in Chemistry.

William Alger Awards. A gold key is awarded annually by Alpha Epsilon Delta, pre-medical society, to the outstanding Freshman pre-medical or pre-dental student. Scholarship, character and possibilities in medicine or dentistry represent the basis for the award.

Blue Key Award. Each year Blue Key Honorary Service Fraternity awards a "service plaque" to an outstanding freshman or sophomore male student. Candidates are judged on college activities, scholarship, service to the College, 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.

Faculty Women's League Scholarship Award is awarded to Senior women and is 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.

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 college life, as exemplified by the following considerations: (1) Awareness of issues vital to college life, (2) individual responsibility for their solution, and (3) accommodation of individual interests to what seems to be the common good.

The College 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, 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 College Award is also conferred annually upon the woman student of the Institution who shows evidence of 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).

COUNSELING SERVICES

A broad program of counseling services has been designed to meet the various levels of student needs. Carefully selected senior and graduate students are provided to serve as counselor in residence halls and fraternity and sorority houses. These persons keep in close touch with key information that will aid in-residence students in matters of direction, campus, orientation, timely management, study habits, regulations and requirements. Among the faculty members of the various schools some are selected to serve as special advisers to students, particularly regarding registration, scholastic standing, and educational planning. Personnel specialists collaborate with departmental staff members and qualified graduate students to supply competent professional counseling for those who need specialized help with personal and social problems, emotional conflicts, marital difficulties, etc.

The various counseling activities are under the supervision of the Coordinator of Counseling Services. Much of the success and effectiveness of the program is attributable to the excellent cooperation and collaboration with the academic deans and staff members of the various schools. Particularly is this true with reference to the faculty advisory system in all the schools and the testing and counselor training activities of departmental personnel in Psychology and Sociology.

The Coordinator of Counseling Services invites students to seek out a qualified, specially trained counselor in the residence halls, among the faculty adviser or in the offices of the Counseling Services to assist in obtaining reliable and useful information and assistance in problem solving. In-service training activities are conducted with a view to keeping this large corps of counselors and advisers alerted to student needs. The Coordinator also conducts research activities through testing and accumulated data that can be useful to academic areas as well as administration.

All of these services are without cost to properly enrolled students..

STUDENT EMPLOYMENT

The office of Student Employment (Main 133) stands ready to serve students who find it necessary to engage in part-time employment, and who can adequately carry an academic load and a part-time job. Students' wives are also assisted in securing full-time positions. The office maintains a current listing of available jobs and every registered student is assured full con-

sideration for job opportunities existing on campus and in the community. Students are urged to contact the office and discuss their employment problems. To extend off-campus services, the College has established a cooperative arrangement with the downtown office of the Logan Branch of the Utah State Employment Service. Requests for information on employment should be addressed to Chairman of Student Employment, Utah State Agricultural College, Logan, Utah.

FOREIGN STUDENTS

Students from foreign lands are provided a friendly and sympathetic counselor in the person of Dr. George A. Meyer, Foreign Student Adviser, Room 124, Main Building. He advises with all students from abroad concerning problems of adjustment to college life and refers them to the appropriate agencies and individuals on campus and elsewhere for further assistance.

Foreign students will obtain additional help from the Registrar's Office in matters of acceptance and admissions, registration, withdrawals, reports to the Immigration Service and "extensions of stay" in the United States.

All students from abroad are invited to participate in activities sponsored by the Cosmopolitan Club. This organization has a membership of students and townspeople from America and foreign lands and promotes numerous activities fostering international friendships.

STUDENT HEALTH SERVICE

Basement, Student Union Building

Regulations and requirements:

1. Physical examinations are required of all new students and of all who participate in athletic and physical education activities.

2. Students are encouraged to have their family doctor give the examination and report on a form provided by the Health Service. If this is not possible the Health Service will give the examination without cost.

3. It is highly recommended that students purchase the Student Accident Insurance available to them.

4. A speech and hearing examination is required of all new students upon entering the College. Arrangements should be made in the Speech Clinic, M377.

5. Office Hours:

8 a.m. to 5 p.m. daily.

10 a.m. to 12 noon Saturday.

The following medical service is available to all registered students without cost:

I. Regular dispensary care.

1. Consultation on health matters.

a. entrance

b. recheck for follow-up

3. Care for emergencies such as: fractures, sprains, bruises, dislocations, cuts, sutures, and all ordinary health matters requiring medical and minor surgical attention.

4. X-rays for injuries—fractures, etc.

5. Consultation for all different cases when needed.

6. Inoculations and immunizations.

Note: This includes all the care regularly given in any Doctor's office or clinic.

II. These services are intended to cover the resident student while on the campus between the hours of 8 a.m. and 5 p.m., and students off the campus in a school supervised activity.

III. Does not include:

1. Emergencies occurring off the Campus.
 2. Emergencies occurring out of town.
 3. Chronic illness originating before entrance to school.
 4. Hospital care for any condition.
 5. Major surgery.
 6. Service to wives or children of students.
- IV. House calls will be made during Doctor's office hours if reported to the Medical Office. House calls or emergencies called in after Doctor's office hours will be charged at the rate of \$2 per call.
- V. No medical bills or charges will be paid by the Health Service unless the service has been approved by the U. S. A. C. Medical Office.
- VI. In case of illness or an emergency, call:
1. U. S. A. C. Student Health Services, Telephone 100.
 2. Dr. W. B. Preston, Telephone 1000.
 3. Ann Burns, Nurse, Telephone 1004-M.
- VII. All night calls clear through Dr. W. B. Preston, Telephone 1000, Dr. E. L. Hansen, Telephone 1036, or Dr. Merrill C. Daines, Telephone 1104.

STUDENT HOUSING

(Costs subject to revision)

Supervised Living Accommodations for Single Women

Lund Hall is a fire-proof, air-conditioned residence hall for 200 women. Linen changes, bedding, and desk lamps are furnished. Towels and other personal effects are not furnished. Cost of \$155 per quarter covers board and room charges.

Co-operative House on campus provides for excellent group living experience for 10 upper-class students who share living expenses and housework. The flat rate for rent and utilities is \$38 per quarter per person.

College Apartments, (Prefabricated Units) 28 in number, located in the east section of the Campus, are combination living room-kitchen-study arrangements with bedroom, bathroom and clothes closets. Single apartments accommodate two to three persons and are equipped with electric refrigerators, rangettes, bedding, laundry facilities, and central hot air heating. Electricity, cooking utensils, dishes, window curtains, towels and personal effects are not furnished. Double apartments consist of two single apartments connected with a doorway and accommodate four to six persons comfortably. Rent is \$15 per person per month, or a minimum of \$30 per apartment per month.

Sorority Houses provide board and room for their members and are managed by their own officers. Each has a mature housemother in a supervisory capacity approved by the Office of Student Personnel. Rates are determined by the house manager and compare favorably with other living rates on campus.

Supervised Living Accommodations for Single Men

Kerr Hall, located at 250 West Center, has facilities for 45 men. A local bus line gives direct service to the Campus. All items except towels and personal effects are furnished. Two meals per day, except one on Sunday, are provided. Board and room rate is \$140 per quarter.

College Apartments. Comparable in number, size, type, facilities and price to those provided for single women.

College Apartments (Quonsets) 20 units are available as batching quarters. Each accommodates 2-3 fellows comfortably. Located three blocks from the campus proper, each consists of a kitchen-living room-studyroom arrangement, bedroom, and bathroom. Electricity, fuel, cooking utensils, dishes, window curtains, towels, bedding and personal effects are not furnished. A coal

range provides space, cooking, and water heating. An ice box provides refrigeration. The rate is \$19 per month per unit. A centralized laundry room is provided.

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

College Apartments, (Prefabricated Units) 248 in number, located on the east fringe of the campus are within easy walking distance of the Campus proper. They are combination livingroom-kitchen-study arrangements with bedroom, bathroom and clothes closets. These units can be rented furnished, unfurnished, or partly furnished with rent ranging from \$25.00 to \$30 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 an electric rangette for cooking. A central laundry room is available to each set of 28 apartments.

College Apartments (Quonsets), approximately 40 units, are located two blocks east of the Campus. Each consists of a combination kitchen-living room, study arrangements, bedroom and bathroom. Rent rates run from \$16 per month unfurnished to \$19 per month furnished. A few double units rent for \$25 per month unfurnished, or \$28 per month furnished. A coal range provides space, cooking, and water heating. Tenants provide their own electricity, fuel, cooking utensils, dishes, towels, window curtains, bedding, washing machines, and personal effects. A centralized laundry room is provided.

College Trailer Court, located on the corner of 12th East and 7th North, three blocks east of the campus proper, provide 16 modern trailer connections to sewer and water mains. Parking space is hard surfaced. A utility house provides laundry space, also rest rooms and individual shower stalls. Washing machines are not furnished. Monthly space rental per trailer house is \$10.

Off-Campus Housing

The College Housing Office maintains lists of accommodations for students in private homes. Many apartments, rooms, board and room, and bathing quarters are available. In each instance the final arrangements must be made with the landlord. Rates are determined by the accommodations offered and run from \$50 to \$60 for board and room, \$15 to \$25 for a single room, and \$30 to \$60 for apartments.

Application for Housing

Prospective students are invited to direct their applications and inquiries to Coordinator of Student Housing, Utah State Agricultural College, Logan, Utah. When application is made for College Housing, a security deposit is required in the amount of \$5 for single student's accommodations, \$10 for family units, and \$5 for trailer space reservations. Students desiring off-campus housing may procure the current housing list upon arrival at the College, Room 133, Main Building.

Food Services

Food service is obtainable in the College Cafeteria located in the New Student Union Building on campus. Mondays through Fridays schedules and approximate costs run, Breakfast 7:30-8:15 a.m., 35c-40c; Lunch, 11:30 a.m.-1:00 p.m., 50c-75c; Dinner 5:30 p.m.-6:30 p.m., 50c-75c. Saturdays and Sundays, Breakfast 9:00-9:30 a.m., Lunch 12:00 m.-1:00 p.m. The snack bar operates 8:00 a.m.-10:00 p.m., Mondays through Fridays and 12:00 m.-11:30 p.m. Saturdays.

Regulations and Procedures

Students are obligated to retain their housing accommodations for at least one quarter, whether in College owned or privately owned housing. If a change of residence is absolutely necessary, students must secure permission from the Coordinator of Student Housing. A two week prior notice of intent to vacate should be made with the householder or the Housing office in case of College housing, whenever a student intends to vacate a living accommodation. Rents are payable in advance.

Dogs, cats or other similar pets are strictly forbidden within the College Housing area. Very few private home owners permit pets.

Freshmen girls are encouraged to live in supervised housing, except those who live with parents or relatives.

STUDENT LOANS

It is the earnest desire of the institution that no student be prevented from completing school because of some temporary financial limitation. As a phase of the program of financial aid to students, small loans are made available on a business-like basis. These are available to all students on the basis of their qualifications and need for financial assistance.

Individual financial problems may be discussed with the Chairman of Student Loans, Main Building, Room 324.

The total Student Loan Fund is composed of the following individual loan funds generously contributed by friends of U. S. A. C.:

U. S. A. C. Faculty Women's League has a loan fund for women students of College. Loans may range from \$50 to \$150. Preference is given Seniors.

U. S. A. C. 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 of up to \$200.00, usually for one year, to deserving students in the School of Forest, Range and Wildlife Management. Application is made to the Dean's office.

Bureau of Land Management Loan Fund provides loans up to \$100.00 to deserving students in the School of Forest, Range, and Wildlife Management. Application should be made to the Dean's office.

Marjorie Poulson Loan Fund. A fund provided by the father of a former Aggie student active in student body affairs.

Ichel Waters 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.

ORIENTATION

A program of activities designed to acquaint students with the life and environment of the college family is formulated and conducted by a committee composed of faculty members and students. New students at the beginning of each quarter are provided with instruction, assistance, and entertainment as specific ways of becoming oriented to college atmosphere, traditions, policies and procedures.

SCHOLARSHIPS AND GRANTS-IN-AID**(Awards primarily for new students)**

Applications for scholarships and grants-in-aid for the succeeding year should be made before March 1. Direct inquiries to Chairman, Scholarships and Grants-in-Aid Committee, Office of Student Personnel Services.

The College grants annually to students scholarships covering from one to three quarters' tuition each on the basis of outstanding academic ability or demonstrated academic ability and outstanding 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 College also awards grants-in-aid to help deserving students with good academic ability who have economic need.

To be eligible for a grant-in-aid, an athlete 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 Scholarships and Grants-in-Aid 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 said committee, 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 Scholarships. The President of the College is authorized by Title 53, Chapter 34, Section 1-a, Utah Code Annotated, 1953, to waive registration and tuition fees in full or in part for a limited number of meritorious or impecunious students whose domicile is in the state of Utah.

Logan Kiwanis Club. Three \$100 scholarships awarded to outstanding students who are in need of financial assistance.

Logan Lions Club. Three \$100 scholarships awarded to outstanding students who are in need of financial assistance.

Logan Rotary Club. Three \$100 scholarships awarded to outstanding students who are in need of financial assistance.

KVNU Scholarship. A \$100 scholarship. \$50 is awarded fall quarter, \$25 winter quarter, \$25 spring quarter, to the winner of the Dairy Darling Contest.

Home Economics Scholarship. The faculty of the school of home economics awards one \$100 scholarship to a high school graduate who shows special interest and ability in the field of home economics.

Faculty Women's League Annual Freshman Scholarship provides tuition for one year for a freshman woman. Selection is based on need, scholarship, and leadership.

The following 4-H Club scholarships are available to Utah 4-H Club members. (Additional information may be obtained from county agents.)

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. These members scholarships are \$100 each and are to be used at Utah State Agricultural College or its branches. The scholarships are available in the following counties:

Beaver	Iron	Morgan	Tooele
Box Elder	Juab	Rich	Utah
Cache	Kane	Salt Lake	Washington
Davis	Millard	Summit	Weber

Standard Oil Scholarships. The Standard Oil Co. of California offers 5 scholarships to 4-H Club members in Utah as follows: \$350.00, 1st; \$300.00, 2nd; \$250.00, 3rd; \$250.00, 4th; and \$200.00, 5th.

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 U.S.A.C.

National 4-H Club Contests. National scholarships of \$300 each are available to 4-H Club members in at least 22 different projects or activities.

Sears Roebuck and Company Scholarships. For Freshmen in the School of Agriculture the company offers 13 scholarships of \$200 each, \$75 of which is paid at the beginning of the fall term, \$75 at the beginning of the winter term and \$50 at the beginning of the spring term. Winners are determined on the basis of scholarship, interest in agriculture, financial need, and leadership. The winner who has the best scholarship record at the end of his freshman year, receives an additional scholarship for use in his sophomore year. Application blanks and information may be obtained from the Dean's office.

SPEECH CLINIC

The Speech Clinic provides individual help and special classes for persons having speech handicaps. In addition to the speech and hearing examination required of all new students, remedial training is available to anyone. The types of problems handled include stuttering or stammering, stage fright, delayed speech development in children, baby talk, lispings and other articulation disorders, cleft palate speech, paralytic speech, "nervous" speech conditions, nasal speech, voice quality deviations, etc. All college students who have defective speech should register in the speech clinic, where they will receive attention. These services are also available to non-college students.

COLLEGE CITIZENSHIP

"Students in a state-supported, land-grant college like the U. S. A. C. are expected to lead in setting high standards of conduct. The College relies primarily on the good taste and sense of personal responsibility on the part of its students for the high level of behavior generally maintained. So that newcomers to our campus can be readily informed, the following well-established rules and traditions are listed:

- A. The College has a long tradition of no smoking in College buildings.
- B. Alcoholic beverages are not used on campus, in college-supervised living quarters, or at any social function. Intoxicated individuals may be requested to leave college functions.
- C. A code of personal honor is traditional at Utah State Agricultural College. Cheating is neither condoned nor accepted.
- D. The friendliness and informality at Utah State are vital to the success of the College. As an Aggie, you have an obligation to be friendly.
- E. A good citizen pays his bills. Now that you are on your own on the Aggie Campus, you should pay yours."

Aggie Bluebook, 1951-52, p. 20

RELIGION

The officers of the College are deeply interested in the spiritual and moral growth of the students. Every student is encouraged to affiliate with the church of his choice immediately upon registering at the College.

Outstanding religious leaders of the Latter-day Saint, Protestant and Catholic faiths cooperate with the College in serving the students of their respective churches. Accredited courses in religion are also offered by scholars representing each of these groups. An L. D. S. Institute, with a staff of four well trained instructors and an enrollment of more than 100 students, is adjacent to the campus.

COURSES OF INSTRUCTION

The courses of instruction offered by the College are listed below under the names of the seven academic Schools.

Courses numbered below 100 are Lower Division courses. Courses numbered above 100 are Upper Division courses. These may be pursued by a Freshman or a Sophomore only with permission of the Instructor of the course and the student's Dean.

Courses numbered above 200 are Graduate courses. Many Upper Division courses also yield Graduate credit.

The amount of credit in quarter hours for a course and the quarter in which the course is given are indicated in parentheses at the end of the course description. "F" is the abbreviation for Fall, "W" for Winter, "S" for Spring, and "Su" for Summer.

Late Organization Changes Not Fully Reflected in This Catalog

Several changes involving entire schools and departments were approved by the Board of Trustees as the catalog was about to go to press, too late for committees to resolve many questions of course transfers and changed number sequences, and to reorganize this edition. The principal changes are as follows:

The name of the School of Arts and Sciences was changed to the School of Humanities and Sciences.

The School of Commerce was renamed the School of Business and Social Sciences.

The Department of History, formerly in the School of Arts and Sciences, was merged with the Department of Political Science, and was thus transferred to the School of Business and Social Sciences. It will be known as the Department of History and Political Science. The History courses are, however, in this edition listed in the School of Humanities and Sciences.

A Department of Fine Arts was created in the School of Education. It embraces Art and Music, previously included in that School, and Drama, formerly in the School of Arts and Sciences. In this edition the Drama courses are still listed under "Speech" in the School of Humanities and Sciences.

The School of Home Economics was renamed the School of Home and Family Living.

SCHOOL OF AGRICULTURE

R. H. WALKER, DEAN

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SCHOOL OF AGRICULTURE

R. H. WALKER, DEAN

A. J. MORRIS, ASSISTANT DEAN

The best trained person receives the best employment opportunities in agriculture as in other occupations. Opportunities in crop and livestock production, marketing, extension work, teaching, research, positions in agriculture in the foreign service, and in various businesses related to agriculture await students who have adequate technical training. Food shortages throughout the world call for increased production and better distribution and for trained personnel to supervise these programs. Better adapted and higher yielding crops and breeds of livestock, better pest and disease control methods are needed to rehabilitate under-developed territories. Increase of soil fertility by prevention of erosion, more widespread use of fertilizers, better control of soil moisture are problems awaiting solution. Thus a great opportunity and a challenge await students who have an interest and an aptitude for agriculture and who are willing to prepare themselves properly.

Utah State Agricultural College is well equipped to train young men to meet these needs. Technical courses are given in crop and animal production, agricultural economics, rural social science, soil management, mechanic arts, and other basic sciences that underlie practical agriculture. Training is also given in English, literature, history, political science, the fine arts, hygiene and public health, and education, all of which supplement the practical, scientific agricultural training and contribute to the well-rounded education of students.

Instruction includes both the principles and practice of agriculture. A new agricultural science building provides the most modern laboratory equipment. The college farms, dairy manufacturing plant, livestock barns, plant breeding plots, gardens, orchards, and technical equipment offer excellent opportunities for combining scientific study with practical experience. A new milking parlor and modern dairy set up has been constructed during the past year, providing the most modern facilities for student training. Outstanding representatives of principal livestock and poultry breeds best adapted to Utah conditions afford a "standard of perfection" in desirable type and form for the student judge.

The College maintains an outstanding herd of Hereford and Shorthorn beef cattle. The Sears-Roebuck Foundation has given \$12,000 towards purchase of foundation beef cattle. Rambouillet, Columbia, Hampshire, Southdown, and Targhee breeds of sheep are maintained for comparative study. Kennecott Copper Company has given \$25,000 to the College toward the breeding and selection of more open-faced sheep of the Rambouillet breed. Duroc and Yorkshire swine are also kept. The dairy herd is made up of purebred Jersey and Holstein-Friesian cattle. The important breeds of chickens and turkeys are available at the new poultry and turkey farms. These animals afford teaching materials and experience in the care and handling of livestock.

Utah Agricultural Experiment Station is devising better methods of feeding, and cropping, is developing more valuable strains of fruits, crops and livestock, and more remunerative systems of marketing agricultural products. These activities are studied by the students first hand, and student employment enables many to take active part in the research work of the Experiment Station. This arrangement gives the student clear insight into scientific methods and valuable practical experience. Special attention is given 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 School of Agriculture is shown by the records of graduates who have gone back to the farm, or have become specialists as teachers or investigators, and have become leaders in their chosen work.

CURRICULA IN AGRICULTURE

Students entering the School of Agriculture may pursue one of three courses leading to the Bachelor of Science degree in Agriculture, as follows:

1. **General Agriculture**, which is designed to meet the needs of the student who desires a broad training in scientific and practical agriculture.
2. **Specialized Agriculture**, in which the student chooses to specialize or major in one department of the School of Agriculture.
3. **Technical Agriculture**, which is for the student who plans to pursue graduate study in one of the basic agricultural sciences, or who plans to enter employment in which technical agricultural training is required.

GENERAL AGRICULTURE

The course in general agriculture is designed to meet needs of students who desire a broad general training in scientific and practical agriculture. The curriculum for this course is partially prescribed as outlined below.

Unless the student has chosen a specific phase of agriculture in which to major, it is usually best for him to follow the curriculum in General Agriculture for two years. Later, when he decides to major in a specific field, he can arrange his major course without serious complications.

The prescribed courses and minimum number of credits in the various fields are as follows:

(a) Minimum Requirements in Following Divisions:

Agricultural economics	9
*Applied plant sciences	26
**Applied animal sciences	26
Engineering and technology	9
Total	70

(b) Physical Science, Biology, Social Science, and Language and Arts:

	Credits	Total
Physical Science		
Math. 34 or 35	3 or 5	
Chem. 10, 11 & 12 or 3, 4 & 5	15	18 or 20
Biology		
Botany 24 or 25	5	
Bacteriology 10 or 70 & 71	5	
Zoology 2 or 3 & 4	5 or 10	
Zoology 112	5	
Entomology 108	5	
Botany 130	5	
Social Science		
Principles of Economics 53	5	
Other social science courses (See College group requirements)	5	10
Language and Arts		
Eng. 10 & 110	9	
College group requirement (See College group requirements)	8	17
(c) Military Science or Physical Education	6	6
		81 to 88

Total credits prescribed	151
Elective	35
Total	186

*Courses to be selected from agronomy and horticulture.

**Courses to be selected from animal husbandry, dairy industry, poultry husbandry, and veterinary science.

Soils 56 is required as part of the 26 credits.

SPECIALIZED AGRICULTURE

A student may major in one of the following departments: Agricultural Economics and Marketing, Agronomy, Animal Husbandry, Bacteriology and Public Health, Botany and Plant Pathology, Dairy Husbandry, Horticulture, Poultry Husbandry, or Zoology, Entomology and Physiology. Information concerning the curriculum for a major in any of these departments may be obtained from the head of the major department, who should be consulted before registering.

In addition to major and minor requirements as specified by each department, the student majoring in specialized agriculture is required to take a minimum of one 3-credit course in each of two departments in the applied plant sciences and one 3-credit course in each of two departments in applied animal sciences.

He must also complete the following:

Mathematics 34 or 35

Chemistry 10, 11 & 12 or 3, 4 & 5

(Majors in agricultural economics may substitute Physical Science 31 and 32 and another 5 hours of exact science for 15 hours of chemistry)

A minimum of 14 credits in the following courses:

Botany 24 and 25

Zoology 2, 3 and 4

Bacteriology 10 or 70, 71

Zoology or Botany 1

Physiology 4

(See various department course requirements in this group. Zool.

1, Bot. 1, and Physiology 4 are not accepted by some departments)

Prin. of Econ. 53, 5 credits; and two additional 3-credit courses

Social science group, 8 credits

Language and arts groups, 8 credits

English 10 and 110

Agron. 56

A total of 186 credits, 60 of which are of Upper Division grade, and a minimum of 1 credit each term for six terms in military science or physical education are required for graduation from the School of Agriculture.

TECHNICAL COURSES

For students who plan to do graduate work or to enter employment in which technical training is required, technical courses are provided in each of the departments. Students may register for these courses only upon permission of the department and the dean.

NON-DEGREE COURSE IN AGRICULTURE

The School of Agriculture offers a 2-year non-degree course in practical agriculture for students who do not wish to take more than two years of college work. A student may register for any of the regular non-prerequisite production, marketing and management courses in the School 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, the student is required to take six

credits in the groups in which he does not major. For example, a student majoring in animal science must complete in addition to 20 credits in his major field, 6 credits in plant science, 6 credits in agricultural economics, and 6 credits in agricultural engineering. He is also required to take the following courses:

Biology, 5 credits; English 10, 5 credits; Physical Science, 5 credits; and Social Science, 5 credits.

The following courses are open to students in the non-degree course in Agriculture: Agricultural Economics 53, 58, 63, 70; Agricultural Engineering 14, 15; Agronomy 6, 7, 8, 56; Animal Husbandry 1, 10, 15; Dairy Husbandry 1, 3, 6, 7; Horticulture 1, 8, 10; Irrigation and Drainage 10; Landscape Architecture 3; Poultry Husbandry 1, 2, 8; Veterinary Science 20.

Students in the non-degree course must complete 96 credits to obtain a certificate.

Agricultural Economics and Marketing

**Administered jointly by the School of Agriculture and
the School of Commerce**

G. T. Blanch, Professor and Head of Department; V. L. Israelsen, Professor; R. H. Anderson, E. M. Morrison, E. W. Lamborn, Associate Professors; Wells M. Allred, Assistant Professor; Lynn H. Davis, Instructor; Jane U. Sandberg, Research Assistant; M. H. Taylor, Leon C. Michaelson, Extension Economists; Clyde E. Stewart, Collaborator in Research, U.S.D.A.

W. P. Thomas, Professor Emeritus.

Students majoring in the Department of Agricultural Economics and Marketing may be graduated from either the School of Agriculture or the School of Commerce. The choice of school should be determined by the field in which the student intends to do his minor work.

Students graduating from the School of Agriculture must satisfy requirements for graduation from that school, in addition to completing all courses required by the Department for students majoring in the School of Agriculture. Those graduating from the School of Commerce must satisfy the requirements of that school, and in addition complete the other courses required by the Department.

Master of Science Degree. The Department of Agricultural Economics offers opportunity for research and graduate study leading to a master of science degree. The facilities of the department for training graduate students in general agricultural economics, farm management, land economics, agricultural finance, marketing, and prices are augmented by the research investigations conducted by the department staff and the federal collaborator with the assistance of graduate students. The following courses in Agricultural Economics may be used for graduate credit: 102, 104, 105, 106, 112, 113, 114, 115, 116, 120, 121, 155, 163, 180.

Agricultural Economics 53 or its equivalent is prerequisite to all other courses in Agricultural Economics.

Suggested Course of Study for Major in Agricultural Economics in School of Agriculture

Exact Sciences:

Course	Credits
Math. 34	3*
Math. 35	5*
Chem. 10	
or Physical Sci. 31	5†
Chem. 11	
or Physical Sci. 32	5†
Chem. 12 or 5 hrs. in another exact science	5†

Total 18 or 20

*One of these is required

Biological Sciences:

Zool. 1 or Botany 1	5
Bact. 10 or 70 & 71	5
Physiology 4	5
Total	15

*14 credits required

Social Sciences (Excl. Econ.):

Sociology 10	5
Pol. Sci. 10	5
Sociology 141	3
Total	13

Languages and Arts:

Speech 1	5
English 40	5
Total	10*

*A minimum of 8 credits required

English Composition:

English 10	5†
English 110	4†
Total	9

Military Science or

Physical Education	6
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†These or equivalent course
required

Journalism:

Journalism 12	3
Journalism 120	3
Total	6

†These or equivalent courses
required

Economics:

Course	Credits
Economics 52	5†
Economics 107	3†
Economics 108	3†
Economics 155	3
Economics 165	3
Other	3
Total	20*

Business Administration:

Accounting 1 or 109	5 or 3
Other	6

Total 15*

*A minimum of 6 credits required

Applied Plant Science and Soils:

Agron. 56	4†
Agron. 6	1
Veg. Crops 1	3
Hort. 1	3
Other	7

Total 18*

*A minimum of 12 credits required

Applied Animal Sciences:

An. Hus. 1	3
An. Hus. 10	5
Dairy 1 or 109	3
Poultry 1	3
Other	4

Total 18*

*A minimum of 12 credits required

Agricultural Engineering:

Irri. & Drainage 10 or 112....	3 or 4
Ag. Eng. 15	3
Ag. Eng. 105	5

Total 13 or 14

Statistics:

Agron. 131	3
Agron. 132	3

Total 6

Major:

Course	Credits
Ag. Econ. 53†, 58†, 63†, 102†, 105, 106, 112, 120, 121†, 155, 163†	
Total	37

Rural Economy

✓ 53. **Fundamentals of Agricultural Economics.** A basic introduction to the field and principles of Agricultural Economics. (5F, W) Staff

X 104. **Economic Development of Agriculture.** Geography and use of agricultural resources with special reference to the United States. Taught alternate years, not taught 1955-56.

✓ 112. **Farm Cooperatives.** Principles of cooperation, organization, operation and management of cooperative sales, purchasing, and service associations. (3F) Thomas

X 113. **Analysis of Farm Cooperatives.** Primarily to give advanced training and experience in agricultural cooperation. Prerequisite or taken simultaneously: Ag. Econ. 112. Taught alternate years. (2F) Thomas

X 155. **Agricultural Laws.** A survey of laws of particular concern to those engaged in agricultural pursuits. Some special attention is given to laws of direct and immediate interest to Utah farmers. (3W) Israelsen

✓ 180. **Agricultural Policies.** An economic analysis of selected agricultural problems, together with government policies and programs associated therewith. (3S) Staff

✓ 230, 231, 232. **Seminar in Agricultural Economics.** Review and discussion of economic problems, principles and techniques in Farm Management, Agricultural Marketing and Rural Economy. (1F, W, S) Staff

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

Farm Management, Land Economics, and Agricultural Credit

X 58. **Introductory Farm Management.** A case-problem approach to the basic considerations of organizing the productive resources of a farm using the farm plan, using labor and power efficiently, and measuring the farm business success. (3S) Morrison

X 70. **Farm Accounts.** Farm accounts and their application to the organization and management of farms and to filing of income tax statements. (3S) Morrison

X 102. **Intermediate Farm Management.** Principles underlying organization and operation of farms for maximum returns with special emphasis on economic laws underlying production function and combinations. Designed for majors in Agricultural Economics and other students preparing for work as farm operators or specialists with farm people. (3W) Blanch

X 105. **Agricultural Credit.** Principles of agricultural credit. Emphasis on problems and methods of financing agriculture. Taught alternate years. Not taught 1955-56.

X 106. **Land Economics and Utilization.** Economic principles underlying utilization, valuation, and tenure of agricultural land. Attention given prevailing land policies and methods and techniques involved in dealing with problems of land use. Taught alternate years. (5S) Blanch

X 202. **Advanced Farm Management.** Primarily to give students advanced training and experience in farm management. Prerequisite: Ag. Econ. 102. (3S) Morrison

✓ 206. **Farm Appraisal.** A basic course in land appraisal and economic classification of land. (2F) Blanch

Marketing and Prices

- ✓ 62. **Principles of Marketing.** Principles, methods, and practices of marketing. (5F, W) **Anderson**
- ✓ 63. **Marketing Agricultural Products.** Economic principles, marketing agencies, functions, and channels of distribution. (3S) **Allred**
- ✓ 114. **Marketing Fruits and Vegetables.** Principles of marketing applied to marketing of fruit and vegetables. Taught alternate years. (3F) **Lamborn**
- ✓ 115. **Marketing Poultry and Dairy Products.** Principles of marketing applied to marketing poultry and dairy products. Taught in alternate years. Not taught 1955-56.
- ✓ 116. **Marketing Livestock and Livestock Products.** Principles of marketing applied to marketing livestock and livestock products. (3F) **Davis**
- ✓ 120. **Agricultural Prices.** Economic principles underlying prices. Factors, policies, and programs as they relate to and influence agricultural prices. (3F) **Thomas**
- ✓ 121. **Statistical Analysis.** Statistical techniques applied to Agricultural Economics data. (3S) **Israelsen**
- ✓ 163. **Intermediate Marketing.** Principles of marketing and their application to specific problems. (3W) **Anderson**

General Graduate Courses

- ✓ 214. **Research in Agricultural Economics.** Thesis. Any quarter. Time and credit arranged. **Staff**
- ✓ 215. **Special Problems in Agricultural Economics.** Any quarter. Time and credit arranged. **Staff**
- ✓ 240. **Research Methods in Agricultural Economics.** (2F) **Blanch**
- ✓ 241. **Research Methods in Agricultural Economics.** Prerequisite: Agr. Econ. 240 (2W) **Blanch**

Agricultural Education

S. S. Richardson, Professor and Head of Department; Eldon Drake, Assistant Professor.

Students preparing to teach vocational agriculture register in the Department of Agricultural Education. In the curriculum planned for training 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 training for youth and adults in the vocation of farming. This curriculum meets minimum requirements for the general secondary and vocational agriculture certificates as set forth by the Utah State Board of Education. Counseling service is available to assist students in selecting courses throughout the four years of college work.

Master of Science Degree

Opportunity is offered for research and graduate study in Agricultural Education through any major department in the School of Agriculture. Students planning to do graduate work should select a co-ordinated program of study in the Schools of Agriculture and Education.

Prescribed Course for Majors in Agricultural Education Institutional and General Requirements

Biological Sciences:		Cr. Tot.	Social Sciences:		
*Botany 24	5		*Agr. Econ. 53	5	
*Zoology 2	5		*Sociology 10, or 70, or		
Zoology 112 (Genetics)	5		*Political Science 10, or		
*Bacteriology 10,			*History 14	5	10
or 70 & 71	5	20			
Language and Arts:		Cr. Tot.	Exact Science:		
*Landscape Architecture	3		*Chemistry 10, 11, 12	15	
*Speech, or Music, or			*Mathematics 34	3	
*Art or Literature	5	8	Radio 21, Physics 3 or 6		
English:			or 7, Geology 3	4	22
Sophomore Composition			Total		69
(10)	5				
Advanced Composition					
(110)	4	9			

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

Animal Industry†		Cr. Tot.	Education		Cr. Tot.
An. Hus. 10	5		Education 112, 113, 114,		
Elective	15	20	125, 126	22	
Plant Industry†			Psychology 102	5	
Agron. 56 (Soils)	4		Public Health 155	3	
Elective	16	20	Elective	3	33
Agricultural Economics			Total Minimum Requirements		
Agr. Econ. 58 or 102, 63	6		For B. S. Degree		
Elective	3	9	Institutional and General	69	
Agriculture			Agriculture	80	
Elective	11	11	Education	33	
Agricultural Engineering*			Military Science & P. E.	6	
Irrig. 10	4		Total		188
Elective	16	20			
Total		80			

Courses

112. Principles of Vocational Education. Fundamentals in general and vocational education. Social and economic basis for vocational education. (3W) Richardson

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 all teaching. Special attention is given to selection, organization, and teaching of subject matter and supervision of agricultural activities on the farm. (5W) Richardson

*Courses which meet lower division group requirements.

†Elective courses must be selected from at least two departments.

126. **Directed Teaching in Agriculture.** Student observation and teaching under supervision in approved local vocational agricultural departments. Student teachers leave the campus to train in selected high schools for a full teaching program for five or six weeks. (4-8 W or S)

128. **Auxiliary Problems.** Developing a sound F. F. A. program, for leadership and educational contests. (3F) Richardson

151. **Extension Methods.** For prospective home demonstration and county agricultural agents. History, objectives, organization and accomplishments of extension work in the United States. Farm and home problems, youth and adult education, and extension methods. (3W or S) Staff

225. **Special Problems in Agricultural Education.** A consideration of needs of individual upper division and graduate students and special types of service. (1-2; S) Richardson

226. **Young Farmer and Adult Classes.** Fundamental principles and techniques in organization and instruction of young farmers and of adults in farming occupations. (3S) Richardson

Agronomy

D. W. Thorne, Professor and Head of Department; D. W. Pittman, D. C. Tingey, H. B. Peterson, Professors; W. H. Bennett, G. L. Stoker, S. A. Taylor, LeMoyne Wilson, D. R. McAllister, Associate Professors; Rex Nielson, Gordon Van Epps, Assistant Professors; Louis A. Jensen, Paul D. Christensen, Extension Agronomists; J. W. Carlson, J. L. Haddock, Vern K. Hugie, Alvin C. Hull, Stanford J. Kitterman, Wesley Keller, Denton C. Linton, M. W. Pedersen, J. P. Thorne, R. W. Woodward, John W. Metcalf, Collaborators in Research, U. S. D. A.

D. S. Jennings, Professor Emeritus.

Bachelor of Science Degree in Agronomy

Study and research in Agronomy focus upon problems of crop production and soil conservation in arid regions. Course offerings emphasize interrelations of plants, soil, precipitation, and irrigation water in production of maximum crop yields under a variety of conditions. Four types of majors for the bachelor's degree are offered within the department: General Agronomy, Soil Conservation, Technical Field Crops, and Technical Soils. In addition, a joint major termed Irrigation and Soils is offered between the departments of Agronomy and Irrigation and Drainage.

Every candidate for the Bachelor of Science degree in Agronomy is required to demonstrate a reasonable knowledge and skill in common farm operations.

Major in General Agronomy

A major in General Agronomy prepares the student for positions related to the management of soils and the production of field crops. Training in general agronomy is preparatory to civil service positions such as agronomist, conservationist, farm planners and soil scientists. Many Agronomy majors are also employed in commercial fields such as field men for sugar beet companies, seed companies, fertilizer distributors, and canning companies. Special course outlines have been prepared to train students for such positions. Studies in General Agronomy are also designed to train students who desire to farm, to be county agricultural agents, or to take field positions related to soils or crop production with various other state and federal agencies. Students majoring in General Agronomy may partially specialize in either crops or soils.

In addition to the general requirements of the college and the School of Agriculture all majors in General Agronomy must take Geol. 3; Bot. 24, 25, and 120 or 130; Bact. 10; Ent. 108; Math. 35, 44; Agronomy 6, 7, 8, 56, 103, 107, 111, 112, 113, 118, 155, and either 109 or 114. A minimum of one summer of practical farm experience is required of all majors in General Agronomy before graduation.

Major in Soil Conservation

A major in Soil Conservation prepares the student for employment as a specialist in the Soil Conservation Service, the Soil Conservation Division of the Indian Service, Soil Surveyors, Soil Scientists in the Bureau of Reclamation, as well as other positions related to the reclamation and conservation of soil and water resources.

In addition to the general requirements of the college and the School of Agriculture, all majors in Soil Conservation must take: Geol. 3 and 115; Bot. 24, 25 and 120 or 130; Bact. 10; Math. 35 and 44; Irrig. and Dr. 10; Engr. Dr. 60 or 61 and 62; Civil Engr. 81 or 84, and 171; Range Mgt. 160; and Agron. 6, 7, 8, 56, 103, 107, 111, 112, 113, 114, 118 and 155. A minimum of one summer of practical farm experience is required of all majors in Soil Conservation before graduation.

Major in Technical Field Crops

Majors in Technical Field Crops are prepared for graduate work and technical employment in plant breeding, crop production, weed control and seed technology. Students having high scholastic standing and special aptitude in the fundamental sciences who are interested in the plant sciences find real opportunity in this major.

In addition to general college requirements, majors in Technical Crops should take Bact. 10 or 70 and 71; Bot. 24, 25 and 120 or 130; Chemistry 3, 4, 5 and 125 and 126 or 12 and 115; Mathematics through 99; Physics 6 and 7 or 17, 18, 19; Geology 3; Ag. Econ. 53; Animal Science, 5 hours; Horticulture, 3 hrs.; I. D. 10 or 112, and Agronomy 6, 7, 8, 56, 103, 107, 109, 111, 112, 113, 118, 120, 131, 132 and 155.

Major in Technical Soils

Majors in Technical Soils are prepared for graduate work and technical employment in research, soil testing, land classification, and soil management. Students having high scholastic standing and marked ability in the fundamental sciences find real opportunities in this major.

In addition to general college requirements, majors in Technical Soils should take Bact. 10 or 70 and 71; Bot. 24, 25, 120; Chemistry 3, 4, 5 and 17 and 18 or 115; Physics 17, 18, 19; 5 hrs. of either Organic Chem. or Advanced Physics; Math. through 99; Geol. 3; Ag. Econ. 53 and 102; An. Sci., 5 hrs.; Hort. 3 hrs.; I. D. 10 or 112; Agron. 6, 7 or 8, 56, 103, 107, 111, 112, 113, 114, 131, 132, 165.

Major in Irrigation and Soils

This joint major between the departments of Agronomy and Irrigation and Drainage is designed for students who wish to specialize in problems related to the management of land and water in irrigation agriculture without specializing in technical engineering phases of irrigation. Extension specialists, civil service positions, and farm managers represent some types of employment available to graduates in this field.

In addition to general college requirements, majors in Irrigation and Soils should take Bot. 24, 25; Chem. 3, 4, 5; Math. through 99; Physics 17, 18, 19; Geol. 3; Ag. Econ. 53, 102; I. D. 112, 145, 149, 160; Eng. Drawing 61, 62; C. E. 81 or 84; An. Sci., 5 hrs.; Hort., 3 hrs.; Agron. 6, 7 or 103, 56, 107, 155, 165, and Agron. 114 or Ag. Eng. 108.

Master of Science Degree

The Agronomy Department offers opportunity for study and research toward the Master of Science degree. A year of graduate study in the department is also accepted by other colleges and universities as a year toward a Ph.D. degree in the subject pursued. The outline of studies and the research program are designed around the objectives of the individual student. The department in co-operation with related departments, is prepared to give strong programs in various phases of plant breeding, crop production, weed control, soil chemistry, soil physics, soil conservation, soil management, and soils and irrigation.

The following courses are acceptable for graduate credit toward the Master of Science degree in Agronomy: 109, 110, 120, 131, 132, 155, 160, 165; in addition, for students majoring in crops, 107.

The following courses are acceptable for graduate credit toward the Master of Science degree in departments other than Agronomy: 103, 107, 109, 110, 114, 116, 117, 120, 121, 131, 132, 155, and 165.

Doctor of Philosophy Degree

The Agronomy Department in co-operation with related departments is approved for the offering of advanced study and research for the attainment of the degree of Doctor of Philosophy in specialized fields of soil science related to irrigation agriculture. Detailed information may be obtained from the department or from the Dean of the Graduate School.

Suggested Course of Study for Majors in General Agronomy

Freshman

Courses	Cr.
Math. 34, 35, 44	11
Bot. 24, 25	10
Soc. Sci.	5
Lit. or Art	5
Agron. 6, 8	4
Poultry 1 & 2	4
Veg. Crops 1 & 2	4
Hort. 1	3
P. E. or M. Sci.	3
	<hr/> 50

Sophomore

Chem. 3, 4, 5, 12 or 10, 11, 12	20 or 15
Geol. 3	5
Eng. 10	5
Agron. 7, 56	8
An. Hus. 10	5
Irrig. & Dr. 10	4
P. E. or M. Sci.	3
	<hr/> 45 or 50

Junior

Courses	Cr.
Agron. 103, 107, 118, 131	14
Bact. 10	5
Agr. Econ. 53, 58, 63	11
*Ent. 108	5
Eng. 110	4
Dairy 109	3
Lib. Sci. 106	1
Phys. 6	5
Land Arch. 3	3
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Senior

Agron. 111, 112, 113	3
Agron. 114, 155	8
*Agron. 109 or 165	3 or 4
Bot. 130	5
*Zool. 112 or Geol. 115	5
Range Mgt. 160	5
An. Sci. Elect.	6
*Agr. Ed. 151	3
Electives	10
	<hr/> 48

For a Soil Conservation major, substitute the following courses for those marked (*): Geol. 115, Agron. 160, 110, Engr. Dr. 60, C. E. 81 and 171.

Farm Crops

6. Crops Laboratory. Morphology, growth habits and identification of crop plants. One 3-hour lab. (1F, W, S) **McAllister**

7. Grain Crops. The classification, history and cultural methods involved in the production of grain crops. Prerequisite: Agron. 6. Three lectures. (3W or S) **McAllister**

8. Root and Miscellaneous Crops. Sugar beets, potatoes, tobacco and fiber crops are studied as to cultural methods, market types and commercial possibilities. Prerequisite: Agron. 6. Three lectures. (3F or W) **Bennett**

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. Prerequisite: Agron. 6. Three lectures. (3F or S) **Bennett**

109. Plant Breeding. Principles, techniques, and practices in breeding improved varieties of crop plants. Prerequisite: Zool. 112. Three lectures, one 3-hour lab. (4F) **Tingey**

118. Weeds. Identification of weeds and plants, the weed problems in agriculture and methods of control. An assessment is made for field trips. Two lectures, one 3-hour lab. (3F) **Tingey**

120. Field Crop Seed Production. Methods, problems, and commercial possibilities of field crop seed production in the Intermountain West. Two lectures. (2W) **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. Prerequisite: Agron. 6. Two 3-hour labs. (2S) **McAllister**

124. Advanced Judging, Grading and Identification. Prerequisites: Agron. 6, 118 and 121. Two 3-hour labs. (2F) **McAllister**

201. Hays and Pastures. Recent advances in current problems related to the production and utilization of hays and pastures. Prerequisite: Agron 6 and 103 or equivalent. Three lectures. (3W) **Bennett**

203. Sugar Beets and Potatoes. Recent advances in improvement and production. Prerequisite: Agron. 6 and 8. Two lectures. (2F) **Bennett**

204. Cereal Crops. Recent advances in the improvement and production of cereal crops. Prerequisite: Agron. 6 and 7. Two lectures. (2S) **McAllister**

205. Weeds. Recent advances in methods of weed control. Two lectures. (2W) **Tingey**

209. Advanced Plant Breeding. The science and practice of plant breeding. Original papers and lectures. Three lectures. (3W) **Tingey**

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

Soils

56. Introductory Soils. Fundamentals of soils with a brief study of soil fertility and management problems. A beginning course for students in agriculture. Prerequisite: Inorganic Chem. Three lectures, one 3-hr. lab. (4F, W or S) **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. One credit. Given the same as Agron. 56 laboratories. **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 Chem. (Credit not given for both 56 and 58.) Four lectures, one 3-hr. lab. (5S) **Pittman**

107. Fertility and Management of Irrigated Soils. Methods and amounts of irrigation water application in relation to soils and crops. Fertilizer

selection and use in relation to irrigation and soil management. The management and reclamation of saline soils. Organic matter maintenance in soils. (Course may be taken as Agron. 207, 3 Cr. by special permission.) Prerequisite: Agron. 56. Five lectures. (5F or W) Peterson; Thorne

110. Soil Microbiology. See Bacteriology 110.

114. Soil Conservation and Survey. Principles and techniques of soil survey and conservation and land classification. Problems of land policy and management and field practice in farm planning. Prerequisite: Agron 56, and 3 credits in field crop production or range management. Two lectures, 3 lab periods. (5S) Wilson

155. 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: Agron. 56. Two lectures, one 3-hr. lab. period. (3W) Peterson

165. 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. Prerequisite: General Soils, General Physics or Chemistry, or approval of the instructor. Three lectures. (3F) Taylor

212. Seminar. Review of current literature in soil science. Required of graduate students in soil science; open to staff members. One credit per quarter, on conference. (1F, W, S) 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. Prerequisites: Agronomy 165 and approval of the instructor. Three lectures. (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. Two lectures. (2S) Thorne

220. Range and Forest Soil Problems. Special soil problems associated with soils used for forest or range. Prerequisite: Agron. 58, 155, 165. 2 cr. Time arranged. Pittman

221. Genesis, Morphology and Classification of Soils. A critical review of basic principles of soil classification, soil forming factors in relation to generic, morphological and zonal distribution of soils. Prerequisite: Agron. 114 or permission of instructor. Three lectures. (3S) Staff

224. Soil Chemistry. Composition and reactions of soil colloids. Prerequisite: Approval of instructor. (3F) Peterson

227. Chemical Analysis of Soils. A laboratory course in soil chemistry. Two lab. periods. Prerequisite: Agron. 155 and 224, or approval of instructor. (2S) Peterson

266. Physical Analysis of Soils. A laboratory course in Soil Physics. Registration limited to twelve students. Two 3-hour lab. periods. Prerequisite: Agron. 165. (2W) Taylor

Special Courses

111, 112, 113. Agronomy Seminar. Review and discussion of current agronomic problems and practices. Required of all seniors in department. One lecture. (1F, W, S) Staff

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: Agron. 7 and 56. Two lectures. (2S)

Pittman

117. Geography of Agriculture. A brief review of the principal agricultural regions of the world, with topography, climate, soils, livestock, population and industries considered in relation to agriculture. Two lectures. (2W)

Pittman

131, 132. Applied Statistics. Sample-based inferences about populations. Individual and group comparisons. Tests of significance. Linear regression and correlation. Analysis of variance and covariance. Multiple regression. Individual degrees of freedom. Prerequisite: Math. 35 or equivalent. Three lectures. (3F, W)

Crandall

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

Staff

215. Design of Experiments. Fundamental principles of experimental designs. Completely randomized blocks; latin squares; components of error; confounding; factorial, split plot and incomplete block designs; fractional replication. Prerequisite: Agron. 131 and 132. Three lectures. (3S)

Crandall

218. Special Problems. Special problems in crop production, crop breeding, soil fertility or other phases of agronomic work. Students review literature on the problem and conduct experiments. Any quarter. Time and credit arranged.

Staff

230. Research and Thesis. Outlining and conducting research in soils or farm crops and preparation of thesis. Any quarter. One or more credits each quarter.

Staff

256. Data Processing on Electric Accounting Machines. Adaption of research data to electric accounting machines. Card design. Coding systems. Experimental design. Analysis of enumeration and measurement data. Analysis of variance. Multiple regression techniques. Prerequisite: Research experience or statistical background. Two lectures, one lab. (3W)

Hurst

Animal Husbandry

J. A. Bennett, Professor and Head of Department; L. E. Harris, G. R. Henderson, Professors; R. H. Keetch, M. A. Madsen, H. Steffen, Associate Professors; Doyle Matthews, Darrell Matthews, Assistant Professors; W. V. Hartwell, Research Assistant Professor; J. R. Harris, D. O. Williamson, Research Associates; Robert J. Raleigh, Research Assistant.

Students majoring in Animal Husbandry are expected to complete 32 credits in this field, including courses numbered 1, 2, 10, 40, 110, 125, 150, 155, 160 and 165.

For students who plan to enter livestock production, county agent work, vocational agricultural teaching or some similar work, a minor in Agricultural Economics, Agronomy, Dairy Husbandry, Poultry Husbandry, or Range Management is recommended.

Graduate study leading toward the Master of Science degree is offered in animal breeding, nutrition, and production. In addition to graduate courses (in the 200 series) courses 150, 151, 155 and 175 may be used for credit by graduate majors in related departments and by graduate majors in Animal Husbandry if the student's supervisory committee approves.

Suggested Course of Study for Majors in Animal Husbandry

Freshman			Junior		
Course		Credit	Course		Credit
An. Hus. 1 & 2, 40		6	An. Hus. 110, 125, 165		9
M. S. or P. E.		3	Dairy 109 or 110	3 or 5	
Math. 34 or 35	3 or 5		Agron. 6, 7, 8, or 107	4 or 5	
Bot. 24 or 25		5	Agr. Econ. 58, 63		6
Bact. 10		5	Vet. Sci. 120		4
Agr. Econ. 53		5	Zool. 112		5
Soc. 10 or 70, or			English 110		4
Pol Sci. 10 or Hist. 14		5	Electives	5 to 9	
Speech 1 or 5	5 or 3				
Vet. Sci. 20		5			
Electives		6 to 10			
Total		48	Totals		45
Sophomore			Senior		
An. Hus. 10		5	An. Hus. 150, 155, 160,		
M. S. or P. E.		3	175, 185	18	
Chem. 10, 11, 12 or 3, 4, 5	15		Agr. Econ. 116 or 162	3	
English 10		5	Range Mgt. 160	5	
Zool. 3 & 4, or 2	10 or 5		Agron. 103	3	
Hort		3	Electives	16	
Agron. 56		4			
Language and Arts		3			
Electives	0 or 5				
Total		48	Total		45

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 or S) **Steffen**

2. Animal Husbandry Laboratory. Exercises in judging, market classification and practical problems. Should be taken at the same time as An. Hus. 1. Two lab. periods. (2F or S) **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 or S) **Steffen**

15. General Animal Breeding. For students who do not expect to major in animal science but who want general knowledge of reproduction and breeding principles and their application to larger farm animals. (3W) **Madsen**

40. Fitting and Showing Livestock. Current methods of fitting and training livestock for showing. Each student prepares and exhibits animals in a showing contest. (1F or S) **Matthews**

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: An. Hus. 10. (3F) **Bennett**

120. Swine Production. Systems of production with emphasis on those suited to western conditions. Breeds, management and feeding of the breeding herd, and feeding for market. Relation of the industry to dairy farming. Prerequisite: An. Hus. 10 (3W) **Steffen**

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: An. Hus. 10 (3W) **Matthews; Madsen**

150. Animal Nutrition. Attention given fundamental phases, including protein, carbohydrate, fat and mineral metabolism, vitamins, content and deficiencies of range forage, and feed and forage poisoning. Prerequisite: Chem. 10, 11, 12 (or equivalent), and An. Hus. 10 (4W) **Harris**

151. Nutritional Diseases. Cause, detection, treatment and prevention. Prerequisite: An. Hus. 150, senior standing or special permission of instructor. Taught alternate years. (Not taught 1955-56) (3W) **Harris**

155. Animal Breeding. Application of genetics to improvement of farm animals. Breeding systems, inheritance problems, fertility and sterility in larger farm animals are emphasized. Prerequisite: Vet. Sci. 20, Zool. 112. Four lectures, one lab. (5S) **Bennett**

160. Livestock Production Problems. Attention is given various problems in livestock production, especially in Utah. Students are expected to apply knowledge acquired in previous courses. Prerequisite: An. Hus. 110 and 125. (3S) **Madsen**

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: An. Hus. 2. Three labs. (3F or S) **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 are included. 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, uses, nutritive value, chemical composition, and palatability. Preparation of meats for the home freezer will be emphasized. (3W) **Matthews**

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

210. Problems in Animal Nutrition. Assignment, discussions and reports. Students review literature of animal nutrition and prepare reviews of assigned topics. Prerequisite: An. Hus. 150. (2-6F, W or S) **Harris**

215. Nutrition Laboratory. Review and practice in techniques used in nutrition research. Two labs. (2F or W) May be repeated. **Harris**

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

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. (2-5 F, W or S) **Bennett**

240. Animal Nutrition Research. Same as A. H. 231, except that research is in some phase of animal nutrition. (2-5 F, W or S) **Harris**

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

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 during Fall, Winter and Spring, respectively. (May be repeated.) (1F, W, S) **Staff**

TECHNICAL ANIMAL HUSBANDRY MAJOR

Exact Science	Math 35, 44, or 46	
	Chem. 3, 4, or 10 and 11, 5, 17, 18	41 to 48
	Physics 6, 7, or 17, 18, and 19	
Biological Science	Zoo. 3, 4	
	Botany 24 or 25	25
	Bact. 70 and 71	
	Zoo. 112	
Social Science	Ag. Econ. 53	5
	Elective in group	5
Lang. and Arts	Elective in group	8 to 12
English 10, 110		9
An. Hus.	10, 110, 125, 150, 155, 160, 165, 175	29
Other Animal Sc.	Vet. Sc. 20	5
	Dairy 109 or 110 or Poult. 1	3 or 5
Plant Cc.	Agronomy 6, 103, 56	8
Electives	32 to 45	138 to 151

Bacteriology and Public Health

Administered jointly by the School of Agriculture and the School of Humanities and Sciences

W. Whitney Smith, Professor and Head of Department; Kenneth R. Stevens, Professor; Lewis W. Jones, Associate Professor; Garth A. James, Instructor; John H. Carlquist, Special Professor; Homer Clark, Special Associate Professor; Russel S. Fraser, Special Assistant Professor. Special staff members from the Cache Valley Medical Association.

Bachelor of Science Degree

Bacteriology majors in Specialized Agriculture should take Bacteriology 10 or 70, 71, 104, 110, 120, 160, 291; Botany 24, 25; Chemistry 10, 11, 12, 190; Mathematics 34 or 35; Physiology 4; Physics 6, 7; Zoology 2 or 3 and 4; Public Health 50.

Bacteriology Majors in Technical Agriculture should take Bacteriology 70 or 10, 71, 104, 105, 110, 120, 160, 172, 180, 291, Public Health 152-153, Botany 24-25, Zoology 3, 4, Chemistry 3, 4, 5, 115, 125, 126, 191, Math. 35, 44, Physics 17, 18, 19, Library Science 106 plus such other courses in Veterinary Science Poultry Husbandry, Horticulture, Dairy Industry, Animal Husbandry, Agronomy, Foods and Nutrition, Forestry, and/or any other related agricultural subjects as are pertinent to the specific objectives and interests of the student.

Master of Science Degree

Graduate courses are offered in various specialized subjects, with strong support from related departments and agencies. Courses 110, 120, 131, 151, 152, 153, 156, 161, 168 and 180 may be used for credit by graduate majors in Bacteriology. These courses and courses 104, 105, 151, 152, 153, 156 and 160 may be modified and used for credit by graduate students in related departments.

Bacteriology

- 1. Principles of Biology.** Basic life principles illustrated in both plant and animal forms. Designed in combination with Bact. 10 or Physiol. 4 to meet the biological science requirements of the college. (5F, W, S) (See Biology) Jones
- 10. Elementary Bacteriology.** Basic concepts, practical applications, demonstrations. (Not open to students who offer credit in Bacteriology 70.) Five lectures (5F, W, S, Su) Smith; Stevens; James
- 70. General Bacteriology.** For majors in science departments. (Not open to students who offer credit in Bacteriology 10.) Three lectures (3F, W, S) Stevens
- 71. General Bacteriology Laboratory.** Prerequisite: Previous or concurrent registration in Bact. 10 or 70. Two 3-hour labs. (2F, W, S) Stevens
- 101. Systematic Bacteriology.** Classification relationships Prerequisite: Bact. 10 or 70. Two lectures (2S) Alternate years not taught, 1955-56. Smith
- 104. Dairy Bacteriology.** Microorganisms of milk and its products. Prerequisite: Bact. 10 or 70. Three lectures. (3F) Jones
- 105. Dairy Bacteriology Laboratory.** Two 3-hour labs. Prerequisite: Bact. 71, and previous or concurrent registration in Bact. 104. (2F) Jones
- 110. Soil Microbiology.** Relationships of microorganisms to soil fertility. Prerequisite: Bact. 10 or 70. Two lectures. (2W) Taught alternate years. Stevens
- 120. Food Microbiology.** Relationships of microorganisms to food preservation, spoilage, and poisoning. Prerequisite: Bact. 10 or 70. Two lectures. (2W) Taught alternate years. Stevens
- 131. Clinical Laboratory Methods.** Prerequisite: Bact. 71. (4S) James
- 133, 134, 135. Applied Medical Technology.** Practical work in hospital laboratories under close supervision.
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|--|-------------|------------------|
| Clinical Bacteriology and Serology | 2 months | Carlquist; Clark |
| Clinical Biochemistry | 3 months | Carlquist; Clark |
| Clinical Hematology | 1 month | Carlquist; Clark |
| Pathological Tissue Methods | 2 months | Carlquist; Clark |
| Blood Bank Procedures | 2 months | Carlquist; Clark |
| Electrocardiograph and Basal Metabolism Procedures | (13F, W, S) | Carlquist; Clark |
- 136. General Pathology Discussions.** (2F) Carlquist; Clark
- 137. Clinical Laboratory Methods Discussion.** (2W) Clark
- 138. Blood Bank and Blood Serology Techniques.** (1S) Clark
- 139. Pathological Conference.** (1S) Carlquist; Clark
- 160. Pathogenic Bacteriology.** Properties of pathogens and relationships to infectious diseases. Prerequisite: Bact. 71. Three lectures, two labs. (5F) James
- 161. Advanced Pathogenic Microbiology.** Common pathogenic molds, yeasts, and viruses. Prerequisite: Bact. 160. Four lectures, one lab. (5S) Taught alternate years. Staff
- 168. Immunology.** Prerequisite: Bact. 160. Three lectures, two labs. (5W) James
- 172, 173. Bacteriology Laboratory Methods.** (2W, 2S) Smith; Jones; James
- 180. Physiology of Bacteria.** Cellular chemistry and physiology. Prerequisite: Bact. 10 or 70, Organic Chemistry. Four lectures. (4W) Jones
- 190. History of Bacteriology.** (2S) Taught alternate years. Smith; Stevens
- 291. Seminar.** (1F, W, S) Staff
- 294. Special Problems in Bacteriology.** Special assignments, reports, and discussions. Preparation of a comprehensive and critical review. Time and credit arranged. Staff
- 299. Thesis Research.** Time and credit arranged. Staff

Public Health

Public Health courses do not satisfy biological science group requirements.

Personal Health. Health problems of college students; especially designed for freshmen and sophomores. Two lectures. (2F, W, S)

Members of Cache Valley Medical Association

50. Elementary Public Health. Communicable and non-communicable diseases of general community significance. No prerequisites. Three lectures. (3F) **Stevens**

151. Public and School Health Administration. Administration, organization and functions of health agencies. Prerequisite: P. H. 50. (3W) **Jones**

152-153. Environmental Sanitation. Biological background; control of air, insect, water, rodent, refuse, and food-transmitted diseases; housing, camping, and school sanitation. Two lectures per quarter. (2W, S) **Jones**

155. School Health. Health training for state certification requirements in health education. Three lectures. (3F, W, S, Su) **Stevens; James**

156. School Health Methods. Objectives, methods, curricula, and materials. Prerequisite: P. H. 155. Three lectures. (3W, S, Su) **Stevens; James**

159. Public Health Laboratory Methods. Experience in the practice of the Public Health Laboratory. (3 to 15 hours credit. Arranged) **Fraser**

254. Special Problems in Public Health. Assignments, reports, discussions. Preparation of a comprehensive and critical review. (Time and credit arranged.) **Staff**

Botany and Plant Pathology

Administered jointly by the School of Agriculture and School of Humanities and Sciences

Ralph W. Ames, Professor and Head of Department; W. S. Boyle, George W. Cochran, Herman H. Wiebe, Associate Professors; Arthur H. Holmgren, Associate Professor and Curator of the Intermountain Herbarium; Richard J. Shaw, Instructor; John L. Chidester, Thomas J. Denman, Research Associates; Orson S. Cannon, Eugene H. Cronin, Leonard L. Jansen, George H. Kaloostian, Bryce N. Wadley, Robert Zundel, Collaborators, U. S. Department of Agriculture.

Bachelor of Science Degree in Botany

Study and research in Botany focus upon four major fields of study: cytology, pathology, physiology, and taxonomy. Course requirements for all fields of botany include: Botany 24, 25, 30, 117, 120, 240, 241, 242; Math 35; Chem. 10, 11, 12; Zoo. 112. Required additional courses for the various fields of botany are as follows: Cytology: Botany 116, 118, 130 or 150; Zoo. 3, 4, 131; Chem. 124, 125; Physics 6, 7; Pathology: Botany 116, 130, 150; Zoo. 2; Ent. 108; Physiology: Botany 130 or 150; Zoo. 3, 4; Taxonomy: Botany 116, 118, 130, 150; Zoo. 107, 131, 214; Agronomy 56; Range Management 126; German 1, 2, 3; Latin 1, 2, 3.

Recommended additional courses for specialized fields include: Cytology: Botany 130 or 150; Math. 44, 97, 98, 99; Pathology: Botany 221, 222, 223; Ent. 230; Math. 44, 97, 98, 99; Chem. 124, 125; Physics 6, 7; Ag. Econ. 53; Bact. 70; Agronomy 56, 131, 132; Hort. 131, 1, 4, 6; Physiology: Botany 116, 130 or 150, 224; Math. 44, 97, 98, 99; Chem. 124, 125, 115; Physics 20, 21, 22; Bact. 180; Agronomy 56, 131, 132; Taxonomy: Agronomy 131, 132; Botany 104, 108, 112.

Course requirements for a teaching major: Botany 24, 25, 30, 120, 130.

Master of Science Degree in Botany

The Department of Botany offers opportunity for research and graduate study leading to the Master of Science degree in the following specialized fields: Cytology, Pathology, Physiology, Taxonomy. The research and graduate possibilities in these subjects are greatly augmented through the cooperation of the Utah Agricultural Experiment Station, United States Department of Agriculture, and the Intermountain Herbarium.

The following courses may be used for graduate credit by students majoring in the Department of Botany: 104, 118, 121, 135. In addition to the courses listed above, students in other departments may receive graduate credit for 117, 120, 130, 150.

1. Principles of Biology. Basic life principles illustrated in both plant and animal forms. For lower division students except those who may elect Bot. 24, 25 or Zool. 2, 3, and 5. (5F, W, S) Shaw

20. Common Plants of Utah. Plants characteristic of Utah valleys and canyons. Whenever possible, plants are studied in native habitats. Designed to aid teachers in grade and secondary schools. (5 Su) Holmgren

24. Elementary Botany. The structure, physiology and reproduction of flowering plants. Consideration given basic structure and functions of cells, tissues, stems, roots, leaves, flowers, fruits, and seeds. Three lectures, two laboratory periods. (5F, or S) Boyle; Shaw

25. Elementary Botany. A survey of the plant kingdom. Emphasis on comparative morphology and reproduction processes of representatives of the major groups of plants. Introduction to the classification of vascular plants is given toward the end. Three lectures, two labs. (5W, Su) 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. Two lectures, two labs. (5S) Holmgren

104. Taxonomy of Poisonous Plants. The kinds, relationships, and classifications of poisonous plants, chiefly of this region. Assumes a knowledge of fundamental principles of botany. (2W) Holmgren

108. Agrostology. A taxonomic study of native and imported grasses of the western ranges. Special attention to species important in grazing and soil binding. Assumes a knowledge of fundamental principles of botany. (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. (3F) Holmgren

116. Microtechnique. Principles and methods in the preparation of plant materials for microscopic study; theory and use of the microscope. Assumes a knowledge of fundamental principles of botany. (4W) Taught alternate years. Not offered in 1955-56. Boyle

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. (4S) Taught alternate years. Offered in 1955-56. Boyle

118. Cytology. A detailed study of the cell; emphasizes structure and behavior of chromosomes and their bearing on genetics, reproduction, and evolution. Assumes a knowledge of fundamental principles of botany or zoology. (4S) Boyle

120. Elementary Plant Physiology. Principles of absorption, mineral nutrition, food manufacture, metabolism, translocation, and growth. Assumes a knowledge of fundamental principles of botany. Prerequisites: Chem. 12 or 121. (5W or S) Wiebe

121. Water Relations of Plants. Consideration of rooting habits, sap concentration, transpiration and water requirements of plants. Prerequisite: Bot. 120. (3W) **Wiebe**

130. Principles of Plant Pathology. Fundamental principles underlying disease in plants. The types of disease and methods of study give the student a comprehensive view of plant pathology. Assumes a knowledge of botany fundamentals. Prerequisite: Bot. 24. (5F or S) **Ames**

135. General Virology. Biological, physical and chemical properties of viruses. Prerequisites: Bot. 130 or Bact. 160. (3W) Taught alternate years. Not offered in 1955-56. **Cochran, Jones**

140. Forest Pathology. Nature, cause and control of diseases affecting forest trees. Factors inducing loss in forest products are emphasized. Prerequisites: Bot. 24, 25 (4W) Taught alternate years. Not offered 1955-56. **Ames**

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: Bot. 25. (5W) Taught alternate years. Offered in 1955-56. **Ames**

221, 222, 223. Pathological Techniques. Special methods applied to plant pathology, physiology, and related subjects. Registration only by special permission. (2F, W, S) Taught alternate years. Offered 1955-56. **Staff**

224. Advanced Plant Physiology. Chemical reactions and transformations underlying the vital processes in plants. Prerequisite: Bot. 120. (3S) **Wiebe**

234, 235, 236. Special Problems. Open to qualified students majoring in pathology, taxonomy, plant physiology, or cytology. (2F, W, S) **Staff**

240, 241, 242. Seminar. (1F, W, S) **Staff**

250, 251, 252. Research. Open to all qualified college students in botany and plant pathology. Any quarter. Time and credit arranged. **Staff**

Dairy Industry

G. B. Caine, A. J. Morris, Professors; G. Q. Bateman, P. B. Larsen, L. R. Hunsaker, G. E. Stoddard, Associate Professors; L. R. Rich, Associate Professor and Extension Dairyman.

There is demand in the field of dairying for students who have had advanced training. Opportunity is offered to pursue graduate study with applications in chemistry, biochemistry, genetics, bacteriology, or economics.

All majors in Dairy Industry must have practical experience on a dairy farm or in a dairy manufacturing plant before graduation.

General Course in Dairy Production

Designed for students majoring in Dairy Production to prepare them for the management and operation of dairy farms and herds; and to become county agricultural agents or field men in the Dairy Industry.

Students must fill the general requirements of the college and the School of Agriculture and in doing so must take Zoology 2 and Botany 24 in filling the Biological Science group. The following courses are also required. Dairy 1, 6, 12, 109, 110, 111, 112, 115, 120 and 121; Bacteriology 10 or 70 and 104; Veterinary Science 20 and 120; Animal Husbandry 10 and 155; Chemistry 10, 11 and 12. Mathematics 34; Political Science 102 and Library Science 106; Zoology 112.

Technical Course in Dairy Production

Designed for students majoring in Dairy Production to prepare them for technical employment in the field of Dairy Production and for advanced study and research in this field.

In filling the general requirements of the college dairy students must take Zoology 2 and Botany 24. The following courses must also be taken. Dairy 1, 6, 12, 109, 110, 111, 112, 115, 120 and 121. Bacteriology 70, 71 and 104; Veterinary Science 20 and 120; Animal Husbandry 10, 150 and 155; Chemistry 3, 4, 5, 125 and 126; Mathematics 34 and 35; Agronomy 6, 7 or 8, 56 and 103; Agricultural Economics 53, 58 and 63; Zoology 112; Library Science 106 and Political Science 102.

General Course in Dairy Manufacturing

This course prepares students of commercial dairying to be plant operators, equipment and supply technicians, inspectors, graders, and sanitarians.

In addition to the general college requirements students in general Dairy Manufacturing must take: Chem. 10, 11, 12, 107 and 108; Math. 34; Ag. Econ. 53, 62, and 115; Land Arch. 3; Poultry 1 and 2; Bacteriology 104 and 105; Business Administration 20 and 63; Agr. Engineering 4; Dairy Industry 5, 6, 101, 102, 103, 104, 105, 110, 215, 254.

Technical Course in Dairy Manufacturing Plant Management

This course prepares students for plant managers, salesmen and dairy industry administrators.

In addition to the general college requirements students in the technical course in Dairy Plant Management must take: Chemistry 10, 11, 12, 107 and 108; Math. 34; Ag. Econ. 53, 62 and 115; Poultry 1 and 2; Bacteriology 104 and 105; B. A. 20, 63, 151, 152, 153, 154 and 156; Agr. Engineering 4; Dairy Industry 5, 6, 101, 103, 104, 105, 110, 215 and 254.

Technical Course in Dairy Manufacturing in Preparation for Research and Quality Control

In addition to the general college requirements students in the technical course in Dairy Manufacturing Research and Quality Control must take: Chem. 3, 4, 5, 17, 18, 121, 122, 107, 108; Bact. 104, 105, 160 and 180; Agron. 131 and 132; Library Science 106; Physics 6; Math. 35 and 44; Dairy Industry 5, 6, 101, 102, 103, 104, 105, 110, 121, 215 and 254.

1. General Dairy Husbandry. Considers history and present status of the dairy industry; starting dairy herds; breeds of dairy cattle; cow testing associations; club work; study of herd records; calf feeding; general principles of feeding. (3F, W or S) Caine

3. Principles of Dairy Industry. History and development of the dairy industry; composition and secretion of milk; use and operation of the separator and Babcock test; dairy arithmetic; and a brief preview of market milk, butter, cheese, and ice cream (3W) Larsen

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

6. Market Milk. Modern sanitary methods of producing, processing, and marketing milk, cream, and related products for city supply. (5F) Larsen

7. Dairy Practice. For special or short course students only. Practice in plant manufacture emphasized. Any quarter. Time and credit arranged. Larsen

12. Breeds of Dairy Cattle. History and development of all breeds of dairy cattle; emphasis on the various families within breeds; requirements for official testing; pedigree and herd book study. (3F) Caine

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 creams, sherbets, and ices. Merchandising and selling included. (5S) Morris

102. Manufacture of Butter. Receiving and grading of milk and cream. Neutralization and pasteurization of cream. Manufacture, packing, and grading of butter under commercial conditions. Quality and composition control are emphasized. (5S) Taught alternate years. Larsen

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. Theory and practice of manufacture of evaporated, sweetened condensed milk powder and other concentrated milk products. Consideration is given to plant processes, vacuum pan and drier operation, factors affecting quality and utilization. (5W) Larsen

105. Management and Operation of Dairy Manufacturing Plants. Personnel problems, advertising, selling, managerial use of records, and other principles underlying successful management and operation are considered. All operations of the creamery are conducted by this class. Application for admittance must be made in writing. (6F, W or S) Morris, Larsen

109. Dairy Production. A brief review of the dairy industry. The place of dairying in a permanent system of agriculture. Study of dairy type, brief review of breeds of dairy cattle. Factors to consider in selecting a breed. Selection of cows; system of record keeping; selection, care and management of the herd sire. (3W) Caine

110. Dairy Production. A brief review of dairy cattle breeding, calf feeding and management, developing dairy heifers, factors influencing the growth and development of dairy cattle, the care and management of dairy herds. Special emphasis on feeding for milk production. A thorough study of housing dairy cattle. (5S) Caine

111. Dairy Cattle Judging. The types of various breeds of dairy cattle. Visits to important herds. Valuation of dairy cattle. (2S) Caine, Hunsaker

112. Feeding Dairy Cattle. Metabolism and the characteristics of feeds and feeding standards. Emphasizes practices under irrigation farming. (3W) Hunsaker

120. Dairy Cattle Breeding. Studies of the inherited characteristics of dairy cattle to be considered in selecting breeding stock. Artificial insemination of dairy cattle, physiology of reproduction, and breeding programs and systems in use. (3W) Hunsaker

121. Milk Secretion. A brief review of the mammary gland. Theories of milk secretion and study of some problems related to management, including mastitis control, flavors in milk. (3S) Hunsaker

215. Seminar. Discussion and reports of current literature. Any quarter. Time arranged. Caine; Larsen; Hunsaker

216. Graduate Research in Dairy Production. Any quarter. Time and credit arranged. Stoddard

217. Graduate Research in Dairy Manufacturing. Any quarter. Time and credit arranged. Morris

254. Special Problems in Dairy Industry. Any quarter. Time and credit arranged. Caine; Larsen; Hunsaker

Horticulture

Leonard H. Pollard, Professor and Head of Department; E. Milton Andersen, Associate Professor and Extension Vegetable Crops Specialist; Anson I. Call, Associate Professor and Extension Fruit Specialist; J. Clark Ballard, Robert K. Gerber, Robert A. Norton, and Dattajeerao K. Salunkhe, Assistant Professors; Otto Riethmann, Instructor; Odeal Kirk, Superintendent, Howell Field Station; Rulon Draper, Superintendent, Farmington Field Station; Leslie R. Hawthorn, Collaborator in Research, USDA.

Students may pursue a course in general Horticulture, or they may specialize in Pomology, Floriculture or Vegetable Crops. All students majoring in Horticulture are required to take the same basic course during the first two years. Suggested special courses are outlined for the Junior and Senior years.

Master of Science Degree

The department offers work towards a Master of Science degree in Horticulture. A year's study in this department is accepted by other colleges and universities as a year toward a Ph.D. degree in the field of study pursued. The outline of studies and the research program are designed around the objective of the individual student.

All courses in horticulture numbered above 100 may be used for graduate credit.

Horticulture 1, 2, 4 and 5 may be counted to fill the horticultural requirement for students in the various fields of agriculture.

Lower Division Courses in Horticulture

Freshman	Cr.	Sophomore	Cr.
Math. 34 and 35	3-5	Chem. 10, 11, 12, or 3, 4, 5	15
P. E. or M. S. & T.	3	Speech 1 or 5	5-3
Botany 24 & 25	10	Eng. 10	5
Agr. Econ. 53	5	Agron. 56	4
Hort. 1	3	Animal Science	0-3
Hort. 2	1	Landscape Arch.	3
Hort. 4	3	P. E. or M. S. & T.	3
Hort. 5	1	Hort. 10 or 11	4 or 3
Animal Science	3-6	Hort. 6	3
Social Science	5	Social Science	3
Bact. 10 or 70 & 71	5	Ag. Econ. 58 & 63	6
Botany 30	5		
	50-52		50-54

Suggested Courses for Students in General Horticulture

Junior	Cr.	Senior	Cr.
Hort. 108	3	Hort. 105 or 151	4
Hort. 101, 102	8	Hort. 131	5
Ent. 108	5	Hort. 152	4
Botany 120	5	Hort. 153	3
Zoology 112	5	Hort. 124	4
English 110	4	Hort. 115	4
Botany 130	5	Electives	27
Entomology 120	2		
Electives	14		
	51		51

Suggested Course for Students Specializing in Floriculture

Junior	Cr.	Senior	Cr.
Hort. 116	3	Hort. 119	3
Entomology 108	5	Hort. 120	3
Hort. 118	3	Hort. 153	3
Botany 120	5	Hort. 130	4
Hort. 117	3	Chem. 125, 126	10
Zoology 112	5	Hort. 115	4
Botany 130	5	Electives	24
Entomology 120	2		
English 110	4		
Landscape Arch. 40	3		
Landscape Arch. 41	3		
Electives	10		
	51		

Suggested Course for Students Specializing in Vegetable Crops

Junior	Cr.	Senior	Cr.
Agron. 107	5	Agronomy 109	4
Zoology 112	5	Agronomy 131 & 132	6
Eng. 110	4	Agronomy 155	3
Hort. 130	4	Hort. 124	4
Hort. 105	4	Hort. 121	4
Hort. 10	4	Hort. 131	5
Hort. 108	3	Hort. 153	3
Botany 120	5	Botany 121	3
Electives	17	Botany 130	5
		Entomology 108	5
		Electives	5
	51		51

Suggested Course for Students Specializing in Pomology

Junior	Cr.	Senior	Cr.
Hort. 108	3	Hort. 152	4
Entomology 108	5	Hort. 151	4
Hort. 101, 102	8	Hort. 153	3
Botany 120	5	Chem. 125 & 126	10
Zoology 112	5	Hort. 131	5
Botany 130	5	Hort. 115 or 124	4
English 110	4	Electives	21
Entomology 120	2		
Electives	14		
	51		51

Technical Course in Horticulture

Students with special aptitude and high scholastic standing may enroll in a course in technical horticulture which is designed to prepare them for graduate work and for technical employment. Students interested in such a course should contact the head of the department.

In addition to the college group requirements, students in the technical course must take Math. 34, 35, & 46; Chem. 3, 4, 5, 121 & 122 or 125 & 126, 190 or 191; Bot. 24, 25, 80, 120, 130; Bact. 70 & 71; Agron. 56, 107, 131 & 132; Zool. 112; Ent. 108; Hort. 1, 2, 4, 5, 6 or 10; Eng. 111.

1. Elementary Pomology. Principles and practices underlying production of tree fruits. Varieties, soils, sites, fertilizers, culture, pest control, harvesting, storage, propagation, and stocks. (3F, W) Norton

2. Elementary Pomology Laboratory. A laboratory course to accompany or follow Hort. 1. A prerequisite for advanced Pomology courses. Practical experience in the various operations of pomological work. (1F, W) Norton

4. Vegetable Production. Methods of production, harvesting, storage and processing of vegetables. (3F, or S) Ballard; Pollard

5. Vegetable Production Laboratory. Gives practical experience in vegetable production. Field trips are taken to important production areas and vegetable processing plants. (1F or S) Pollard; Ballard

6. Plant Propagation. Principles and practices involved in propagation of horticultural plants. (3S) Gerber, Riethmann

10. Principles and Practices of Floriculture. Fundamentals involved in the culture of annual and perennial flowers, bulbs, house plants, shade trees, shrubs, lawn grasses and greenhouse plants. (4W) Riethmann

11. Garden Flowers. Principles and practices of growing garden flowers. (3S) Riethmann

101, 102. Advanced Pomology. Principles and practices of orcharding; 101, water relations, nutrition, light, growth regulators; 102, temperature, pruning, fruit setting. Prerequisite: Bot. 24, 25; Chem. 12 or 121; Agron. 56; Hort. 1 and 2. (4F, 4W) Taught alternate years. Gerber

108. Small Fruit Production. The culture of small fruit in home and commercial plantings. Prerequisite: Hort. 1 (3W) Norton

115. Fruit and Flower Breeding. Fundamental principles and practices of plant breeding in the improvement of fruit and ornamental plants. Prerequisites: Zool. 112; Hort. 1 and preferably 6, 10, and 108. (4S) Taught in alternate years. (Not taught 1955-56) Pollard

116, 117. Commercial Greenhouse Management. Principles and practices of commercial greenhouse management. Prerequisites: Hort. 1, 6, 10; Bot. 24, 25. (3F, 3W) Taught in alternate years. Riethmann

118. Floral Design. Methods used in making floral displays, wreaths, bouquets, arranging cut flowers. (3F) Taught in alternate years. Staff

119, 120. Systematic Floriculture. 119. Systematic study of garden flowers. Prerequisites: Hort. 1, 6, 10; Bot. 30. 120. Systematic study of plants grown by florists. (3F, 3W) Staff

121. Advanced Vegetable Crops. Economic, ecological and physiological factors underlying vegetable production, based on study of experimental results. Prerequisites: Hort. 4; Agron. 56; Bot. 120. (4W) Taught in alternate years. Ballard

124. Vegetable Breeding. Principles and practices of plant breeding in the improvement of vegetables. Prerequisite: Agron. 109. (4S) Taught alternate years. (Not taught 1955-56) Pollard; Ballard

130. Vegetable and Flower Seed Production. Methods and commercial possibilities of vegetable and flower seed production in Utah. A required field trip is taken into seed producing areas in southern Idaho. (4F) Taught in alternate years. (Not taught in 1955-56) Pollard; Hawthorn

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 application equipment. Two laboratory periods a week. Jointly

administered by the Departments of Botany and Plant Pathology, Horticulture, and Zoology, Entomology, and Physiology. Prerequisites: Bot. 130 or Ent. 108. (5S) Ames; Davis; Norton

151. **Systematic Pomology.** Systematic study of fruits, origin, classification, identification, judging, adaptation. (4F) Taught alternate years. Norton

152. **Fruit Handling.** Problems in handling and marketing; picking, grading, packing, transportation, storage, distribution, buildings, equipment, roadside and local marketing, processing. One laboratory period per week. Prerequisite: Hort. 1. (4F) Taught alternate years. Staff

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

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

201. **Research and Thesis.** Original research by graduate students taking a major or minor in horticulture. Registration by permission only. One to ten credits. 201, Fall; 202, Winter; 203, Spring; 204, First Summer Term; 205, Second Summer Term. Staff

206. **Graduate Conference and Problems.** (Variable credit F, W, S) Staff

215. **Special Problems.** Any quarter. Time and credit arranged. Staff

220. **Advanced Vegetable Breeding.** A study of special techniques and practices used in vegetable breeding. Prerequisites: Vegetable Crops 124. (3 arr.) Pollard

221. **Advanced Vegetable Problems.** A study of current research as related to important vegetable problems. Prerequisites: Hort. 4, 105; Agronomy 56; Botany 120. (4W) Ballard

Landscape Architecture and Planning

Administered jointly by the School of Agriculture and the School of Humanities and Sciences

Laval S. Morris, Professor and Head of Department; Kenji Shiozawa, Assistant Professor.

The Department of Landscape Architecture and Planning is concerned with the design and development of land areas for use in relation to man's needs. Land use is of prime importance in the evolution of a plan or design, and constant endeavor is made to turn out work that is functional.

Courses Required to Graduate in the Department of Landscape Architecture and Planning

The following courses are intended to provide: (1) necessary instructional material directly concerned with Landscape Architecture and Planning. (2) Supporting courses listed in fields which are closely related, such as Civil Engineering, Art, Horticulture, and Botany. (3) Courses required in the various fields of Science and Art for liberal education. These courses are required by students regardless of the department in which they graduate.

Freshman		Cr.	Sophomore		Cr.
Elem. of Landscape Arch.			Plant Materials, L.A. 40, 41		6
L. A. 3		3	Architectural Design,		
Drawing, L. A. 20		3	60, 61, 62		6
History and Lit. of Landscape			Mechanics and Molecular		
Architecture, L. A. 30		5	Physics, 6		5
Theory of Design, L. A. 35		3	Descriptive Geometry,		
Algebra, Math. 34, 35		8	C. E. 63		3
Trigonometry, Math. 46		5	Plane Surveying		
General Botany, Botany 24, 30		10	Civil Eng. 81, 82		6
Inorganic Chemistry			Mechanical Drawing 94		3
Chemistry 10		5	Soph. Comp., Engl. 10		5
Mechanics of Writings, Engl. 2		3	Sociology 70		5
Elem. Design and Form Study,			Soils, Agronomy 56		4
Art 1		3	Plant Propagation, Hort. 6		3
Electives		2	Electives		4
		50			50
Junior		Cr.	Senior		Cr.
Design, L. A. 140, 141, 142		6	Planting Design, L. A. 151, 152		6
Landscape Constr. 160, 161, 162 ..		9	Advanced Planning and		
Planting Design, L. A. 150		2	Design, L. A. 180, 181, 182		9
Recreational Planning, L. A. 130..		2	City Planning, L. A. 170		3
Fundamentals of Speech 1		5	Creative Expression,		
Creative Expression, Art 104		3	Art 4 or 104		3
Adv. Comp., Engl. 110		4	Landscape Architecture 190		6
Economics 51, or Agr. Econ. 53		5	The Writing of Feature		
Principles of Eugenics, Zool. 111..		4	Articles, Journalism 112		3
Geology 3		5	Roads and Pavements		
Electives		5	Civil Engineering 120		4
		50	Electives		16
		50			50

Students in the School of Agriculture take those agricultural subjects listed in the college catalog as necessary requirements.

3. Elements of Landscape Architecture and Planning. 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 or S) **Morris; Shiozawa**

20. Drawing. A general course to acquaint students with use of instruments. Necessary to all design courses. Lettering, general drafting, perspective drawing, light and shade studies. (3F or W) **Shiozawa**

30. History and Literature of Landscape Architecture. The history of landscape architecture and its relation to architecture and other allied arts. Present trends and future possibilities are emphasized. (5W) **Morris**

35. Theory of Design. A study of 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 the student with an awareness of design as early in his training as possible. (3W) **Staff**

40, 41. Plant Materials. Classification, identification, ecological requirements and uses of woody and herbaceous plants for landscape purposes. Both native and introduced plants studied. (3F, S) **Shiozawa**

60, 61, 62. Architectural Design. Study and design of architectural structures. Relation of buildings to the land. Integration of roofed and open areas. (2F, W, S) **Staff**

130. Recreational Planning. Public and private recreation in relation to design, construction and operation. National and state parks and forests studied as they pertain to recreation. Field trip required. (2S) **Shiozawa**

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. Time and credit arranged. **Staff**

140, 141, 142. Design. Design of private and public properties based on principles of utility and composition. Prerequisites: L. A. 3, 20; and Civil Eng. 81, 82. (2F, W or S) **Shiozawa**

150, 151, 152. Planting Design. Pictorial compositions and planting plans developed together. Designed to develop the student's ability to visualize the finished landscape. (2F, W, S) **Morris**

160, 161, 162. Landscape Construction. Master construction plans, grading, drainage, sprinkling systems, structures, cost estimates. (3F, W, S) **Morris**

165. Construction Methods and Practice. For students who intend to become contractors or go into maintenance work. Students work in the field on construction projects involving grading, general construction and planting. Registration by permission during summer. Credit arranged. **Staff**

170. Town and City Planning. Gathering and analyzing data for town and city planning. Land use, zoning circulation, recreation, housing. (3F) **Morris**

180, 181, 182. Advanced Planning and Design. Design of subdivisions, housing projects, public grounds, parks, cemeteries, building groups and recreational areas on various types of topography. (3F, W or S) **Morris**

190. Special Problems. Selected problems to meet the needs of individual students for completion of training. Registration by permission only. Any quarter. Time and credit arranged. **Staff**

195. Seminar. Readings and discussions. (1W) **Staff**

210. Advanced Problems in Design and Planning. Time and credit arranged. **Staff**

Poultry Husbandry

C. I. Draper, Professor and Head of Department; **J. O. Anderson**, Associate Professor; **J. D. Carson**, Assistant Professor; **Elmer Clark**, Assistant Extension Specialist; **D. D. Thomas**, Associate Poultry and Livestock Specialist.

Courses in other departments that can be applied toward a major in Poultry Husbandry are: Animal Husbandry 150, 151, and 155; and Veterinary Science 120 and 170, Agricultural Economics 115.

The department offers courses leading to the Master of Science degree in Poultry Husbandry.

Credit for the following courses may not be used to meet requirements for this advanced degree: Poultry Husbandry 104, 127.

SUGGESTED COURSE OF STUDY FOR MAJORS IN POULTRY HUSBANDRY

Freshman Year		Junior Year	
Course	Credit	Course	Cr.
Physiol.	5	Lib. Sci. 106	1
P. H. 1	3	Agr. Econ. 58 & 63	6
Math. 34 or 35	3 or 5	An. Hus. 10	5
M. S. or P. E.	3	Zool. 112	5
Agr. Econ. 53	5	P. H. 126, 107, 105, or 106, 104	9
Bact. 10	5	Agr. Econ. 115 or Agron. 103	3
Vet. Sci. 20	5	Eng. 110	4
Hort. 1	3	Vet. Sci. 170	3
A. H. 1	3	Elective	10
Speech 1	5		
Rural Soc. 10	5		
Elective	4		
	<hr/> 49		<hr/> 47

Sophomore Year

Veg. Crops	3
Chem. 3, 4, & 5 or 10, 11, 12	15
P. H. 8	3
Agron. 6 & 7 or 8 & 56	8
M. S. or P. E.	3
Eng. 10	5
Soc. Sci.	3
Zool. 2	5
L. A. 3	3
Electives	2
	<hr/> 50

Senior Year

An. Hus. 150	4
Physiol. 121	5
Entom. 108	5
P. H. 125, 126, 105 or 106	6
D. H. 109	3
Agr. Engr. 105	5
Electives	21
	<hr/> 49

Suggested Electives: Irr. and Dr. 10; Vet. Sci. 140, 151, 155; Agron. 131, 132; Chemistry 125, 126, 190; English 5, 111.

1. General Poultry. A study of breeds, judging, incubation, brooding, feeding, marketing, and problems of production. (3F, W or S) **Draper**

2. General Poultry Laboratory. Covers the same work as Poultry 1, with practical laboratory problems. (1F, W or S) **Staff**

8. Turkey Production. A study of the breeds, breeding, brooding, feeding, and marketing of turkeys. Special problems involved in small farm flock or large commercial ock management are emphasized. (3F) **Carson**

104. Incubation. Problems involved in incubation, embryology, and hatchery operations. Two lectures and one lab. Lab. arr. (3S) **Carson**

105. Poultry Management. Problems of location of poultry farm, farm planning, renewing the flock, brooding, marketing and problems affecting labor income. Prerequisite: Poultry 1 (3W) Taught alternate years. (taught 1954-55) **Carson**

106. Poultry Breeding. Discussed from the standpoint of populations rather than individuals. Consideration is given to selection pressure, relationships, inbreeding, heritability, expected gains, mating systems, and selection indexes. Prerequisites: Poult. 1, Math. 34, and Zool. 112. (3W) Taught alternate years. (Taught 1955-56) **Carson**

107. Poultry Feeds and Feeding. A study of the nutritive requirements of poultry, the composition of poultry feedstuffs, methods of feeding and formulation of rations for special needs. Prerequisite: Poultry 1. Three lectures, one lab. (4W) **Anderson**

125. Special Problems. Selected problems to meet student needs. Registration by permission only. Prerequisites: Poul. 1, 104 and 107. Credit arranged. (F. W. S) **Staff**

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

Poultry Diseases. (See Veterinary Science 170.)

210. Research Problems in Poultry Nutrition. Time and credit arranged (2-5) **Anderson**

212. Research Problems in Poultry Breeding. Time and credit to be arranged. (2-5) **Carson**

214. Research Problems in Poultry Production. These problems are in some phase of poultry production other than breeding or nutrition. Time and credit arranged. (2-5) **Draper**

Veterinary Science

Merthyr L. Miner, Professor and Head of Department; **LeGrande Shupe**, **Royal A. Bagley**, **J. Alan Thomas**, **Joseph L. Thorne**, **Wendell Brooksby**, Assistant Professors. **Don Thomas**, Extension Veterinarian; **Wayne Binns**, Collaborator in Research, U. S. D. A.

Courses in this department are designed not for training students to become veterinarians, but to give them a basic understanding of anatomy and physiology of domestic animals, and the principles of animal sanitation related to disease control. Students wishing a course in Veterinary Medicine should take the proposed pre-veterinary course and then enter a school of Veterinary Medicine for a degree.

Students desiring to study toward a degree in Veterinary Medicine (D.V.M.) must have at least two years and preferably three of pre-veterinary training at some authorized college or university, with all the basic courses completed. Enrollment in veterinary schools is limited; generally, preference is given to the students from the state in which the school is located. Therefore, it is advisable to have a solid and well-rounded background. Students majoring in bacteriology, zoology, animal husbandry, dairy husbandry, poultry husbandry, or chemistry are eligible for entrance into all veterinary schools if the requirements in the basic sciences are fulfilled.

A suggested three-year pre-veterinary course has been drawn up. Any student wishing to take this course and who fulfills the college group requirements with a minimum of 141 credits, can, after one year at an accredited veterinary school, obtain a Bachelor of Science degree from this institution. It requires four school years to complete the requirements for graduation from a veterinary school.

20. Anatomy and Physiology of Domestic Animals. A study of how the animal's body is constructed and its functions. Each system is studied separately; emphasis on the digestive and reproductive system. 4 lectures, 1 lab. (5F or W) **Thorne and Miner**

120. Animal Hygiene. Principles of animal sanitation in relation to disease control. Federal and state disease control programs and the etiology, symptoms, and control measures of the more prevalent diseases are also studied with demonstrations of first aid, and the common farm operations on animals. 3 lectures, 1 lab. (4S) **Shupe**

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. 4 lectures, 1 lab. (5F) **Miner**

170. Poultry Hygiene. Principles and practices necessary to maintain poultry health. The causes, description, control, and prevention of common diseases affecting poultry in this region. Taught alternate years. 2 lectures, 1 lab. (3S) **Bagley**

200. Special Problems. Open to upper division or graduate students majoring in some subject related to Veterinary Medicine and who wish to study a particular phase of disease in animals. Any quarter. Time arranged. Credit 1 to 3. **Staff**

210. Research. Outlining and conducting research on animal diseases. Any quarter. Time and credit arranged. **Staff**

Suggested Pre-Veterinary Courses

The following courses are recommended for pre-veterinary training; those marked (*) are basic pre-veterinary requirements for all schools of veterinary medicine.

*Zoology 3, 4, 118; *Chemistry 3, 4, 5, or 10, 11, 5; *Organic Chemistry 121, 122, or 125, 126; *Physics 20, 21, 22, or 6, 7; *Mathematics 34, 35, and 44, or 46; *Botany 25, 104; Animal Husbandry 1, 10, 150; Poultry 1, 2; Dairy 1; and *English 10, 110.

It is also required that 20 to 30 hours be taken in the language and arts and social science groups to meet the requirements of the veterinary schools where the individual expects to make application.

Zoology

Zoology, Entomology, and Physiology

**Administered jointly by the School of Agriculture and the School of
Humanities and Sciences**

D. M. Hammond, Professor and Head of Department; G. F. Knowlton, Clyde Biddulph, Eldon J. Gardner, William F. Sigler, Professors; J. Sedley Stanford, Thomas L. Bahler, Donald W. Davis, Associate Professors; Merrill Gunnell, Gene H. Linford, Assistant Professors; Howard E. Dorst, F. V. Lieberman, G. E. Bohart, H. F. Thornley, William H. Chinn, George H. Kaloostian, Marshal Levin, William P. Nye, Collaborators in Research, U. S. D. A.; Paul R. Fitzgerald, Parasitologist, U. S. D. A.; Albert Earl Johnson, Cooperative Agent and Research Associate.

In addition to course work, the Department of Zoology, Entomology and Physiology offers excellent opportunities for research and graduate study in various phases of agricultural entomology, taxonomy and morphology of insects, physiology, genetics and parasitology. Frequently, further training and experience in these subjects may be obtained by participation in the research projects of the Agricultural Experiment Station.

Courses required for a major in Agricultural Entomology: Zoology 3, 4, 112, 131; Entomology 13, 103, 104, 108, 120, 230; Botany 24, 25, 130; Mathematics 35; Chemistry 3, 4, 5, 125, 126 (or 10, 11, 12); Physics 6, 7; Agronomy 118; Agricultural Economics 53, 58; Horticulture 131 and 6 additional credits.

Courses recommended: Zoology 107; Entomology 21, 105, 111, 115, 231; Botany 30; Agronomy 131, 132; Wildlife Management 160; Bacteriology 10 or 70; English 111; Foreign language.

SCHOOL OF BUSINESS AND SOCIAL SCIENCES

M. R. MERRILL, Dean

Pre-Legal Training	110
Agricultural Economics and Marketing	110
Business Administration	112
Accounting	113
Business Management	114
Business and Distributive Education	117
Merchandising	117
Economics	117
History and Political Science	120
Secretarial Science	122
Sociology	125
Social Work	128

SCHOOL OF BUSINESS AND SOCIAL SCIENCES

M. R. MERRILL, Dean

General Information

The School of Business and Social Science gives opportunity for a liberal education with special emphasis upon the business, social and political phases of life. The School comprises three major areas—business, the social sciences, and agricultural economics and marketing. Graduates are prepared to assume leadership and responsibility in business and they will have the basic elements for further training in the professions. Students may major in Accounting, Business Administration, Merchandising, Secretarial Science, Business Education, Economics, Political Science, Pre-law, Sociology, Social Work, and Agricultural Economics and Marketing.

For the profession of law, the programs offered in Economics and Political Science afford excellent preparation. Graduates who have met the necessary requirements are prepared for positions as secondary school teachers. Many desirable positions as industrial managers are open to those who are qualified by training and experience. Many students find employment in retail and wholesale merchandising.

Special attention is called to the many opportunities for service in social work in government. The departments of Political Science and Sociology offer basic and professional courses in these fields.

Pre-Legal Training

Students who plan to enter the profession of Law may pursue a course of study, primarily in the School of Commerce, that will not only prepare them to meet all entrance requirements in any American law school, but will also form an excellent foundation for the study of law. There is always opportunity for capable, well-trained lawyers.

Some law schools admit only college graduates. Others admit students on the basis of three years of college training. College graduation is desirable even when it is not required for admission.

All pre-legal students should consult Dean M. R. Merrill or Professor Wendell Anderson.

Agricultural Economics and Marketing

**Administered jointly by the School of Agriculture and the
School of Business and Social Science**

G. T. Blanch, Professor and Head of Department; **V. L. Israelsen**, Professor; **R. H. Anderson**, **E. M. Morrison**, **E. W. Lamborn**, Associate Professors; **Wells M. Allred**, Assistant Professor; **Lynn H. Davis**, Instructor; **Jane U. Sandberg**, Research Assistant; **M. H. Taylor**, **Leon C. Michaelson**, Extension Economists; **Clyde E. Stewart**, Collaborator in Research, U. S. D. A.

W. P. Thomas, Professor Emeritus.

Students majoring in the Department of Agricultural Economics and Marketing may be graduated from either the School of Agriculture or the School of Commerce. The choice of school should be determined by the field in which the student intends to do his minor work.

Students graduating from the School of Agriculture must satisfy requirements for graduation from that school, in addition to completing all courses required by the Department for students majoring in the School of Agriculture. Those graduating from the School of Commerce must satisfy the requirements of that school, and in addition complete the other courses required by the Department.

Master of Science Degree. The Department of Agricultural Economics offers opportunity for research and graduate study leading to a master of science degree. The facilities of the department for training graduate students in finance, marketing, and prices are augmented by the research investigations conducted by the departmental staff and the federal collaborator with the assistance of graduate students. The following courses in Agricultural Economics may be used for graduate credit: 102, 104, 105, 106, 112, 113, 114, 115, 116, 120, 121, 155, 163, 180.

Agricultural Economics 53 or its equivalent is prerequisite to all other courses in Agricultural Economics.

Suggested Course of Study for Students Majoring in Agricultural Economics in School of Commerce

Course	Credits	Course	Credits
Exact Sciences:		Economics:	
Math. 34	3*	Economics 52	5†
Math. 35	5*	Economics 107	3†
Chem. 10		Economics 108	3†
or Physical Sci. 31	5†	Economics 155	3
Chem. 11		Economics 165	3
or Physical Sci. 32	5†	Other	6
Chem. 12 or 5 hrs. in another exact science	5†	Total	23*
Total	23	*A minimum of 18 credits required	
*One of these is required		Business Administration:	
Biological Sciences:		Accounting 1	5†
Zoo. 1 or Botany 1	5†	Accounting 2	5†
Bact. 10	5	B. A. 20	5
Physiology 4	5	Accounting 150	5
Total	15*	B. A. 156	5
*14 credits required		Other	5
Languages and Arts:		Total	30*
Speech 1	5	*A minimum of 15 credits required	
English 40	5	Statistics:	
Total	10	Agronomy 131	3†
*A minimum of 8 credits required		Agronomy 132	3†
Social Sciences (Excl. Econ.):		Total	6
Sociology 10 or 70	5	Applied Plant and Animal Sciences:	
Pol. Sci. 1 or 10	5	A minimum of 9 credits required	
Sociology 141	3	Military Science or	
Social Work 165	3	Physical Education	6†
Total	16*	English Composition:	
*A minimum of 12 hours required		English 10	5†
Journalism:		English 110	4†
Journalism 12	3	Total	9
Journalism 120	3	Major:	
Total	6	Agricultural Economics 53, 58,	
†These or equivalent courses required		62, 106, 112, 114, 115, 116,	
		120, 121, 155, 163.	
		Total	37

Business Administration

V. D. Gardner, Professor and Head of Department; **L. Mark Neuberger**, Professor; **Ina Doty**, **Norman S. Cannon**, Associate Professors; **Leo M. Loll**, **Floris S. Olsen**, **Stanford L. Johnson**, Assistant Professors; **Guy Murray**, Special lecturer.

W. L. Wanlass, Professor Emeritus.

Students majoring in Business Administration may concentrate in Accounting, Management, Merchandising, Secretarial Science, or Business Education. Students are advised to select from courses listed below to complete their major and technical subjects. (Students majoring in Secretarial Science should register under the advice of the instructional staff for Secretarial Science.)

Credit Toward Master of Science Degree

With approval of heads of related departments in which students are candidates for the Master of Science degree, courses numbered 101 or above in the Department of Business Administration and Secretarial Science are acceptable for graduate credit.

RECOMMENDED COURSES

In conformance with group requirements, as discussed on page 51, students in business administration are urged to secure as broad a cultural background as possible in the first two years of their work toward a degree. To that end the following courses favored by the department are recommended:

FRESHMAN AND SOPHOMORE YEARS, GENERAL EDUCATION BACKGROUND

Physical Education and Military Science

Biological Science Requirements: Biology 1, Physiology 4.

Exact Science Requirements: Chemistry 1, 2; Geology 42; Math. 34, 35, 60; Physical Science 31, 32, 33.

Language Arts Requirements: Art 3, 26; English 40; Landscape Architecture and Planning 3; Music 1, 80, 81.

Social Science Requirements: Economics 27, 51 and 52; Political Science 1 or 10; Psychology 53; Sociology 70.

Communications Requirements: English 10 and 110, plus Speech 1 or 5.

Departmental Foundational Work: Ag. Econ. 62; Eng. Drawing 59; B.A. 1 and 2, 20, 29; Political Science, 11, 12, 13; Secretarial Science 41, 42, 65.

JUNIOR AND SENIOR YEARS CONCENTRATIONS

Accounting. B.A. 101, 102, 103, 104, 105, 111, 121, 122, 126, 127, 128, 129, 130, 131, 132, 140, 141, 164; Political Science 104, 105, 106, 107, 108; English 110; Secretarial Science 99, 175.

Business Education: (In addition to course listed as departmental Foundational Work B.A. 29, 30 will be taken in freshman and sophomore years.) 131, 132, 133, 134, 135, 149, 151, 152, 153, 156, 157, 161, 162, 163, Economics 107, 108; Education 111, 113, 114, 116, or 141, 127, 129, 130; Bacteriology 155; Psychology 155, 161; Secretarial Science 179; English 110.

Distributive Education: Same as for general business education eliminating B.A. 29, 30, 133, 134, 135, 149, 150, 156, and Education 111 and Secretarial Science 179 and adding B.A. 63, 156, 194, 195; English 110.

Management: Tool Engineering 51, 52, 58; B.A. 131, 132, 133, 134, 135, 111, 136, 137, 138, 141, 149, 150, 151, 152, 153, 155; Economics 165, 171, 174; 125, 126, 127; Psychology 155; Industrial Education 117 118, 120; English 110.

Merchandising: (Add B.A. 63 to departmental foundational work) B.A. 131, 132, 149, 150, 151, 152, 153, 154, 155, 156, 157, 160, 161, 162, 163; 164; English 110.

Secretarial Science: (See discussion in that section of catalog.)

Since some of the above courses are taught only in alternate years, the student is not required to take the courses in the year indicated. However, the general outline should be followed whenever possible.

Special Offerings for Mature Persons Who Are Not Candidates for Degrees

For capable, mature persons whose education has been interrupted by war or other causes and who want maximum professional training in a minimum of time, two two-year courses in addition to the one in Secretarial Science have been organized in the School of Commerce. These courses minimize liberal course offerings and concentrate upon vocational and professional courses. One gives training in merchandising and the other in accounting. Only students who know definitely that they will not seek a degree should pursue these courses, and then only after consultation with the head of the department. A special course in problems of small business is included. A diploma certifying completion will be given.

ACCOUNTING

1, 2. Introductory Accounting. Lectures, questions, problems and practice sets that require application of the theory advanced. Principles and techniques learned here are basic to further study of accounting and to understanding the common problems of business. Technique emphasized. (B. A. 1-5F or W) (B. A. 2-5W or S) Cannon

Burroughs Calculator. (See Secretarial Science 94.)

Commercial and Bank Posting. (See Secretarial Science 98.)

Mathematics for Business and Accounting Students. (See Math. 30.)

Mathematics of Investment. (See Math 60.)

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

104, 105. Advanced Accounting Principles. An extension covering material more advanced than that of intermediate accounting. (3F, 104, and 3S, 105 — 1955-56) (Not given 1956-57) Cannon

109. Accounting for Non-Commercial Students. For Engineering, Agriculture, Home Economics, Forestry, and other non-commercial students. (3F and W 1955-56) (3F and S 1956-57) Gardner; Cannon

111. Industrial Cost Accounting. Job costing, process cost accounting, standard costs, estimating cost systems, distribution cost, special considerations. (5W) Gardner

121, 122. Auditing Theory and Practice. Principles and procedures presented to give practical knowledge of auditing. Prerequisite: A good working knowledge of accounting principles and techniques. (3F, 3S) Cannon

126. Accounting Seminar. (1F, 1W, 1S) Not taught 1955-56. Cannon

127, 128. Income Tax Accounting. Current Federal and State Income Tax Laws. Practical problems in preparation of income tax returns. (3F, W) Cannon

129. Governmental 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. Not taught 1956-57.

Cannon

MANAGEMENT

The degree program in Management is offered through the combined resources of the Schools of Commerce, Education, and Engineering and Technology. It is designed to provide through professional training in Executive Development for business and industry. Majors are offered in three areas:

- 1. Business Management.** Gives training in executive development for students whose basic training is in the field of Business Administration.
- 2. Industrial Management.** Gives training in executive development for students whose basic training is in Engineering, Technology or Industrial Education.
- 3. Personnel Relations.** Gives training for counseling, testing, consultation and guidance in industry and business.

Students will obtain a degree in one of the three schools participating in the program, with a major in the department of special interest and emphasis. A core curriculum is taken by all students in Management. In addition the student takes the special courses required for specialization in the particular phase of Management for which he is preparing. The core curriculum is shown below. The special courses for the department majors are shown in the departments concerned: Business Administration, Industrial Education and Psychology and Sociology.

The Core Curriculum

(For All Students in Management)

Freshman Year		Sophomore Year	
	Cr.		Cr.
Economics 51, General Economics ..	5	Botany 1, Principles of Biology	5
Psychology 53, General Psychology ..	5	Physiology 4, General Physiology ..	4
Speech 1, Public Speaking	5	Sociology 70, Principles of Sociology	5
Political Science 1,		Chemistry 31, 32, Physical Science ..	6
Government and the Individual	5	Political Science 11, Commercial Law	3
Math. 34, Introduction to		Sociology 140, Social Psychology	3
College Algebra	3	Military Science	3
Math. 35, College Algebra	5	Work Experience in Industry	
Military Science 1, 2, 3	3	(10 weeks)	
Work Experience in Industry			
(10 weeks)			
Junior Year		Senior Year	
	Cr.		Cr.
Ind. Educ. 118, Industrial Safety	3	Sociology 241,	
Psychology 155, Psychology of		Community Organization	3
Business and Industry	3	Ind. Educ. 119, Job Evaluation	
Ind. Educ. 102, Instructional Aids ..	3	and Wage Incentives	3
Psychology 161, Social Psychology ..	3	Sociology 163, Industrial	
Bus. Adm. 109,		Sociology	3
Accounting (Applied)	3	Bus. Adm. 133, 134, 135,	
Econ. 125, Trade Unions and		Industrial Manage. Problems	9
Collective Bargaining	3		
Econ. 126, Trade Unions and			
the Law	3		
Econ. 127, Social Security	3		
Work Experience in Industry			
(10 weeks)			

BUSINESS MANAGEMENT

(Courses required in addition to the core curriculum)

Freshman Year

	Cr.
B.A. 1, Introductory Accounting	5
Econ. 52, Economic Problems	5
B.A. 2, Introductory Accounting	5

Sophomore Year

	Cr.
E.D. 59, Blueprint Reading and Industrial Drawing	3
T.E. 56, Machine Practice for Engineers	3
English 10, Sophomore Composition	5
P.S. 12, Commercial Law	3
T.E. 58, Manufacturing Processes	2
P.S. 13, Commercial Law	3

Junior Year

	Cr.
B.A. 130, Corporation Finance	3
B.A. 131, 132 Business Statistics	6
Econ. 165, Money, Credit & Prices ..	3
T.E. 158, Manufacturing Analysis	3
Econ. 171, Business Cycles	3
English 110, Advanced Composition	4
I.E. 120, Personnel Relations	3

Senior Year

	Cr.
Econ. 174, Govt. and Business	5
Econ. 107, 108, Intermediate Economic Theory	6
B.A. 111, Ind. Cost Accounting	5
B.A. 150, Managerial Accounting	4
B. A. 149, Business Policy	4
Electives	6
B.A. 136, 137, 138	
Production Management	9

MANAGEMENT**Business Communications.** (See Secretarial Science 30.)

20. Problems of Small Business. A survey of problems encountered in starting a small business. Problems and details of actual operating procedures are considered. Designed to aid the man just entering business. (5W or S, 1955-56) (5F or S, 1956-57) **Staff**

29. 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 speculating in securities, everyday legal problems dealing with illness, death, personal taxes. (5W) **Gardner**

30M. Business Mathematics. For students in B.A. Students with good placement scores in mathematics and in credit college algebra should not register for this. Does not fill group requirement. (3F) **Olsen**

Commercial Art and Posters. (See Art 31.)**Color.** (See Art 32.)**Psychology of Business and Industry.** (See Psychology 55 and 155.)**Indexing and Filing.** (See Sec. Sci. 65.)

Blueprint Reading and Industrial Drawing. (See Civil Engineering 59. Required of all sophomore majors in Management.)

125, 126, 127. Labor Problems. (See Economics 125, 126, 127.) Required of all business administration majors.

130. Business Finance. The structure of corporate enterprise. Financial and operating ratios and proper financial plans and methods of marketing securities are considered. Practical problems emphasized. Prerequisite: Econ. 51, 52 or equivalent; B. A. 1, 2, (3S) **Gardner**

131, 132. Business Statistics. (See Economics 131, 132.) Application on statistical methods of business problems; graphs, analysis of time series, interpretation of index numbers and statistics of particular industries and business in general. Prerequisites: Econ. 51 and 52. (3F, W) **Cannon**

133, 134, 135. Industrial Management Problems. Problems in industrial location; choice of site; buildings and layouts; selection, purchase, and arrangement of equipment; purchasing of stores; organization; industrial research; labor relations and problems in managerial control. Problems in work simplification, tune and motor study included in 1934. Prerequisite: B. A. 20. (3F, W, S) Gardner

136. Development of Scientific Management. A study of the contributions of Taylor, the Gilbreths, Emerson, Barth and other leaders in the development of improved management. (3F) Staff

137. Layout and Materials Handling. Applications of principles necessary for efficient movement of materials and men and the use of equipment in the production process. (3W) Staff

138. Production Planning and Control. Study and application of principles of sound analysis leading to installation and operation: product engineering, production engineering, scheduling, inventory control, order preparation, tool control, dispatching, and cost control in the production process. (3S) Staff

Investment Principles. (See Economics 139)

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 over insurance companies. Johnson

Social Psychology. (See Sociology 40, 140 and Psychology 161.) Recommended for all business administration majors.

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

147, 148. Administration of Small Business. For students in Engineering, Technology, and Agriculture only. Attention paid to factors determining the establishment of a business, form of the business; such operating problems as accounting, statistical control, financial control; and problems of marketing. (3W, 3S) Staff

149. Business Policy. A co-ordinating course aimed to develop perspective, judgment, and facility in solving problems in production, distribution, personnel, finance, control and social aspects of business. Required of all Bus. Adm. majors. (5S) 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 Bus. Adm. majors. (5F) Gardner

155. 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. (3S) Neuberger

Business Cycles. (See Econ. 121.) Required of all Bus. Adm. majors.

Money, Credit, and Prices. (See Econ. 165.) For Bus. Adm. majors.

Office Management. (See Sec. Sci. 175.) Required of all accounting majors. Neuberger

Economics of Business Cycles. (See Econ. 171.) Required of all Bus. Adm. majors.

Government and Business. (See Econ. 174.)

191. Business Administration Seminar. Special reports and group discussion on current developments in business. Open only to qualified juniors and seniors. (2S) Staff

BUSINESS AND DISTRIBUTIVE EDUCATION

The School of Commerce and the School of Education co-operate in meeting the demand for well-trained teachers of business subjects. In selection of their courses in Business Administration, Secretarial Science, and Education, students should consult Professor Neuberger.

MERCHANDISING

Principles of Marketing. (See Ag. Econ. 62) Required of all majors in business administration and merchandising.

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 are studied. Special projects are carried out in relation to a particular type of selling. Lectures and assigned cases. (4F or S 1955-56) (4F, or W, 1956-57) **Johnson**

151, 152, 153. Problems in Merchandising. Selected cases are used to teach methods of marketing merchandise; selection of channels of distribution for consumer and industrial goods; sales organization and control, advertising and sales promotion; stock-turn, price policies. (3F, W, S) (Not taught 1955-56) **Johnson**

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. (3F) (Not taught 1955-56) **Staff**

156. Principles of Advertising. Intended for those who as business executives will direct publicity programs: includes study of the structure of advertisements, appeals used in the preparation of advertisements for different products, choice of media, consumer research, and the work of advertising departments and agencies. (5S) (Not taught 1956-57) **Johnson**

157. Advertising for Small Business and the Retail Store. Studies direct mail, radio, television, newspaper, window display, and layout practices. Designed to assist student in judging advertising effectiveness as a sales tool for the small businessman. (Not given 1955-56) **Johnson**

160. Sales Management. Aims to give 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 the sales organization and correlation of its activities with those of production and other departments of the business enterprise. (5W) (Not given 1956-57) **Johnson**

161, 162, 163. Problems in Retail Distribution. 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. (3F, W or S) (Not given 1955-56) **Johnson**

164. 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. (Not taught 1956-57) **Johnson**

Economics

Evan B. Murray, Professor and Head of Department; **V. L. Israelsen**, Professor; **Leonard J. Arrington**, Associate Professor; **Leo M. Loll, Jr.**, Assistant Professor.

W. L. Wanlass, Professor Emeritus.

Students majoring in the Department of Economics should register with the department chairman after they achieve junior standing. Some variation is permitted in the program of study depending on whether the student is preparing to do graduate study in Economics or is planning to enter law school, teaching, government service, or employment with private business. Students who plan graduate study in Economics should have thorough training in mathematics. Majors in this department draw heavily on the course offerings of other departments in the School of Commerce.

The Department of Economics offers a program of study leading to the Master of Science degree.

26. Economic Development of Europe. The classical and medieval heritage of modern Europe. The Commercial Revolution and the Industrial Revolution: their history, consequences and interrelationship with political and social development. (3F) Loll

50. General Economics. An abbreviated course in General Economics for students in certain fields of engineering. (3W and S) Staff

51. General Economics. For the college student regardless of field of specialization. Emphasis is on the understanding of principles and institutions underlying operations of the economic system. (5F, W and S) Staff

52. Economic Problems. Continuation of Economics 51. Problems of labor, finance, economic instability, international economics, government control, and world economic systems. Prerequisite to all upper division courses in Commerce except in Agricultural Economics. (5F, W and S) Staff

106. History of Economic Thought. A critical study of the origin and the development of the economic theory of leading thinkers in Western Civilization from 1750 to the present. (3F) Israelsen

107, 108. Intermediate Economic Theory. Critical analysis of present-day price, distribution, and income theory. Required of all students majoring in Business Administration, Agricultural Economics, and Economics. Prerequisites: Economics 51, 52, or Agricultural Economics 53. (3W or S) Israelsen

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

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

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

131, 132. Business Statistics. (See Business Administration 131, 132.)

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

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. Prerequisite: Economics 51, 52. (3F) Israelsen

143.* Economy and Trade of Latin America Influences exerted by Latin America on world trade. Alternates with Economics 140. (3F) Staff

145. Economics of Consumption. Deals with personal and group expenditure, standards of living, budgets, variations in consumption. (3W) Staff

150. Comparative Economic Systems. Important present forms of economic organization; their history, theory, and practices. Emphasis on Capitalism, British Socialism, German Fascism and Soviet Communism. (3S) Loll

155. Principles of Taxation. 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. Special tax problems of Utah. (3W) Israelsen

165. Money and Banking. Development of our present monetary and banking systems; a critical analysis of central banking. Prerequisites: Economics 51, 52. (3F) Israelsen

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

171. Business Cycles. The economics of cyclical fluctuations. Critical examination is made of the more significant theories offered in explanation of the cycle. A survey of existing and proposed means of control. (3W) Loll

174. Government and Business. History and development of regulation and control of business by government. Monopolies, combinations, cartels, public utilities, and transportation are explored. (5F) Arrington

180. Income and Employment. Analysis of factors determining the general level of output, income, and employment; discussion of public policies designed to maintain full employment and high production. (2S) Arrington

200. Research in Economics. Special investigations carried on by senior and graduate students. Credit granted according to work done. (F, W, and S) Staff

201. Readings and Conferences. For senior and graduate students. Time and credit arranged. Staff

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

206. Income Theory. Factors determining the general level of output, income and employment; public policies designed to maintain full employment and high production. Open to graduates and seniors with adequate preparation. (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) Loll

209. Graduate Seminar. Designed to acquaint students with methods of research in economics. A survey of the literature of economic research and practice in the carrying forward of research projects. Prerequisite: permission of instructor. (2) Murray

211. Graduate Seminar. Same as Economics 209, except that emphasis is placed upon a study of bibliographical materials in economics and a study of economic literature. Prerequisite: permission of instructor. (2) Murray

212. Graduate Seminar in Industrial Relations. Application of principles and practices of American trade-unionism brought to light through individual and group research project: analysis and evaluation of current issues in labor activities. (2) Murray

Political Science

M. R. Merrill, Professor and Head of Department; Wendell Anderson, M. Judd Harmon, Assistant Professors; Asa Bullen, Professor Emeritus; Charles P. Olson, Lecturer.

Students majoring in Political Science are expected to have their course schedules approved by the head of the department for at least six quarters prior to graduation. Exceptions may be made by the department faculty.

1. Government and the Individual. The course proposes to introduce 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, or S) Merrill

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

11, 12, 13. Commercial Law. Course 11 is a general survey intended for all students who are interested. It is also an introductory course for students who take additional Commercial Law courses. Courses 12 and 13 are devoted to a comprehensive study of the law of contracts and agency. Open to all students of sophomore standing or above. (3F, 3W, 3S) Olson

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

70. Comparative European Governments. A comparative study of the various forms and kinds of governments that have developed in the modern world with primary attention directed toward Europe. (3S) Staff

75. Latin American Governments. In addition to a study of Latin American governments, attention is given to the relations between these countries and the United States. (3W) Porter

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

104, 105, 106, 107, 108. Commercial 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 1955-56, and 105 and 106 will be given in 1956-57. Prerequisites: Political Science 11, 12, 13 or the consent of the instructor. (3F, 3W, 3S) Olson

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

111. International Organization. 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 Agriculture Organization, International Labor Organization, the World Bank, and World Monetary Fund. (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) **Harmon**

125. Political Parties and Practical Politics. Organization and practices of political parties. (3S) **Staff**

126. Soviet Government and Politics. Designed to present the structure and functioning of Soviet government and the Communist party system. Attention is also given to the theoretical background of government and party practices in modern times. (3W) **Harmon**

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

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. (3W) **Anderson**

129. Public Administration. Introduction to study of public administration for those contemplating public service careers. The role and techniques of management in public enterprise, the organization, legal bases, planning, staffing, personnel, finance and public relations of modern government. (5W) **Anderson**

131. Administrative Law. Constitutional limitations, legislative supervision, and judicial control of administrative agencies, and the forms of administrative action appropriate for American economic and political institutions. (3S) **Anderson**

136, 137, 138. Student Government. Course 136 studies problems of student government, group dynamics, and parliamentary law and is a pre-requisite to courses 137 and 138 which are under the supervision of the Dean of Students and based upon significant student government activities. They include an evaluation of such activities and any appropriate recommendations for future student leaders. (1F, 1W, 1S) **Anderson**

140. American Legislation. The course 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 method of approach is used as far as is feasible. Parliamentary law is emphasized. (3W) **Anderson**

145, 146. History of Political Thought. No. 145 covers political thought from its beginnings in the Greek period to Machiavelli. No. 146 carries on the study from Jean Bodin to Bentham. Students may register for the courses separately. (3F, 3W) **Harmon**

150. Recent Political Thought. Political ideas and political thinkers from the Utilitarians to the present time, with special emphasis on study of Karl Marx and his successors in Communist political philosophy. (3S) **Harmon**

180, 181, 182. Current Political Problems. A series designed for upper division students. Students may take any quarter without the preceding quarter or quarters. Lower division students must receive the consent of the instructor. (2F, 2W, 2S) **Merrill**

201. Research in Political Science. For senior and graduate students. Time and credit arranged. **Staff**

203. Readings and Conferences. For senior and graduate students. Time and credit arranged. **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 the 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 who are preparing a master's degree thesis. Time and credit arranged. 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)

Secretarial Science

V. D. Gardner, Professor and Head of Department; L. Mark Neuberger, Professor; Ina Doty, Associate Professor; Floris Olsen, Assistant Professor; Helen Lundstrom, Instructor.

Students majoring in Secretarial Science are urged to complete the following courses in addition to institutional requirements for graduation. Elementary shorthand and elementary typewriting are not required of students who have had the equivalent.

Curriculum in Secretarial Science for B. S. Degree

Dept.		Cr.
Sec. Sci.	30	3
Sec. Sci.	41, 42, 43	6
Sec. Sci.	65	3
Sec. Sci.	69, 70, 71	3
Sec. Sci.	75, 76, 77	9
Sec. Sci.	80, 81, 82	9
Sec. Sci.	92 or 94	2
Sec. Sci.	96 or 98	2
Bus. Adm.	1, 2	10
Bus. Adm.	20	5
Bus. Adm.	30	3
Pol. Sci.	11	3
English	5	3
*Econ	51, 52	10
Sec. Sci.	167	2
Sec. Sci.	170	2
Sec. Sci.	175	3
Sec. Sci.	183, 184, 185	9
Sec. Sci.	186, 187	6
**Sec. Sci.	180	3
**Sec. Sci.	179	3
Sec. Sci.	190	2
Bus. Adm.		
Upper Div.	Elective	3
Econ. Upper Div.	Elective	3

Students who wish to qualify for a teaching certificate should add the following courses: Psychology 102, Education 113, Bacteriology 155; Education 114, 116 or 141; Education 111, 127, 129, and 130, Methods in Secretarial Science 179 or 180, and a 3-Hour elective.

A two-year course is also offered in Secretarial Science for students who wish to qualify themselves for secretarial positions as quickly as possible. An official certificate is granted at the graduation exercises to those who successfully complete the two year course. Elementary shorthand and elementary typewriting are not required of students who have had the equivalent.

Two-Year Secretarial Course

Certificate Granted Upon Completion

First Year

Fall		Winter		Spring	
Courses	Cr.				
Biology	5	Accounting 1	5	Accounting 2	5
1st Q. Shorthand 75	3	2nd. Q. Shorthand 76	3	3rd Q. Shorthand 77	3
Typewriting 41	2	Typewriting 42	2	Typewriting 43	2
Bus. Math. 30	3	El. Psychology 53	5	Bus. Commun. 30	3
SS 92 or 94	2	P. E. or M. S.	1	Elective	3
P. E. or M. S.	1			P. E. or M. S.	1
Total	16	Total	16	Total	17

Second Year

Int. Shorthand 80	3	Int. Shorthand 81	3	Int. Shorthand 82	3
Transcription 69	1	Transcription 70	1	Transcription 71	1
Bus. Adm. 20	5	Econ. 51	5	Econ. 52	5
Indexing & Filing 65	3	SS 96 or 98	2	Soph. Composition	5
Political Science 11	3	Scientific Vocab. 5	3	Electives	3
P. E. or M. S.	1	P. E. or M. S.	1	P. E. or M. S.	1
		Office Practice 167	2		
Total	16	Total	17	Total	18

*These courses count toward filling the group requirements.

**Required for a teaching certificate.

30. Business Communications. Fundamental principles of business letter writing. Practice in writing sales, order, collection, adjustment, and application letters. (3W or S) **Lundstrom**

41. First-Quarter Typewriting. For students who have had 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) **Lundstrom**

42. Business Typewriting. For students who have had previous training in typewriting. Practice in typing letters, envelopes, manuscripts, business forms. (2F, W) **Lundstrom**

43. Secretarial Typewriting. Typing of minutes, legal forms, business forms, rough drafts, stencils for duplication. (2S) **Lundstrom**

45. Speed Building. Remedial typewriting; emphasis on improvement of accuracy and speed. (1F, W, S) **Lundstrom**

65. Indexing and Filing. Training in alphabetic, numeric, triple-check automatic, subject, decimal, geographic, and soundex methods of filing. Indexing, coding, and filing of letters, cards, and catalogs. (3F, W or S) **Lundstrom**

***69. Transcription Practice.** Designed to develop skill and speed in transcription. Students must be able to take dictation at not less than 60 words a minute and type at least 40 words per minute. (1F or W) **Doty; Olsen**

- *70. Transcription Practice.** Continuation of 69. (IW or S) Doty; Olsen
- *71. Transcription Practice.** Continuation of 70. (1S) Doty
- 75. First-Quarter Shorthand.** For students who have had no previous training in shorthand; includes study of fundamentals of simplified Gregg shorthand. (3F or W) Doty; Olsen
- 76. Second-Quarter Shorthand.** Continuation of course 75. Introduction of new-matter dictation. (3W or S) Doty; Olsen
- 77. Third-Quarter Shorthand.** Continuation of course 76. Intensive practice in new-matter dictation. (3F or S) Olsen; Doty
- 80. Intermediate Shorthand.** For students who have had previous training in shorthand and who are able to take dictation at not less than 60 words per minute and type at least 40 words per minute. Includes review of the theory of simplified Gregg shorthand and development of new vocabulary. Students must register for Transcription Practice 69. (3F or W) Olsen
- 81. Intermediate Shorthand.** Continuation of 80. Must be accompanied by Transcription Practice 70. (3W or S) Olsen
- 82. Intermediate Shorthand.** Continuation of 81. Must be accompanied by Transcription Practice 71. (3S) Olsen
- *Required of all who register for Intermediate Shorthand 80, 81, 82.**
- 92. Business Machines.** Basic training in use of ten-key adding machines, full-keyboard adding listing machines, and rotary calculator machines. (2F, W or S) Lundstrom
- 94. Burroughs Calculator.** Practice in addition, multiplication, subtraction, and division on Burroughs calculators and application of the machine to such business computations as percentages, discounts, prorating, decimal equivalents, and constants. (2F, W or S) Olsen; Lundstrom
- 96. Underwood Bookkeeping Machine.** Application of the Underwood bookkeeping machine to business and accounting problems. (2F, W or S) Olsen
- 98. Commercial and Bank Posting.** Application of the Burroughs posting machine to bookkeeping procedures in commercial and financial institutions and banks. (2F, W or S) Olsen; Lundstrom
- 99. I. B. M. Machine Operation.** Application of I. B. M. machines to punch card accounting and statistical methods. Latest techniques in sorting, tabulating, and summarizing of numerical data. (2F, W or S) Hurst
- 167. Office Practice.** Training in use of dictating and transcribing machines, spirit duplicator, mimeograph, mimeoscope. (2F, W or S) Doty
- 170. Statistical Typewriting.** For juniors and seniors majoring in business administration, economics, and secretarial science. Practice in setting up charts, tables, and reports. Prerequisite: Sec. Sci. 41, 42, 43, or equivalent. (2S) Lundstrom
- 175. Office Management.** Emphasis on principles of office management, duties and responsibilities of the office manager; type of organization; methods of control; office arrangement and equipment; job analysis; selection, employment, and training of employees. Prerequisites: Bus. Ad. 1 and 2 and Econ. 51 and 52. Neuberger
- 179. Methods of Teaching Typewriting and Bookkeeping.** Recent developments and practices in teaching of typewriting and bookkeeping. Analysis of objectives, laws of learning, organization of material, texts, standards of achievement, and methods of presentation. (3W) (Not taught 1955-56) Neuberger

180. Teaching of Shorthand. Methods and trends in teaching shorthand, and observation and practice in shorthand classes for those preparing to teach. Consult instructor before registering. (3F) **Doty**

183, 184, 185. Advanced Speed Course in Shorthand. For students who have had at least two years of shorthand and are able to take dictation at not less than 100 words a minute. Emphasis on increasing shorthand speed through speed phrases and reporting shortcuts. Practice in advanced transcription. (3F, 3W, 3S) **Doty**

186, 187. Secretarial Procedures. Office routines and procedures are studied. Attention given office conduct and attitudes, personal qualities of a secretary, and obtaining a position. Prerequisite: Two years of shorthand and typewriting, general economics, introductory accounting, and business communications. (3W, 3S) **Doty**

189. Practicum in Business Education. Provides opportunity for planning and development of practical or creative projects in Business Education. Experienced teachers and students who are registered for teacher training, are encouraged to build projects around actual school situations. (1-2F, W or S) (Not taught 1955-56) **Neuberger**

190. Seminar in Business Education. A reading and research course for junior and senior students majoring in business administration and secretarial science. Special reports are made on current business education problems and literature. (2S) (Not taught 1955-56) **Neuberger**

200. Research in Business Education. For senior and graduate students. Time and credit arranged. (F, W or S) (Not taught 1955-56) **Neuberger**

Sociology

R. Welling Roskelley, Professor and Head of Department; **Don C. Carter**, **Carmen Fredrickson**, Associate Professors; **C. Jay Skidmore**, **Therel R. Black**, **William A. DeHart**, Assistant Professors.

Joseph A. Geddes, Professor Emeritus.

Majors in Sociology must meet the group requirements for graduation. In addition, they are expected to complete a minimum of 47 credits in Sociology distributed in the following fields: general and historical, 5 credits; Social Organization, 6 credits; Social Problems, 6 credits; Social Psychology and the Family, 6 credits; Social Research and Statistics, 3 credits; Seminar, 3 credits; Cultural Anthropology, 3 credits; Social Work, 9 credits; Population and Industrial Sociology, 3 credits.

Either Sociology 10 or 70 is prerequisite for all upper division courses in Sociology; also Sociology 40 for 140, and 60 for 160.

Master of Science Degree in Sociology

The Department of Sociology offers courses leading to the Master of Science degree. Research is promoted through departmental relationship with the Agricultural Experiment Station and with federal agencies. Students majoring in Sociology may use the following courses of the 100 series for graduate credit: Sociology 110, 130, 141, 153, 154, 158, 160, 170, 172 and Social Work 165, 177, and 178. These courses may also be used by students in other departments for graduate credit.

Doctor of Philosophy Degree in Sociology

Institutional requirements for the Ph.D degree are explained in the section "Graduate School." This degree is offered in the Department of Sociology through collaboration with closely related departments in the social sciences.

Resources are now being expanded in rural sociology, in which major emphasis is now made. A program of building resources for emphasis in general Sociology is also contemplated.

5. American Culture. Basic beliefs, values, customs, and institutions of the American people. Also study of governmental, educational and other agencies consciously concerned with improvement of American life. (3F) **Black**

10. Rural Sociology. Background information which will lead to a more enlightened rural and urban citizenry through better understanding of and plans for resolving rural problems dealing with organization, institutions, social processes, and population. (5 F, W, or S) **Roskelley; Black**

40. Social Psychology I. Personality development among social classes and peoples. Analysis of crowds, social movements, social conflicts and other collective behavior; ideologies and institutions. Prerequisite: Sociology 70 or Psychology 53. (3F) **Skidmore**

60. Courtship, Marriage and the Family. Designed to help all students understand the social and emotional factors in personality development, courtship, mate selection, and marriage adjustment. Open to all students. (3F, W or S) **Skidmore; Carter**

70. Introductory Sociology. Open to students in all departments. Emphasis upon developing understanding of the social world, and how social experience contributes to personal development. Sociology 70 or 10 is prerequisite to all upper division classes in sociology and social work. (5F, W or S) **Staff**

87. Elementary Social Statistics. Techniques of using statistical method in studying social problems with emphasis upon logical methods of collection, tabulation, graphic portrayal, averages, dispersion, reliability, elementary sampling and simple correlation with brief consideration of theoretical implications. For majors in Sociology and Social Work. (3F) **Staff**

100. Educational Sociology. The influence of the social processes and social changes on school curricula, objectives and teachers. Appraisal of educational goals in the light of present social needs. (3F) **Staff**

110. Utah Social Problems. Present-day problems in population, migration, housing, insurance, manufacturing, temperance, and safety. (3W) **DeHart**

130. Introduction to Cultural Anthropology. Study of the attitudes, ideas, behavior, social organization, and material results of selected primitive and contemporary cultures. (3S) **Black**

131. The American Indian. Indian cultures, problems, and needs. Programs for the improvement of Indian adjustment. Actual and potential contributions of Indian knowledge and philosophy to our way of living. (3S) **Black**

140. Social Psychology II. Relationship between personality development and ideological patterns among various social classes and cultures. Prerequisite: Soc. 40. (3S) **Staff**

141. Rural Community Organization and Leadership. Analysis of forces and procedures at work in developing community organization, with special emphasis on techniques of training leaders to help make the community more effective. (3F) **Roskelley**

144. Women Today. Progress of women in American society since Colonial days; their struggles for status in industry, politics, education, sex, religion, and the arts. Roles and contributions of outstanding women. (3W) **Fredrickson**

145. Alcoholism. See P. E. 145. (3S) **Nelson**

153. History of Social Thought. Development of social thought from early periods is traced to August Comte. From this point important developments in Europe and America are studied, with emphasis on American thought. (3S) **Staff**

- 151. Population Problems.** The nature of population growth and decline studied in reference to international, national and local social problems. Significance of present population distributions, characteristics, and trends. (3W) Roskelley
- 153. Social Institutions.** Similarities and differences in life histories of institutions as they emerge, grow, and decline are appraised. Society's efforts to keep institutions attuned to the objectives for which they were organized are observed. (3S) Staff
- 153. Human Relations in Industry.** Designed to extend understanding of the human or social characteristics involved in the operation of modern industry. The pattern of social relations that affect work behavior will be studied. (3S) DeHart
- 160. Family Relations.** The social-emotional development of the child in the family; marital adjustment; social-culture difference in family behavior; problems; ideological considerations. Prerequisite: Soc. 60 (3S) Skidmore
- 161. Modern Social Problems.** An approach based on adjustment to instruments of change as a means of minimizing disorganization. (3W) Fredrickson
- 170. Juvenile Delinquency I.** Nature and extent of juvenile delinquency. Theories of causation and methods of prevention of delinquency in children. (3F) Carter
- 172. Juvenile Delinquency II.** Origin and operation of the Juvenile Court. Detention, probation, placement, and institutional care, as methods of rehabilitation and correction. (3W) Carter
- 174. Introduction to Criminology.** Extent and nature of crime, and various factors related to criminal behavior. Theories of crime causation, and methods of prevention and treatment. (3S) Staff
- 180, 181, 182. Current Sociological Problems.** For upper division and graduate students. (1F, 1W, 1S) Staff
- 190. Seminar in Sociology.** Time arranged. Required for majors in Sociology. (1F, 1W, 1S) Staff
- 201. Research in Sociology.** For advanced students only. A project for original study is organized, and field work is carried on under supervision. Prerequisite: Soc. 287. (F, W, S) Credit arranged. Staff
- 202. The Study of Society.** Basic principles of sociology are considered in their theoretical and scientific settings, as a body of facts, a method of investigation, and an explanation of associate living. (5W) Black
- 203. Independent Readings in Sociology.** Readings and conferences on topics selected by the student. (F, W or S) Credit arranged. Staff
- 207. Graduate Seminar.** Short subjects within the field of Sociology and pertinent to but not available in regular courses are selected for study. (2W) Staff
- 210. Advanced Rural Sociology.** Analysis of major developments in rural social thought, research and application of both toward solution of social problems throughout the world. (3S) Roskelley
- 241. Rural Organization.** Social organization in areas larger than the local community; district, state, regional, national and international. (2S) Roskelley
- 262. Instructional Problems in Family Life Education.** Methods, materials, and content for teachers dealing with the social, emotional and cultural phases of Family Life Education. (3) Skidmore
- 263. Marriage Counseling.** The philosophy, principles, and techniques of pre-marital and marriage counseling. (3) Skidmore

287. Methods of Social Research. Formulating problems, collecting, analyzing, and interpreting data in social research. (3F) Roskelley

301. Research Methods in Criminology. Careful study and analysis of problems, methods, techniques, and outlook involved in criminological research. (3S) Staff

DIVISION OF SOCIAL WORK

R. W. Roskelley, Director; **Don C. Carter**, Assistant Director; **Evelyn H. Lewis**, Assistant Professor.

Joseph A. Geddes, **W. B. Preston**, Professors Emeritus.

The demand for social workers exceeds the qualified personnel available for employment. 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 July, 1952, the graduate schools and undergraduate departments of social work joined forces with other segments of the profession to provide for 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 later undertaking graduate study, in social work. More than 60 undergraduate departments of social work have been approved by the Membership Committee 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 B.S. degree in social work are: S.W. 165, 173, 175, and S.W. electives, 12 hours; Economics 127, 145, 180; Political Science 129; Psychology (9 hours selected from:) 105, 121, 140, 161, 183; Sociology (12 hours selected from:) 130, 141, 160, 161, 170, 172; Child Development 67.

During the freshman and sophomore years, students should take the following courses, in addition to filling the general group requirements for graduation: (Most of these courses may be applied towards the Social Science group requirement) Economics 51; Political Science 1, or 10; Psychology 53; Sociology 10 or 70, 40.

162. Mental Hygiene. Social and cultural changes that have given rise to problems of adjustment. Reactions to stress: "preventive" growth and adaptation. (3W) Lewis

165. Culture and Personality. The process of personality development, with emphasis on the influence of culture, social class, and the nature of personal experiences. (3F, S) Carter

173. The Field of Social Work. Contemporary social work as it is divided into the following areas of activity: social casework, social group, community organization and social action. Objectives, processes, and personnel requirements of social work agencies. Social Work majors should take S.W. 175 concurrently. (3F) Lewis

174. Introduction to Case Work. Theories and practices of social case work, with emphasis on problems and techniques of interviewing. (3W) Lewis

175. Introduction to Field Work. Acquaints students with various agencies dealing with social work and related areas, includes field trips. Should be taken concurrently with S.W. 173. (1F) Lewis

177. **Social Treatment of Children's Problems.** Analysis and treatment of problems of children. (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. (3W) Carter

180. **Group Relations and Group Dynamics.** Analysis of group and inter-group relations and processes. Methods of group work, leadership, and group dynamics are emphasized. (3S) Carter

182. **Children in Institutions.** Principles underlying care and treatment of children in voluntary or non-custodial institutions. Development and trends in institutional care. (3S) Lewis

195. **Social Work Seminar I.** A study of social work publications and other source material applicable to the field. Required of majors in Social Work. (1F) Lewis

196. **Social Work Seminar II.** Analysis of behavior causation and motives through use of literature and case studies. (1W) Lewis

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

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

201. **Social Case Work II.** A continuation of Social Case Work I. Further application of principles and methods, especially in relation to social case recording and development of skill in relationship. (3W) Lewis

202. **Social Case Work III.** Application of case work principles and techniques as affected by agency setting and by special types of client needs. Consideration is given to case work with children, families, aged, and the emotionally or physically ill. (3S) Lewis

210. **Field Work I.** Field work centers are maintained in selected public and private agencies; supervision is provided under college direction. S.W. 200 should precede or be taken concurrently. (2-4F or W) Lewis

211. **Field Work II.** A continuation of Field Work I. S.W. 201 should precede or be taken concurrently. (2-4W or S) Lewis

212. **Field Work III.** A continuation of Field Work II. S. W. 202 should precede or be taken concurrently. (2-8S) Staff

222. **Social Work in Rural Communities.** Social work in relation to problems of organization, administration and community relations as they affect rural counties. (2S) Staff

230. **Social Psychiatry I.** Emotional and intellectual factors in adjustment problems; diagnosis of mental and nervous disorders; interrelation of physical, emotional, mental and environmental factors. (2W) Staff

231. **Social Psychiatry II.** An advanced course open only to students who have completed S.W. 230. (2S) Staff

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

250. **Public Welfare Services I.** Development of the concept of public responsibility and its application in a modern public welfare services program; and historical development of various public welfare services. (3F) Carter

251. **Public Welfare Services II.** Analysis of the operation of a modern public welfare services program, including: public assistance, social security, public services for children. (3W) Staff

260. Medical Information. Diseases most frequently encountered in social work. Interrelations of disease and social conditions. Medical resources. (3W) **Staff**

270. Child Welfare. Evolution and current developments in programs for meeting needs of children. Consideration is given to substitute parental care and adoptions, to child labor laws, juvenile courts, to problems of the child of unmarried parents, and the handicapped and the exceptional child. (3S) **Lewis**

276. Contemporary Social Work Literature. Reviews current contributions to fields of social work literature and acquaints the student with the periodical literature published during the previous year. (2W) **Staff**

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

295-296. Seminar in Social Work. For advanced students in the Division of Social Work. Reviews the current trends and the recent literature of social work. (1-2S) **Staff**

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SCHOOL OF EDUCATION

JOHN C. CARLISLE, Dean

General Information

The School of Education, as an administrative unit of the College, includes the departments of Art, Education (Administration), Education (Elementary), Education (Secondary), Education (Vocational), Library Science, Music, Physical Education and Recreation, and Psychology. A major function of these departments is the preparation of teachers for elementary and secondary schools. Each department, in addition, offers courses contributing to general education and courses designed to supplement the major work of other departments.

The Bachelor of Science degree with a major in elementary or in secondary education is designed for students preparing to teach in elementary or in secondary schools. Students majoring in other departments who wish to prepare for teaching are admitted to teacher training curricula and are counseled in their programs by a committee composed of representatives of the departments and of the departments in which teaching majors are selected. On the graduate level, provision is made for students who desire to meet requirements for administrative and supervisory credentials and for those who seek general professional advancement.

Teachers in junior and senior high schools should be prepared to teach in two high school teaching fields. The student's mastery of essential subject matter, rather than the credit hours, should determine subject matter proficiency. Teaching fields should be chosen by the student on bases of his individual abilities and interests also in the light of available information concerning the demands for beginning teachers and the supply in the respective fields. The curriculum in professional education and psychology aims to impart to prospective teachers the meaning of education in its relation to desirable social objectives, the organization and administration of schools in relation to the needs of the learner and to social aims, an understanding of the nature and needs of the learner and the learning process, and by means of certain technical courses in education, to develop skills in teaching.

The sequence of professional courses in Psychology and Education is such that it is necessary to study these subjects before the final year. A detailed plan of study is not outlined or prescribed. The student who plans to prepare for teaching usually finds it advantageous to devote the first two years to securing a well-balanced general education, giving some attention to courses prerequisite to advanced study. During these years some emphasis may also be placed in the field of specialization. The third and fourth years should be devoted primarily to concentration in the major field of study and to professional courses in Psychology and Education.

The School of Education is a member of the American Association of Colleges for Teacher Education.

TEACHER PLACEMENT SERVICE

The College is interested in placing qualified teachers in teaching positions. To accomplish this purpose, the teacher placement service has been organized. All students who qualify for teaching certificates are required to register with the bureau to facilitate the compilation of the proper credentials to be used in placement for the current and future years. Registration should be completed in the winter quarter or early part of the spring quarter.

TEACHER CERTIFICATE

The School of Education is designated by the State Department of Public Instruction as its official representative in administering certification requirements for regular students of the College.

Certification standards conform as nearly as possible to the requirements of the State Board of Education. With the Bachelor's degree the student may qualify for any one of the following certificates:

Teacher's Certificate for Secondary Schools
Teacher's Certificate for Elementary Schools
Teacher's Certificate for Kindergarten
Librarian's Certificate for Elementary Schools
Librarian's Certificate for Secondary Schools
Two-year Counselor's Certificate
Certificate for Secondary School Teachers of Vocational Agriculture
Two-year Certificate for Secondary School Teachers of Industrial Arts
Certificate for Teachers of Vocational Homemaking in Secondary Schools

Administrative Certificates granted by the State Board of Education may be earned by graduate students.

Specific requirements for each certificate are listed with the departments in which the major work is offered.

TEACHER TRAINING

The College offers complete programs of teacher training in all phases of public school work. Facilities for practice teaching have been carefully chosen. The Nursery School, operated on the campus by the Department of Child Development in the School of Home Economics, is especially concerned with the pre-school child. Teachers in Home Economics, Agricultural Education, Industrial Arts, and Technology do their practice teaching under the direction of the departments concerned in selected schools throughout the state and under supervision of the teacher education committee.

For training kindergarten and general elementary teachers, the College maintains the Whittier School, which includes the kindergarten and grades one to six inclusive. The teachers in the school, selected especially for their fitness to serve on the teacher education program, are regular members of the College faculty. The training school, in addition to its function as a center for teacher education, serves the School of Education as a laboratory in which child growth and development are studied and desirable school practices are developed.

By arrangement with district boards of education, facilities of their elementary and secondary schools are utilized as teacher training centers.

Fine Arts

Floyd V. Cornaby, H. Reuben Reynolds, Professors; Jessie Larson, Everett Thorpe, Associate Professors.

The Art Department offers major and minor courses of study in Art Education, Applied Art, Fashion Illustration, Painting, Sculpture, Interior Decoration, and Crafts. As a service unit, the Art Department is closely correlated with Home Economics, Industrial Arts, Recreation, Landscape Architecture, and other major divisions of the college.

The following courses may be repeated for additional credit: Art 4, 106, 107, 108, 109, 110, 111, 112, 113, 135, 140, 145, 171, 175, 271, 272.

Graduate Study. Provision is made through the Art department for study leading to the Master's degree.

Students choosing to major in any of the following fields of art must show aptitude for the work and complete courses listed as follows:

Applied Art and Lettering

Students who choose Applied Art as a major are required to complete Art 1, 2, 7, 104, 106, 107, 108, 110, 124, 125, 132, 135, 140; and 3 credit in appreciation.

Minors in Applied Art should take 1, 2, 4, 7, 110, 124, 125, 132 and 135; and 3 credits in art appreciation.

Art Education

Teaching majors in secondary education are advised to complete Art 1, 2, 4, 7, 22, 106, 107, 110, 119, 124, 125, 127, 151 [See Education (Secondary) 161]; 9 credits in art appreciation; 9 credits in painting, and 9 credits in crafts.

Teaching majors in elementary grade supervision or special teaching of drawing or creative expression are required to complete Art 1, 2, 3, 4, 7, 106, 110, 119, 124, 125, 151; and 12 credits in painting.

Teaching majors in fine and practical arts and crafts for elementary grades are required to complete Art 1, 2, 4, 7, 106, 110, 111, 112, 113, 114, 119, and 6 credits in art appreciation.

For teaching minors the following are recommended: Art 1, 2, 4, 7, 110, 119, 124, 125, 132, 151; 6 credits in painting. 151 or 152, and 6 credits in appreciation.

Clothing and Textile majors desiring a teaching minor in Art should complete Art 4, 111, 127, 135, 152, and 6 credits in crafts.

For Elementary Education majors who elect Art as a specialization field, Art 1, 2, 4, 7, 110, 119, 151; 9 credits in painting and 6 credits in appreciation are recommended.

Crafts

Majors are required to complete Art 1, 2, 4, 7, 106, 110, 111, 112, 113, 114, 119, 125, 127, Woodwork 61a; 9 additional credits in Crafts; Landscape Architecture 20, and 6 credits in art appreciation.

It is recommended that Minors complete Art 1, 2, 4, 106, 111, 112, 113, 114, 119, 140 and 6 credits in art appreciation.

Fashion Illustration

Majors must complete Art 1, 2, 4, 7, 107, 110, 111, 125, 132, 135; 3 credits in 171; Clothing, Textiles and Related Arts 24, 105, 115, 125, 140, and 6 credits in art history.

Minors should complete Art 1, 2, 3, 7, 110, 11, 132, 135 and Clothing Textiles and Related Arts 24, 105, 115, 125.

General Art

Students desiring to major in General Art with no specialization or emphasis on teaching are required to complete Art 1, 2, 4, 7, 26, 33, 36, 106, 107, 110, 112, 119, 124, 125, 127, 132, 135, 140, and 12 credits in painting.

Interior Decoration

Majors are required to take Art 1, 2, 3, 7, 22, 26, 33, 36, 110, 111, 123, 124, 132, 175; Landscape Architecture 3, 20, Clothing Textiles and Related Arts 24, 33; Household Administration 65; Woodwork 170.

It is recommended that for a minor the student take Art 1, 2, 3, 7, 26, 33, 36, 22, 111, 123, 124, 175, and Landscape Architecture 3.

Painting

Major requirements are Art 1, 2, 4, 7, 26, 33, 36, 106, 107, 112, 124, 125, 127, 132, 140 and 2 credits in painting techniques.

Minors should complete Art 1, 2, 4, 7, 26, 33, 36, 106, 107, 124, 125, 127, 132, and 15 credits in painting techniques.

Sculpture

Major requirements are Art 1, 2, 7, 26, 33, 36, 12 credits of 106, 107, 110, 112, 124, 125, 127, 140.

Minors should take Art 1, 2, 3, 7, 26, 9 credits of 106, 107, 112, 124, 125.

Applied Art

110. Lettering-Layout. Elementary and advanced pen and brush lettering. (3F, W, S) **Thorpe**

135. Applied Art and Illustration. Elementary and Advanced Fashion Illustration, art for reproduction, advertising layouts, techniques and skill in any media that will prepare the student for a professional career. (3F, S) **Thorpe**

Appreciation

3. Art Understanding and Appreciation. Aims to increase enjoyment of living through the sense of sight. Develops understanding of basic principles underlying the visible forms of art in everyday life. (3F, W, S) **Reynolds**

26. History and Appreciation of Architecture. Characteristics of the great styles of building and the development of a taste for good architecture. (3W) **Reynolds**

33. History and Appreciation of Painting. Designed for the layman desiring to extend his knowledge of the great painters, as well as for the teachers of art and artists. (3W) **Reynolds**

36. History and Appreciation of Modern Art. Development of modern tendencies in painting, design, architecture, crafts, sculpture, and household arts. (3W) **Cornaby**

37. History of Latin-American Art. Discussion of Mayan, Aztec and other pre-Columbian developments; colonial and contemporary painting, sculpture, and architecture. Subject to approval of Curriculum Committee for Language and Arts requirement. (3F) **Cornaby**

132. Color. Color used in stage lighting, painting, design, and every-day life. Physical, psychological, and artistic phases are correlated. Suited to the businessman, layman, dramatists, artist, teacher, and painter alike. (3S) **Reynolds**

Art Education

34. Art for Young Children. Designed to meet needs of child development majors, mothers in the home, kindergarten and first grade teachers. (3F) **Staff**

151. Art Methods for Elementary Grades. Methods of teaching drawing, painting, design and handwork in the elementary schools. Required for preparation of a grade school teacher. Prerequisite: Art 1 and 2 or 4. (3S) **Reynolds**

152. Art Education 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. Prerequisites: Art 1 and 2 or 4. (3W) **Larson**

Crafts

111. Fabric Design and Application. Projects in creating designs of character and beauty and applying them to suitable textiles in techniques of block print, stencil, hooked rug, creative embroidery, silk screen printing, freehand painting, and batik. Desired prerequisites: Art 1 and 2. (3F or S) **Larson**

112. Ceramics. Art of making pottery, tiles, figurines. (3F, W, and S) **Shideler**

113. Art Metal, Jewelry and Lapidary. Art metal projects in hand-wrought copper, and silver, jewelry design and construction, precision casting. (3F, W, or S) **Cernaby**

114. Leathercraft. Design and construction of wallets, belts, bags, briefcases, holsters, bridles and related projects. Executed in techniques of modeling, carving, stamping, embossing, etc. (3F, W or S) **Cernaby**

Design—Structure and Organization

1. Art Structure and Design. Creative approach to line, mass, form, pattern, texture, color, and their combined relationship to design construction. (3F, W or S) **Staff**

2. Design Creation and Application. Problems in creating designs for application to specific projects. Instruction is adapted to the individual needs of teacher, homemaker, hobbyist, or scout, summer camp and recreational counselor. (3F, W or S) Prerequisite: Art 1. **Staff**

4. Creative Expression. Experiments in developing spontaneous expression and freedom of interpretation in basic creative painting. (A desirable prerequisite to all other painting classes.) (3W) **Larson**

7. Freehand Drawing. Objective drawing of natural forms from observation and memory in various media. A desirable prerequisite to all painting courses. (3F, W or S) **Staff**

107. Advanced Drawing and Composition. Continuation of freehand drawing. Prerequisite: Art 7. (3S) **Staff**

124. Perspective. The principles of cylindrical, parallel, and oblique perspective. For students of art and landscape architecture. (3F) **Reynolds**

125. Anatomy and Life Drawing. From anatomical rendering to the analysis of the figure in relation to elements of design. (3F, W) **Staff**

127. Advanced Design. Special problems in creating designs for furniture, leather, art metal, jewelry, ceramics, textiles, plastics, etc. For teachers, industrial artists, craftsmen. (3W) **Staff**

Graphic Art

140. Print Making. Such methods as block printing, wood cuts, silk screen, and etching are studied. Desirable preparation, Art 7. (3F and S) **Shideler**

Interior Decorating

22. Essentials in Interior Decoration. Study of historic styles and the analysis of art elements and principles of design applied to home planning and furnishing. Prerequisites: Art 1, 2. (3F or W) **Larson**

123. Applied Interior Design. Practical application of art elements and principles of design to problems of home decoration and furnishing. Prerequisite: Art 22. (3W or S) **Larson**

175. Advanced Problems in Interior Decoration. Experimental projects in home planning and furnishing. Prerequisite: 22 and 123. (3S) **Larson**

Painting

(Desirable prerequisites to all painting classes: Art 4 and 7).

108A. Still Life. Experiments in basic techniques of oil painting. (3W) **Larson**

108B. Landscape. Various approaches in oil painting—out-door sketching. (3F) **Larson**

108C. Figure Composition. Creative approaches to human and animal composition in oil painting. (3S) **Larson**

108D. Portrait Painting. The contemporary study of the functions and form problems of portrait painting in terms of the principles of value, plane, line, texture, color and design. Any media may be employed. Prerequisite, 125. (3S) **Thorpe**

108E. Mural Design Work Shop. Introduction of methods and materials, consisting of a series of problems exploring color, line and space, as applied to mural design. (3F, W) **Thorpe**

108F. Watercolor. **Cornaby**

108G. Painting Technique. Experimental use of contemporary paint, mediums, including plastic paint, vinylite, pyroxylin, etc. (3S) **Cornaby**

Sculpture

106. Sculpture. Creative expression in a variety of plastic media. Emphasizes esthetic employment of form and the technique necessary to casting, built up plaster modeling, beating metals, stone cutting, and wood carving. (3F or S) **Shideler**

Special Art Problems

171, 271. Special Studio Courses. Individual work on specific problems as approved by instructor. Time and credit arranged. (FWS) **Staff**

272. Art Research, Seminar and Thesis Problems. Time and credit arranged. (FWS) **Staff**

Education (Administration)

E. A. Jacobsen, Professor and Chairman; **John C. Carlisle**, **L. G. Noble**, Professors; **Jefferson Eastmond**, Assistant Professor.

10. College and Life. Orientation course for freshmen but open to all students. (2F, W or S) **Staff**

50. Introduction to Teaching. Study of qualifications essential to teaching success and to each student's aptitudes for teaching. Required of all candidates for teaching training curricula. (2F, W, S) **Staff**

114. Organization and Administration. Fundamental principles of operating public schools, with emphasis on Utah conditions. (3F or W) **Staff**

116. Articulation of the Educational Program. A survey of existing needs for close articulation of the various educational units and agencies. Discussion of factors conditioning nature, and extent of articulation and of the unifying principles upon which a well-articulated education program rests. (3F or W) **Jacobsen**

141. Social Education. The implications for education involved in social conditions and social change. The social significance of current educational theories and practices. (3W) **Noble**

181. School Finance. The importance of finances in a school system; principles and practices involved in collecting and distributing school revenues, with special reference to conditions in Utah. (3F) **Eastmond**

182. History of Education. Major educational movements from early Greek to the present with emphasis on purposes, organization, instructional procedures, curriculum, etc., and their bearing on today's education. (3 Su. First) **Staff**

190, 191, 192. Intercultural Education. A sequence of courses planned in cooperation with other departments to acquaint prospective teachers with ways and means of studying the culture of other peoples in elementary and secondary schools. (1F, 1W, 1S) **Carlisle and Staff**

160. Background of Modern Education. An integration of the history and philosophy of education as a basis for understanding modern education. The evolution of educational thought, the sources of great philosophies of education in relation to their times. (5F) **Staff**

203. Comparative Education. 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. (W) **Staff**

205. Reading and Conference. Provides for individually directed study in subjects of one's special interest and preparation. (1-2F, W or S) **Staff**

211. Educational Measurements and Statistics. Principles of measurements, tests and test construction, statistical analysis, and evaluation procedures in education. (3W) **Eastmond**

213. Organization and Administration of Guidance. (See Psychology 213). (3S) **Staff**

215. Curriculum Development. Advanced problems in the foundation of curriculum building. Philosophic bases of the curriculum, current practices, and organization for curriculum study. (3S) **Carlisle**

218. Public Relations in Education. Objectives and techniques and media for an improved school public relations program are listed and evaluated. (3F) **Eastmond**

221. School Administration. 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 are studied. (3W) **Staff**

222. Administration of School Personnel. Principles and practices in management of teacher and pupil personnel. (3S) **Jacobsen**

223. Legal Aspects of School Administration. Emphasis is given to responsibilities and functions of local and district school administrators with interpretation of legal status, form and procedure as established by statutes, legal opinions, and court decisions. (3F) **Staff**

247, 248, 249. Education Seminar. 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 or S) **Staff**

251, 252, 253. Master's Essay. Individual guidance in preparation of research papers as part of research requirement for the Master of Science degree.

255. Programs, Plans, and Construction of School. 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 provision governing financing and construction of new buildings, bids and contracts. (3S) **Staff**

267. Introduction to Research. An inquiry into the nature and sources of research problems with a study of underlying principles and methods of working out such problems in education. Some attention is given thesis writing as a problem related to research. (2W) **Carlisle**

271. Research and Thesis Writing. Individual work in thesis writing with necessary guidance and criticism. Credit arranged. (F, W or S) **Staff**

275. Field Studies and Thesis. Individual work on research problems applying on the program of the Ed.D. Credit arranged. F, W, S) **Staff**

Education (Elementary)

Caseel Burke, Associate Professor and Chairman; **Edith S. Shaw**, Associate Professor; **Ellen Humphrey**, **Fern Nicholes**, **Myrtle R. Jensen**, **Thomas Taylor**, **Olson**, **Beatrice Murray**, **Ivan Pedersen**, Instructors.

In connection with general requirements for the Bachelor of Science degree, the following requirements must be met:

- (1) Courses designed to provide a broad liberal background. These must include ten credits in each of the four basic fields of knowledge: social science, biological science, physical science and mathematics, and language arts; and six credits in fine and practical arts.
- (2) Thirty credits in one field of concentration or 18 credits in each of two such fields.
- (3) A major of 45 credits in professional study selected from the following divisions:

Group I. Understanding the Child—Minimum 9 credits: Psychology 105, 123, 145, 181, 182, 183, Physical Education 84, Public Health 155, Speech 107, Child Development 67.

Group II. Understanding the School—Minimum 6 credits: Education 103, 114, 116, 141.

Group III. Curriculum and Methods—Minimum 12 credits: Education 104, 105, 107, 108, 109, 161, Psychology 108, 127, English 24, Speech 118, Music 130, Art 152, Physical Education 177, 182, Child Development 174.

Group IV. Student Teaching—Minimum 12 credits: Education 106, Child Development 175.

Group V. Electives—may apply on 45-credit major: Psychology 161, 140, 112, Education 110, 145, 165, 181, 194, 203, 205.

Selection of the program of study should be guided by the major professor. Completion of a major in Elementary Education includes all requirements for a Utah general elementary certificate.

A student who wishes to qualify for elementary certification in addition to completing his secondary requirements must have completed fifteen (15) quarter hours of professional education courses specifically listed for elementary teachers including: Psychology 105, Child Psychology, Education 104, Elementary School Curriculum: Education 106a, Student teaching; and additional courses selected from: Psychology 108, Education 103, 104, 105, 107, 108, 109.

103. Principles of Elementary Education. Aims, functions, work and attainable goals of the elementary school as an integral part of the American system of education. Part of the work of the course is observation and analysis of practices and procedures in selected elementary schools near Logan. Two hours of observation weekly. Time arranged. (4F, W, S) **Burke**

104. Elementary School Curriculum. Familiarizes prospective elementary teachers with the nature and content of the elementary curriculum and factors that influence its development. Includes an introduction to Utah Elementary Teaching and Supplements, and considers some of the objectives, methods of instruction, teaching aids and materials, and sources of information related to the subjects of the curriculum. (3F, 3W, 3S) **Jacobson**

105. Principles of Teaching in Elementary School. The purposeful activity of the child as the basic principle determining teaching procedure. Significance of individual differences in application to school room practices. Consideration of schoolroom equipment and of organization and play activities. (5F, W or S) **Shaw**

106. Student Teaching in Elementary Schools. For juniors or seniors who have had Educational Psychology and Principles of Education. The apprentice plan is followed which requires an initial period of observation with minor responsibilities but with gradual increase of work and responsibility as trainee's ability is demonstrated. Registration for all quarters should be arranged at fall quarter registration. Any quarter, time arranged. Students who have credit for other courses in practice teaching, or who have successful teaching experience, may register, by special permission of the instructor, for less than 12 credits. (F, W or S) **Shaw and Supervising Teachers**

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 achievement of the objectives of reading. (3F) **Burke**

108. Social Studies in the Public School. Social responsibilities and opportunities of youth in the modern world. Emphasizing the part played by the school and the teacher in helping children meet problems of living. Content and methods on both elementary and secondary levels. (3W) **Burke**

109. Arithmetic and Science in the Elementary Grades. Investigation of the aims of the arithmetic and science programs and an acquaintance with the materials, technique of instruction, and experiences of children that may help them gain the skills, understandings and attitudes desirable in these subjects. (3S) **Burke**

110. Diagnostic and Remedial Teaching. Specific objectives of the elementary school and methods of analyzing the extent to which these objectives are reached. Diagnostic and remedial measures with respect to various areas of the curriculum. (2S) **Staff**

207. Elementary School Administration. The operation and management of the elementary school. (3W) **Burke**

208. School Supervision. The principles and practices of school supervision including the qualifications and responsibilities of the supervisor in elementary education. (3S) **Burke**

245. Problems in Elementary Education. Consideration given those fields of elementary education that members of the class desire to investigate in order to gain modern authoritative viewpoints. Opportunity for both individual and group work. (2S) **Burke**

Education (Secondary)

John C. Carlisle, Professor and Chairman; L. G. Noble, Professor; Helen Cawley, Terrance E. Hatch, Associate Professors; Israel C. Heaton, Assistant Professor; Pearl S. Budge, Instructor.

For a major in Secondary Education the student must complete at least 36 credits of professional work in Education and Psychology, including the 33 credits required for a general secondary certificate in the State of Utah.

The Utah requirements for a certificate include courses in three main areas:

- (1) Understanding the pupil,
- (2) Understanding the school, and
- (3) Curriculum, methods, and student teaching.

The following sequence of courses at U.S.A.C. is suggested to meet these requirements: *Education 111, 5 credits; *Psychology 102, 5 credits; *Education 114, 3 credits; Education 113, 3 credits; *Public Health 155, 3 credits; *Education 127, 3 credits; *Education 129 and 130, (Student Teaching) each 4 credits; a special methods course or other approved elective course in Education, 3 credits.

The starred (*) courses in the above list are required; equivalent electives may, with the approval of the department, replace the others. The additional 3 credits required for a major must also be selected in Education with the approval of the department.

A teaching major of not fewer than 36 credits, of which 15 credits must be Upper Division, and a teaching minor of 18 credits are required of majors in secondary education. The major and the minor must each be in some one subject taught in Utah secondary schools. In lieu of a teaching major and minor, a composite teaching major may be selected. Such a major consists of not fewer than 60 credits in two or more related subjects taught in secondary schools with a minimum of 18 credits in any subject included in the composite major.

111. Principles of Secondary Education. The background and status of the American secondary school. Problems concerning desirable objectives and functions are analyzed. An introduction to various type curricula and methods is included. (5F, W, S) Carlisle

113. Principles of Guidance. Major emphasis given to organization of guidance as a service, including individual and occupational differences, tests, measurements, and counseling. (5F, W, S) Hatch

119. Extra-curricular Activities. Designed to acquaint prospective teachers and administrators with extra-curricular programs in secondary schools, and the place such activities occupy. (5S) Staff

127. Secondary School Methods. Teacher personality, planning instruction, study procedures, types of teaching, adapting classroom practices to individual differences, testing and evaluation, are all included. Recommended to be taken the same quarter with Education 129. (3F, W, S) Budge, Hatch

129. Student Teaching in the Secondary School. This course must be taken during the same quarter as Education 127 and should be taken concurrently with Education 130, thus making a block of eleven credits to be completed in one quarter. The student should reserve all morning or all afternoon in his daily schedule for these courses.

Application for admission to student teaching is made the preceding quarter, and students may enroll only if their application has been approved. Applications will be approved only if the student has completed Education 111 and Psychology 102. Members of the class are assigned to a sponsor teacher in nearby 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 quarter, the student has had guided experiences in all professional responsibilities of the typical faculty member in the secondary school. (4F, W, S) Carlisle, Hatch, Heaton, Budge

130. Student Teaching in the Secondary School. See 129 above. (4F, W, S) Carlisle, Hatch, Heaton, Budge

138. Improvement of Teaching in Secondary Schools. Designed to meet the needs of teachers, supervisors, and administrators. Emphasis upon recent developments in the improvement of teaching learning situations and activities from the junior high school to the Junior college. (3F) Carlisle

161. Audio-Visual Aids in Education. Studies the building of a workable program in which the newest materials and techniques are utilized. (3F, W, S) Drake

—— Teaching of Speech. (See Speech 123)

—— Teaching of English. (See English 124)

—— Teaching of Typewriting and Bookkeeping. (See Secretarial Science

179)

—— Teaching of Shorthand. (See Secretarial Science 180)

—— Teaching of Mathematics. (See Mathematics 150)

—— Teaching of Physical Education. (See special methods courses in Physical Education.)

—— Teaching of Art. (See Art 152)

236. Secondary School Administration. Topics in secondary school administration are considered, 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 certificate in secondary education. (W) **Carlisle**

237. Problems in Secondary Education. For graduate students in secondary education and those preparing for school administration or supervision in the junior or senior high schools. Reviews current research in areas of special interest to class members. (3F) **Hatch**

Education (Vocational)

S. S. Richardson, Professor and Chairman; L. Mark Neuberger, Professor; Helen Cawley, Associate Professor; Eldon Drake, Assistant Professor.

Candidates for a teacher's certificate in any branch of Vocational Education must comply with Utah certification requirements. The following courses are suggested:

Agriculture Basic: Psychology 102; Education 112, 113, 114, 125, 126; Public Health 155; Elective, 3 credits.

Home Economics Basic: Psychology 102; Education 114, 120, 121, 122; Bacteriology 155; Public Health 155; Elective, 7 credits.

112. Principles of Vocational Education. Social and economic bases for vocational education and its relation to general education. Fundamental principles and practices in vocational education. (3W or S) **Richardson**

120. Methods in Teaching Home Economics. Contributions of Home Economics to the educational program. Analysis of teaching situations based upon observations of school activities; methods of teaching in education for home and family living. Prerequisite or parallel: Psych. 102. (3F or S) **Cawley**

121. Problems in Teaching Home Economics. Recent investigations in Home Economics and their bearing upon Home Economics curricula and teaching methods. (Especially for students who are to qualify for a Vocational Certificate.) This course should be blocked with Education 122 and with one other 3-hour Education course so that concentrated work may be taken on the campus prior to and following the off-campus student teaching experience. Prerequisite: Ed. 120. (4F, W, S) **Cawley**

122. Student Teaching in Home Economics. Observation and teaching of homemaking under supervision in public schools having co-operative arrangement with the College. Student teachers leave the campus the middle five or six weeks of Fall or Winter Quarter and teach a full homemaking program each day in an approved school. An occasional student may find it impossible to do the student teaching on this block plan. Such a student must receive approval of the instructor of Education 121 and 122, preferably at the beginning of her junior year, to make arrangements for teaching at least two hours daily in an approved local school in Spring. Prerequisites: Ed. 120, 121. (8F, W, S) **Cawley**

123. Student Teaching in Home Economics for Non-Vocational Education Majors. For student dietitians whose responsibilities will involve teaching student dietitians, and patients. For other non-vocational homemaking education majors interested in securing practical teaching experience. Prerequisite: Ed. 120, with Ed. 121 taken the same quarter as Ed. 123. (4S) **Cawley**

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 agriculture, selection and organizing of subject matter, and supervision of agricultural activities on the farm. (5W or S) **Richardson**

126. Directed Teaching in Agriculture. Student observation and teaching in approved local vocational agricultural departments under supervision. Trainees leave the campus to train in selected Utah high schools for a full teaching program. (4-8W or S) **Richardson**

151. Extension Methods. For prospective home demonstration and county agricultural agents. History, objectives, organization and accomplishments of extension work in the United States. Farm and home problems, youth and adult education, and extension methods. (3S) **Richardson and Extension Staff**

194. Principles and Objectives of Distributive Education. To acquired students with the general philosophy and purposes of vocational distributive education, and to enable them to understand and appreciate its place in the modern education program. Students compare the principles and objectives of distributive education with those of other educational programs. **Arr. Staff**

195. Part-time Distributive Education. The content, methods and devices to be used in part-time education program. Emphasis placed on problems of coordination, selection of students, arrangement of a class schedule, supervision on the job, and other phases of the co-operative part-time distributive education program in the high school. Requirements and standards of part-time vocational education will be treated. **Arr. Staff**

199. Special Problems in Home Economics Education. Developed around individual needs of students which are not otherwise provided for in curriculum. (1-2F W or S) **Cawley**

210. Research for Master's Thesis. Credit arranged. **Cawley**

225. Special Problems in Agricultural Education. A consideration of needs of individual students and special types of service. (1-2S) **Richardson**

226. Young Farmer and Adult Classes. Fundamental concepts in organization and instruction of young farmers and adults; principles and techniques of teaching classes. (3S) **Richardson**

237. Seminar. Home Economics Education. Opportunity for investigation and reporting on individual problems. (Time and credit arranged) **Cawley**

GRADUATE WORK

Graduate study in the Departments of Education leads to the Master of Science degree in Education or to the Five Year Diploma. All courses listed in the department are applicable to either the degree or the diploma with the exception of Education 103, 104, 105, 106, 113, 114, 129, 130.

Library Science

King Hendricks, Professor and Chairman; Milton Abrams, Russell Davis, Leone Harris, James Tolman, Assistant Professors; George Beutler, Ann Caine, Pearl Carter, LaPrele Hatch, Ida Marie Logan, A. M. Smith, Instructors.

Library Science may be used as a teaching minor in connection with a major in Education. This course prepares the student for a librarian certificate as issued by Utah State Board of Education and for a position as school librarian on the elementary or secondary level. It also provides background for advanced training in librarianship. A teaching minor of not fewer than 18 credits must represent credits selected from each of three groups of courses including courses marked*.

Group 1: Technical processes; 1, 113, 120*, 121; Eng. 111; Educ. 161; Art 110.

Group 2: 100*, 155*, 156, 160; Eng. 23, 24, 40; any upper division courses in Literature; Speech 18; Educ. 107.

Group 3: Administration 150*; Educ. 104, 105; Psychology 110.

The courses required for an Elementary library certificate are English 24, L. S. 120, and L. S. 150; for a high school library certificate: L. S. 120, L. S. 150, and L. S. 155.

1. Library Procedures. Designed for library employees. Procedures and techniques of library operation including circulation, reserve, and all branch libraries. Open to prospective employees of the library and required of all student employees of the library. Restricted to 20 and open to freshmen and sophomores upon consultation with instructor. (2F, W, S) Davis; Smith

100. Reference Materials and Bibliography. Principal reference tools in each field. Reference materials for school, public, and college libraries. (3W) Davis

103. Bibliographic Research in Education. Technical reference materials, including bibliographies, abstracts, and technical journals, in education. (1F, W) Logan

104. Bibliographic Research in Commerce and Business Administration. Technical reference materials peculiar to Commerce and Business Administration, including indexes, bibliographies, abstracts and technical journals. (1F or W) Staff

105. Bibliographic Research in Forestry. Technical reference materials peculiar to Forestry, including indexes, bibliographies, abstracts and technical journals. (1W) Tolman

106. Bibliographic Research in Agriculture. Technical reference material peculiar to Agriculture, including indexes, bibliographies, abstracts and technical journals. (1F, S) Tolman

107. Bibliographic Research in Engineering. Technical reference materials peculiar to Engineering, including indexes, bibliographies, abstracts and technical journals. (1F or W) Davis

108. Bibliographic Research in Home Economics. Technical reference materials peculiar to Home Economics, including indexes, bibliographies, abstracts and technical journals. (1F or W) Staff

113. Book Repair and Binding. Methods of book repair, necessary bindery records, and the history of book binding. (2S) Beutler

120. First Quarter Cataloging and Classification. Classification of books according to the Dewey decimal system, and cataloging instruction adapted primarily to the use of school and public libraries. (3F) Davis

121. Second Quarter Cataloging and Classification. A continuation of Library Science 120, which is prerequisite to this course. (3W) Davis

150. School Library Administration. The theory of school library work with emphasis on demonstration and practical application. (3S) Davis

155. Book Selection. Methods and principles of book selection and book ordering. (3S) Smith

156. School Library Problems. Reading in professional library literature on current issues of librarianship, related especially to the school library. (2F) Smith

160. Art of the Book. The history of bookmaking and printing. (2W) Tolman

Music

N. Woodruff Christiansen, Walter Welti, Professors; John Philip Dalby, Assistant Professor; George Pahtz, Instructor.

INSTRUMENTAL MUSIC DIVISION

Instrumental Music Majors. Students may work in the field of Music Education or applied music.

I. Courses required of all Music Education Majors:

(For graduation students may choose a music major with related minor or a composite music major of 60 hours with a minimum of 18 hours each in vocal, instrumental, and theory divisions).

Music	Total Hours
3, 3, 5	9
74, 75, 76, 174	16
106, 183	8
114, 115, 116	5
121, 122, 123	9
107	3
Performing groups (including 3 hours in small groups)	16

Private instruction or equivalent—4½

Performing ability on piano sufficient to satisfy departmental requirements.

*Students with sufficient background may with permission of the instructor be excused from taking this course.

II. Majors in Musical Performance:

A. Piano

	Hours
1. Music 3, 4, 5	9
74, 75, 76, 174	16
lor 90	3
106, 185	8
Small ensembles	4½
Private Instructional	18
2. Pass a departmental examination in sight-reading.	
3. Present a public recital with a program approved by the department.	

B. Major performing instrument other than piano, same as for piano plus 4½ hours piano instruction.

10, 11, 12, Group Instruction. To supplement music 121, 122, 123 (no fee). 2 credits each quarter. 10 vocal, 11 strings, 12 wind and percussion Staff

15, 115. String Orchestra. Composed of capable string players performing in a group. Music specially arranged for a large string group is used. (½F, ½W, ½S) Pahtz

18, 118, Symphony Orchestra. Provides training and practical experience in a wide range of orchestral works including symphonies and the annual opera score. Students below junior standing register for 18. (½F, 1½W, 1½S) Christiansen

41, 141. Marching Band. Open to all students who play band instruments. Rehearsals and drill for presentation of shows for athletic events. Attendance at all public appearances of band required. (1½F) Dalby

42. Military Band. Open to men students enrolled in ROTC Basic. Band drill and rehearsal. Fall quarter Military band combined with Marching band meets daily. Winter and Spring quarters band meets twice weekly. All military band students excused from 1 hour military drill period each week. (1½F, ½W, ½S) Dalby

43, 143. Concert Band. Study and preparation of modern symphonic band literature. Public performances and concerts. Permission to register must be obtained from instructor. (½F, 1½W, 1½S) Dalby

44, 144. **Wind Ensembles.** Brass quartets, sextets and woodwind trios, quartets or quintets. Members are selected from applicants. ($\frac{1}{2}$ F, $\frac{1}{2}$ W, $\frac{1}{2}$ S)
Dalby

71. **Development of String Literature.** A historical study of literature for string instruments from Corelli to the present time. Demonstrations of concert numbers. (2F, 2W, 2S)
Poznanski

74, 75. **Diatonic and Keyboard Harmony.** Chord progressions and melody writing up to and including seventh chords. Form and analysis. (4F, 4W)
Christiansen

76. **Counterpoint.** Elementary study of counterpoint based on style of 16th Century. Prerequisite Mus. 74, 75. (4S)
Dalby

*80 **Opera Appreciation.** Study is made of the world's best operas. Particular attention is given to development of the orchestra as an essential of the opera. By means of recordings, the choicest musical selections are learned. (2F, 2S)
Christiansen

84, 184. **String Ensembles.** Offers opportunity for capable string players and pianists to organize into trios, quartets, and other small units. Standard literature is studied. ($\frac{1}{2}$ -1F, $\frac{1}{2}$ -1W, $\frac{1}{2}$ -1S)
Pahtz

*90. **Music in General Culture.** A non-technical course aiming to increase the enjoyment and understanding of potential lovers. Primarily for non-music majors, but open to all interested persons. (3W, 3S)
Christiansen

*Language Arts Group.

114, 115, 116. **Applied Conducting.** Foundation in theory and practice: 2 credits fall and winter $\frac{1}{2}$ spring.
Staff

Fall: Principles of ConductingWelti

Winter: Score ReadingChristiansen

Spring: Group ConductingDalby

121, 122, 123. **Secondary School Music Methods and Materials.** Teaching and administration of various phases of the music program; 3 credits each quarter.
Staff

Fall: Vocal; Winter, strings; Spring, wind and percussion.

170. **Instrumentation and Arranging.** Study of each of the standard instruments in use today, their use in small ensembles and large heterogenous groups. Scoring and arranging for band and orchestra. (3)
Dalby

174. **Chromatic Harmony.** The study of chord embellishments. Analysis of Corresponding musical literature. Composition in small forms (4)
Christiansen

183. **Music Literature.** A comprehensive and intensive study of the worlds masterpieces. Required of music majors but open to other interested students. Fall (5), Spring (5)
Christiansen

187. **Composition and Scoring.** Study in composition for advanced students. Writing for large vocal and instrumental groups. Prerequisite: Music 87, 170 or 171. (W, S) Time and credit arranged.
Dalby

300. **Thesis.** 5-10 credit hours.

Staff

PRIVATE INSTRUCTION COURSES

N. Woodruff Christiansen, violin; Walter Welti, vocal; John Philip Dalby, brass; George Pahtz, cello; Mischa Poznanski, violin, Instructors; Brass and woodwind instruments: Max Dalby; Eldon Torbensen; Vocal: Maxine Greenwood, Patience Thatcher. Piano: Lucy L. Christiansen; S. E. Clark (and organ); Thelma Lundquist; Laverne Odd; Irving Wassermann; Jeanne T. Welti.

The following courses are given through private study only. Appointments must be arranged with the instructor selected. For fees see "Student Fees."

Students taking one lesson a week in any private music study, and getting the required amount of practice and preparation, shall register for one and one-half credits per quarter. Students taking two lessons and getting the required amount of practice and preparation shall register for three credits per quarter. Upper division credit is given students of junior standing provided they have had at least two years, or equivalent, of previous study.

50P, 150P. Piano, Fundamental and Advanced Techniques. A study of music suited to the ability of the performers. **Staff**

53P, 54P, 55P, 153P, 154P, 155P, Vocal. See statement for piano **Staff**

56P, 156P. Wind Instruments. See statement for piano. **Staff**

60P, 160P. String Instruments. See statement for piano. **Staff**

66P, 166P. Pipe Organ. See statement for piano. **Clark**

VOCAL MUSIC DIVISION

Music students desiring to major in this Division are required to attain proficiency either in singing or in playing the piano. In addition, for those who plan to teach, the following comprehensive program is recommended:

Music 3, 4, 5; 74, 75; 121, 122, 123; 131, 132; 106; 114; plus at least nine hours in choral activities either as singer or accompanist.

Students desiring to major in applied music must attain recital capacity in voice or piano. In addition, the following courses are required:

Music 1, 3, 4, 5; 74, 75; 106, 114; at least six hours in choral activities either as singer or accompanist.

1. Music Appreciation. A general appreciation course designed to make music more meaningful to the average listener. The relationships of rhythm, melody, harmony and form will be demonstrated through selected recordings, and treated non-technically, together with historical and biographical observations. (3F) **Welti**

3. Music Fundamentals. A basic approach to music for the beginner. Recommended especially as a background course for prospective elementary school teachers. Should precede Music 130. Open to all students. (3F) **Welti**

4. Reading Music. Designed to develop music reading ability, in unison and in parts through practical application of music fundamentals. Recommended for prospective elementary school teachers. (W3) **Welti**

5. Melodic and Harmonic Dictation. Practice in recognizing musical sounds in sequence and in combination. To develop the ability to write down the music we hear. (S3) **Welti**

10. Group Instruction. Principles of voice care and production, style in singing, correct posture, phrasing, articulation, and breath control. Designed primarily for instrumental specialists who plan to teach music in the secondary school. (F-2) T.Th. 9:00 **Welti**

24. Chorus. Open to all students with a normal singing voice, and a desire to sing good music. Auditions will be conducted during first week. Regular attendance at rehearsals is imperative. A public performance concludes the quarter's work. (F-1) (Sec. 1. Men. M.W.F. 12:00) (Sec. 2 Women T.Th.F. 12:00) **Welti**

25. Opera Chorus. The chorus is trained to perform in the College Opera. Auditions are conducted intermittently to determine progress in memorization. (Arr. 2-W) **Welti**

26. Chorus. Offering an opportunity for all students with a normal singing voice to prepare and present a selected oratorio at the close of the spring quarter. New students admitted by auditions during first week. (S1) (Sec. 1. Men M.W.F. 12) (Sec. 2 Women T.Th.F.12) **Welti**

35, 36, 37. Small Ensembles. Opportunities for good voices to organize into small groups. See instructor before registering. (1F, 1W, 1S) Arr. **Wolti**

53, 54, 55. Voice Training. (as listed under Private Instruction Courses.)

106. Music History. Music's place in history from antiquity to present. Lives of eminent contributors to development of music as a science and an art. (Not open to Freshmen) (3S) **Wolti**

114. Principles of Conducting. Methods, materials and techniques of developing choruses; use of baton; style in expression; care of voice. (Not open to Freshmen) (2F) **Wolti**

124, 125, 126. Meistersingers. A selected group of men singers. Admission by audition only. Auditions are conducted at first and second rehearsals. Limited registration. No credit for less than two consecutive quarters. (1F, 1W, 1S) **Wolti**

127, 128. Opera Staging. Through competitive auditions, announced and conducted in the Fall Quarter, a cast is selected for the College Opera. The cast is required to register for credit in the Winter quarter, during which rehearsals are conducted, and the Opera presented. (W3) **Wolti**

129. Opera Analysis. Several Operas, including the current College productions, will be played on recordings, and critically analyzed, for musical, literary and dramatic content. (W3) **Wolti**

130. Elementary School Music for the Classroom Teacher. Application of music to the elementary classroom. Problems, methods and materials in singing; rhythm, creative music, reading, and appreciation. Prerequisites: Mus. 3 or equivalent. (S3) **Staff**

132. Secondary School Music Methods. Principles, practices, materials and problems in Junior and Senior High School. Prerequisite: Mus. 3, 4, or equivalent (F3) **Staff**

135, 136, 137. Chansonettes. A selected group of women singers. Admission by audition only. Auditions are conducted at first and second rehearsals. Limited registration. No credit for less than two consecutive quarters. (1F, 1W, 1S) **Wolti**

138, 139. Opera Production. Applied study of details involved in production of Opera. Students enrolled become members of the production staff, and are assigned specific tasks. (2W) **Wolti**

150, 151, 152. Piano.

153, 154, 155. Voice Training.

214. Special Problems in Music Education. Independent study of chosen problems in Music Education, developed around individual needs. Time and credit arr. **Wolti**

300. Thesis. Time and credit arr. **Wolti**

Physical Education and Recreation

H. B. Hunsaker, Professor and Head of Department; **Israel C. Heaton**, **Lois Downs**, Associate Professors; **Dale O. Nelson**, **Ray Watters**, **Pauline Fuller**, **Roxie Diver**, Assistant Professor; **Ned Stringham**, Instructor.

INTERCOLLEGIATE ATHLETIC STAFF

H. B. Hunsaker, Professor and Director of Athletics; **Cecil Baker**, Associate Professor; **Everette Faunce**, **Ralph Maughan**, Assistant Professors; **George Nelson**, **Gordon Porter**, **Everett Thorpe**, Instructors.

SERVICE COURSES

In the service courses, opportunity is given each student to perfect skills in some physical activity that will help establish a permanent interest in healthful recreation both active and passive, the promotion of physical fitness, the building of morale, and the maintenance of health.

A physical examination is given each student at the beginning of each year to advise him properly about the type of activity best suited to his individual needs.

Women students are required to take physical education service courses for six quarters. Classes may be selected by the student; no course may be repeated for credit. Before a student may enter an intermediate course, in any activity in which she has completed and received credit for the elementary course, minimum service course requirements must have been satisfactorily completed.

All male students should take some activity course in Physical Education. Numerous courses in aquatics, dual, team, individual and outing activities are offered each quarter. Credit in physical education counts toward a college degree.

INTRAMURAL COURSES

Intramural sports are conducted as part of the program of the Department of Physical Education and Recreation. The Women's Athletic Association, in cooperation with the women's division of the department, sponsors and offers a widely varied program of activities. All women students are eligible and encouraged to participate in any or all of the sixteen activities offered during the year. Women's intramurals strive to provide "a sport for every girl and a girl for every sport."

The department carries on an extensive organized intramural sports program for men. Competition in 12 to 16 sports is carried on in separate leagues, fraternity, department, club, and all-campus. All male students are eligible and encouraged to participate in one of these leagues.

The intramural program is planned to give every student moral, social, physical, and educational values derived from competitive athletics. This program of athletics provides for both individual and team endeavor. "Athletics for all" is the purpose of the intramural sports program.

RECREATION

The Department of Physical Education and Recreation aims to meet the recreational needs and interests of every student, whether he is being trained in agriculture, engineering, business, or other professional activity. After taking courses in this department, students should be so interested in recreation that they will be a valuable aid to any community.

Awards are given to managers of various recreational groups; individual awards are given for special achievement. Groups are organized in hiking, water sports, winter sports, tap dancing, fencing, archery, horse shoes, tennis, golf, badminton, boxing, swimming, tumbling and square dancing.

Professional Study in Health, Physical Education and Recreation

The Department of Physical Education and Recreation offers major study with specialization in the following areas: Physical Education, Elementary Physical Education, Secondary Physical Education Certification, Recreation, Health, Dance, Professional Scouting, and Physiotherapy. A composite major including two of the above areas may be taken to meet the major-minor requirement. Selection of a study program in the above areas should be carefully worked out under the guidance of the student's adviser. The following courses, in addition to the six credits required for graduation, are suggested for each of the above areas:

Non-certifying Physical Education Majors should complete Physical Education 17A, 18, 20, 21, 22, 30, 31, 75, 83, 84, 85 or 92, 106, 181, 183; six credits in Sports Techniques, and ten credits of approved electives.

Elementary Physical Education Majors should complete Physical Education 24, 55, 75, 81, 83, 84, 85 or 92, 160, 177, 181, 182, 183, 184; six credits in Sports Techniques and six credits from approved electives.

Secondary Physical Education Men Majors should complete the following:

Freshman				Sophomore			
Course	F	W	S	Course	F	W	S
P. E. 20, 21, 22	1	1	1	P. E. 30, 31	1	1	2
P. E. 75	2	...	...	*P. E. 74 .....	...	...	2
*P. E. 17A, 18 .....	...	1	1	P. E. 85, 84, 83	3	3	3
M. S.	1	1	1	Eng. 10	5	...	...
Group Req.	5	10	10	Ed. 50 .....	...	2	...
Electives	7	3	3	M. S.	1	1	1
				Minor .....	...	3	3
				Group Req.	5	5	5
				Electives	2	2	2
	16	16	16		17	17	17

Junior				Senior			
Course	F	W	S	Course	F	W	S
P. E. 120, 121, 122	2	2	2	P. E. 130, 131, *132	2	2	2
P. E. 188, 189, 190	2	2	2	P. E. 183	3	...	...
P. E. 106, 181	5	3	...	P. E. 192 .....	...	3	...
				P. E. 184 .....	...	...	3

The following courses may be taken any quarter during the year indicated.

Ed. 111	3	...	...	PH	3	...	...
Psy. 102 .....	...	5	...	Ed. 127 .....	...	3	...
Ed. 114 .....	...	...	3	Ed. 129 .....	...	4	...
Eng. 110 .....	...	...	4	Ed. 130 .....	...	4	...
Minor	3	3	3	Minor	6	...	3
Electives	2	2	2	Elective	3	...	8
	17	17	17		17	16	16

*Courses taught more than one quarter each year.

Secondary Physical Education Women Majors should complete the following:

Freshman				Sophomore			
Course	F	W	S	Course	F	W	S
P. E. 75	2	...	...	P. E. 81, 83	3	...	3
P. E. 20, 21, 22	1	1	1	P. E. 92, 84 .....	...	3	3
P. E. 24, 26	1	...	1	P. E. 77, 78, 79	1	1	1
P. E. 98 .....	...	...	1	P. E. 94, 95, 96	1	1	1
*P. E. 17A	1	...	...	*P. E. 74 .....	...	2	...
*P. E. 17A	1	...	...	Eng. 10	5	...	...
Group Req.	5	10	10	Ed. 50 .....	...	2	...
Electives	6	4	4	Group Req.	5	5	5
	16	16	17	Electives	2	3	3
					17	17	16
Junior				Senior			
Course	F	W	S	Course	F	W	S
P. E. 106, 181	5	3	...	P. E. 160, 161, 162	2	2	2
P. E. 120, 121, 165	2	2	2	P. E. 183, 192, 184	3	3	3
P. E. 132 .....	...	...	2				
P. E. 150 .....	...	...	4				

The following courses may be taken any quarter during the year indicated.

Ed. 111	3	...	...	P. H. 155	3	...	...
Psy. 102 .....	...	5	...	Ed. 127 .....	...	3	...
Ed. 114	3	...	...	Ed. 129 .....	...	4	...
Eng. 110 .....	...	...	4	Ed. 130 .....	...	4	...
Minor	3	3	3	Minor	6	...	3
Elective .....	...	3	3	Electives	3	...	8
<hr/>				<hr/>			
16 16 17				17 17 16			

Recreation Majors should complete Physical Education 3, 17A, 18, 74, 75, 83, 84, 85, 153, 157, 179, 183, 196; three credits in Sports Fundamentals, four credits in Sports Techniques, and 12 credits in the related fields of sociology, arts and crafts, music, drama, and photography.

Health Education Majors should complete Physical Education 55, 84, 145, 181, 183, 184; Public Health 15, 50, 151, 152, 153, 156, and Psychology 145 or Sociology 162 or Social Work 165, and 12 credits from approved electives.

Dance Majors should complete Physical Education 72, 76, 81, 83, 84, 102, 103, 104, 106, 111, 140, 150, 151, 153, 183, 184, and six credits of approved electives.

Students planning to go on to a Physiotherapy School should complete Physical Education 17A, 18, 55, 74, 75, 83, 84, 106, 180, 181, 183; four credits in Sports Fundamentals and four credits in Sports Techniques, and 12 hours from approved electives. Physiotherapy students should work closely with the adviser in selecting courses to fill groups and minor requirements.

Master of Science Degree in Physical Education

The Department of Physical Education and Recreation offers courses leading to the Master of Science degree in 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 Utah State Agricultural College and additional requirements as prescribed by the graduate school. Required courses are P. E. 192, 250, 271, 295, 299, Ed. 267, Eng. 211.

Students entering the department for graduate study should select supporting fields from one or two other areas of the school, closely allied to physical education and recreation, from which graduate courses will be selected. Suggested areas and courses are:

Education 201, 211, 219, 221, 230, 237.

Health 160, 166, Bact. 144, 151, 156, 168, 201.

Sociology 141, 152, 154, 160, 170, 172, 202, 222, 240, 250, 270, 280.

Psychology 107, 110, 140.

INTERCOLLEGIATE ATHLETICS

Utah State Agricultural College is a member of the Mountain States Conference, which also includes Montana State University, University of Utah, Brigham Young University, University of New Mexico, University of Denver, Colorado A & M College, and University of Wyoming.

The Conference authorizes competition in football, basketball, baseball, track, wrestling, swimming, skiing, tennis, golf, cross country, hockey and gymnastics. The college is represented in the Conference organization by a Faculty Representative and the Director of Athletics. On the campus the intercollegiate athletics are administered by the Director of Athletics.

Every student in the college is given opportunity to try out for various teams. Students who participate enough to earn a letter receive the college block "A" award and, according to his sport, a sweater, blanket or some other trophy.

Every student is given opportunity to try out for the various teams. Attractive schedules with teams from other colleges are arranged in football, basketball, track and field, baseball, swimming, wrestling, tennis, golf and skiing. The College has an attractive Stadium for football, track, and field sports. The Field House seats 7500 people for basketball games and provides practice areas for other teams.

A splendid spirit of cooperation exists between the Intercollegiate Athletic Department and the Department of Physical Education and Recreation.

COLLEGE HEALTH SERVICE

The Health Service is maintained primarily for care of students who may become ill during their stay on the campus. This service also functions as an educational department by teaching preventive medicine and hygiene. Through consultations, examinations, and advice it points out causes of ill health, and presents the fundamental laws of good health.

SERVICE COURSES FOR MEN

2. Football. (1F, 1W)	Staff
4. Boxing. (1F, 1W, 1S)	Staff and G. Nelson
5. Boxing. (Advanced) (1F, 1W, 1S)	Staff and G. Nelson
6. Football. (1W)	Staff
7. Wrestling. (1F, 1W, 1S)	G. Nelson
8. Wrestling. (Advanced) (1F, 1W, 1S)	G. Nelson
12. Track. (1S)	Staff
14. Handball. (1F, 1W, 1S)	Staff
15. Softball. (1S)	Staff
16. Swimming. (Beginners) (1F, 1W, 1S)	Staff
17. Swimming. (Intermediate) (1F, 1W, 1S)	Staff
23. Basketball. (1F, 1W, 1S)	Baker
26, 27, 28. Restricted Gymnastics. For students physically unable to take required physical education. Students may register only after consultation with head of department. (1F, 1W, 1S)	Staff
29. Sigma Delta Psi. (1S)	Heaton
34. Soccer. (1F)	Staff
35. Volley Ball. (1W)	Staff
37-38 Tumbling and Gymnastics. (1F, 1W, 1S)	Heaton

SERVICE COURSES FOR WOMEN

39. Soccer-Speed Ball. (1F)	Staff
40. Volleyball. (1F, 1W)	Staff
41. Basketball. (1W)	Diver
42. Softball. (S)	Staff
43. Field Hockey. (1S)	Staff
44. Tumbling and Stunts. (1W, 1S)	Staff

- 45, 46, 47. **Restricted Activities.** Four students physically unable to take required courses in physical education. Students may register only after consultation with head of department. (1F, 1W, 1S) **Downs**
52. **Swimming.** (Elementary). (1F, 1W, 1S) **Diver**
56. **Swimming.** (Intermediate). (1F, W, or S) **Diver**
60. **Body Conditioning and Physical Fitness.** (1F, 1W, 1S) **Staff**
152. **Synchronized Swimming.** (1F) **Staff**

SERVICE COURSES FOR MEN AND WOMEN

1. **Hiking.** (1F, 1S) **Staff**
3. **Skiing (elem.)** (1F) **Watters**
9. **Fencing.** (Elementary). (1F, 1W, 1S) **Downs**
13. **Bowling.** (1F, 1W, 1S) **Staff**
18. **Swimmers.** (1F, 1W, 1S) **Staff**
19. **Skiing.** (Interm.) (1W) **Staff**
48. **Modern Dance (Elementary)** (1S) **Fuller**
49. **Modern Dance.** (Intermediate) (1W, 1S) **Fuller**
61. **Archery.** (1F, 1W, 1S) **Staff**
66. **Badminton.** (1F, 1W, 1S) **Downs**
67. **Tennis.** (Elementary) (1F, 1S) **Staff**
68. **Folk Dance.** (1F, 1W) **Staff**
70. **Tap Dancing.** (1F, 1W, 1S) **Fuller**
71. **Tap Dance.** (Interm.) **Fuller**
72. **Social Dancing.** (1F, 1W, 1S) **Heaton**
73. **Golf.** (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. (2W, 2F, 2S) **Staff**
76. **Social Dance.** (Advanced) (1F, 1S) **Heaton**
90. **Tennis.** (Intermediate) (1S) **Staff**
136. **Golf.** (Advanced) (1S) **Staff**
141. **Modern Dance (Advanced)** (1W, 1S) **Fuller**
155. **Diving.** Prerequisite: Swimming. (1S) **Staff**
161. **Archery.** (Advanced) Prerequisite: 61. (1W, 1S) **Staff**
166. **Badminton.** (Advanced) Prerequisite: P. E. 66, (1F, 1W, 1S) **Downs**
167. **Tennis.** (Advanced) Prerequisite: P. E. 67. (1S) **Staff**
168. **Square Dancing.** (1F, 1W, 1S) **Heaton**

THEORY AND PROFESSIONAL COURSES

- 17A. **Swimming.** For screening of all freshmen and transfer students majoring in Physical Education. (1F, 1W) **Watters**
- Sp. 20. **Playground Dramatics and Pageantry.** See Speech 20.
- 20, 21, 22. **Fundamentals of Sports.** A freshman laboratory course for Physical education majors. These courses are prerequisites for P. E. 120, 121, 122. (1F, 1W, 1S) Taught alternate years. (Not taught 1955-56) **Staff**

24, 26. Dance Laboratory. For teaching folk, square and tap to freshman and sophomore women majoring or minoring in physical education or dance. Material presented as a survey. Taught alternate years. (Not taught 1955-56)

Fuller

30, 31, 32. Fundamentals of Sports. A sophomore laboratory series for men physical education majors. These courses are prerequisites for P. E. 130, 131, 132, and are a continuation of the freshman class. Taught alternate years. (1F, 1W, 1S)

Staff

55. First Aid. Standard American National Red Cross course in first aid with emphasis on practical use of the knowledge as applied to everyday life in various occupations. Detailed demonstrations and practice. American Red Cross First Aid certificate may be obtained by students who pass a satisfactory examination. (3F, 3W)

Nelson-Watters

75. Backgrounds and History of Physical Education. Acquaints the student with the background, growth, and trends in physical education. Physical education's role in the development and adjustments of the individual and the qualification, responsibilities and training are given consideration. (2F) Heaton

77, 78, 79. Dance Laboratory. For teaching the techniques of beginning, intermediate and advanced modern dance to freshman and sophomore women majoring in physical education or dance. Taught alternate years.

Fuller

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

Fuller

83. Playground and Community Recreation Leadership. Lectures and practical work. Lectures consider selection of suitable material and methods of handling various groups. (3S)

Heaton

84. Normal Growth and Development. Traces the individual through the various stages of growth and development with special emphasis on principles and function of play. (3W, S)

D. Nelson

85. Organization of Intramural Sports. Organization and administration of intramural sports in secondary schools. Sports, tournaments, units of competition, scoring systems, and co-ordination of intramural sports with physical education and athletics are considered. (3F)

Watters

86, 87. Sports Officiating. Men, knowledge of rules, mechanics of officiating, proper instructions to other game officials such as timers and scorers, and game administrations. (2F, 2W)

Watters

92. Organization of Intramural Programs for Women. Organizations of sports days, play days, tournaments, and administration of intramural activities for women. (3W)

Downs

93. Sports Officiating for Women. Techniques of officiating, knowledge of rules, and practical experience in officiating. (2F)

Staff

94, 95, 96. Physical Education Laboratory. For teaching team sports fundamentals to lower division women majoring or minoring in physical education. Taught alternate years. (1F, 1W, 1S)

Downs

98. Physical Education Laboratory. For teaching fundamentals of individual sports to lower division women majoring or minoring in physical education. (1F, 1W, 1S) Taught alternate years.

Downs

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

Fuller

103. Dance Composition. Composition based upon the following musical forms: AB, Rondo, Theme, and Variation, Canon and Round, Dance Suite. (2W)

Fuller

104 Dance Production. Composition done independently and participation in a performance required; lighting, staging, costume and make-up applied to a dance concert. (2S) **Fuller**

106. Applied Anatomy and Physiology. The structure of the human body in relation to adaptations made by the healthy body during mild and strenuous physical activity. Laboratory experience is included. (5F) **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. (2W) **Fuller**

113. Construction of Physical Education Equipment. Construction of and practice in the use of rhythmic instruments and play equipment. (3S) **Staff**

120, 121, 122. Technique of Team Sports. For students majoring in physical education. Prerequisites: P. E. 20, 21, 22. Techniques of dual combatives and team sports. Each student expected to prepare a teaching syllabus of class work. (Taught alternate years. Not taught 1955-56) **Staff**

P. E. 124. Scoutmaster's Basic Training Experience. The standard training course approved by the National Council and includes the following: Plans and Methods, Fundamentals, Organization and Leadership, Program Planning, Meetings, Hiking, and Camping. (2S) **Staff**

130, 131. Technique of Individual Sports. For men students majoring in physical education. Prerequisites: P. E. 30, 31, 32. Students taught technique of individual gymnastics and aquatic sports. Each student expected to prepare a teaching syllabus for class work. (2F, 2W) **Staff**

132. Water Safety Instructor's Course. Prerequisite: American Red Cross Senior Life Saving certificate and permission of the instructor. Special attention is given methods of teaching swimming, diving, life-saving and use of small water crafts. Proper American Red Cross certification is given students who pass the examination. (2S) **Watters**

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. (3W or S) **Staff**

140. Dance History. A history of dance from the primitive through Greek, Medieval and Renaissance periods into the theatrical dance forms: Ballet and Modern. (3) (Not taught 1955-56) **Staff**

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) **Nelson**

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. (3S) **Fuller**

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

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. One quarter of social or square dancing is prerequisite. A syllabus is required. (2S) **Heaton**

157. Social Recreation Leadership. Practical experience in conducting social recreation activities by planning and conducting social recreation evenings for church, school and civic groups. Prerequisite: P. E. 83. Time and credit arranged. (F, W, or S) **Heaton**

160, 161, 162. **Techniques of Team Sports for Women.** Upper division students majoring or minoring in physical education are taught techniques of teaching and officiating team sports. **Downs**

165. **Techniques of Sports for Women.** Upper division students majoring or minoring in physical education are taught techniques of teaching sports. Taught alternate years. (Not taught 1955-56) **Downs**

177. **Physical Education in the Elementary School.** Characteristics of the growth and development of the elementary school child with special reference to his needs in social and physical development which can be aided through physical activities. (3F, 3W) **Diver**

179. **Camping and Camp Craft.** Training in camp technique and camp leadership. Different types of camps and their organization, supervision, equipment and safety are considered. Several short hikes and an overnight camp are conducted during the course. Each class member is expected to participate in these hikes. (2S) **Watters**

180. **Athletic Training and Conditioning.** Conditioning of men for the various sports. Principles, techniques and practices of athletic training. Special instruction given to taping, bandaging, massage, use of special methods and devices to prevent and care for injuries. (2F) **D. Nelson**

181. **Corrective Physical Education.** Facts in body mechanics which contribute to the basic principles of posture. Analysis of postural deviations, their prevention and correction. Prerequisite: P. E. 106 (3W) **Nelson**

182. **Material and Methods of Elementary School Physical Education.** Practical experience in, participation in, and direction of activities in the well balanced physical education program. Students teach at all grade levels in local elementary schools. (3W, 3S) **Downs**

183. **Interpretation of Physical Education Objectives.** Results and values of physical education activities under leadership in terms of development, adjustment and standards, and their relationships as objectives. (3F) **Hunsaker**

184. **Administration of Physical Education.** Administration procedures in the conduct of physical education in the high school; curriculum construction and program planning. (3S) **Hunsaker**

188. **Methods in Football.** Fundamentals of football, theory and practice, details of each position on the team, training, and managing, complete technique of developing offensive and defensive tactics. (2W) **Faunce**

189. **Methods in Basketball.** Coaching and training of basketball teams, beginning with fundamentals; passing, dribbling, and pivoting, with emphasis on the psychology of the game; methods of defense and offense. (2S) **Baker**

190. **Methods in Track and Field.** How to train for various track and field events; their form and technique; conduct of athletic meets; construction, use, assembling of and equipment used by the participants on the field; development of certain types of individuals for certain events. (2S) **Maughan**

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) **Preston**

192. **Tests and Measurements in Physical Education.** Practical studies of tests now used and technique of test construction. (3W) **Hunsaker**

194. **Problems of Athletics.** Discussing problems in athletics relative to public relations, athletic management, administration of athletics, purchase of equipment, schedules, plant layout, etc. (3S) **Staff**

196. **Organization of Recreation.** Problems of organization and administration of community recreation departments, including staff, facilities, program

of activities, and office management. Special problems of recreation surveys, legislation, property acquisition, finances, construction, and maintenance, and securing community and school co-operation in a united recreation program. (3S)
Heaton

250. Reading and Conference. Provides for individually directed study.
Hunsaker
271. Research and Thesis Writing. Credit arranged.
Hunsaker
295. Problems in Physical Education. (F, W, S) Credits arranged.
Hunsaker
299. Physical Education Seminar. (3F, 2W, 3S)
Hunsaker

Psychology and Guidance

Arden N. Frandsen, Professor and Head of Department; David R. Stone, Heber C. Sharp, Bruce Gardner, Associate Professors.

Psychology is a scientific approach to understanding people; its main purpose is improvement of human efficiency, usefulness, and happiness. Courses in Psychology contribute, therefore, to both professional training and personal development of students in nearly every department of the College.

A major or preferably a master's degree in psychology should prepare students professionally (1) for guidance and psychological counseling in high schools; (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 "special" teacher of exceptional children; (5) as clinical psychologists (with additional graduate training) in mental hygiene clinics and hospitals; (6) for personnel work (at the junior professional level) in industry, the U. S. Employment Offices, various Civil Service positions, and in the military services, and (7) for further graduate study in psychology, education, child development and social work. Psychology is also a suitable major for students planning to study medicine, nursing, law, and social work, or personnel work after graduating with a bachelor's degree.

The Department of Psychology has arrangements with schools, social welfare agencies, juvenile courts, the industrial school, and a mental hospital in which graduate students and some seniors may have practical experience in the general field of clinical psychology. The 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 for 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 40, 45, and other literature (novel and biography) courses; Mathematics 34, 35, and desirably additional mathematics courses for students with interest in the subject: Physics 7. 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, 80 and, if desired before attaining upper division status, 102, 105, and 112.

Requirements for a major in Psychology include 40 credits of approved courses from the following basic: Psychology 53, 71, 102 or 105, 112, 127, 140 or 145, 161, 183, 281, 282; and elective: from Psychology 80, 102, 105, 108, 114, 115, 121, 123, 140, 145, 155, 191; Sociology 170; Education 110; Speech 167, or

173. As upper division electives, Zoology 111; Physiology 121, 122, 123; the Education courses for teacher certification: Sociology 130, 153; S. W. 165, 270; an upper division courses in literature are also suggested.

A minor in psychology (which should include Psychology 53, 71, 102, or 105, 112, 127, 140, or 145, 161, 181, and 183) is recommended for high school teachers who expect to participate in the school guidance program, social workers, students majoring in speech correction, students whose major is business administration, and students majoring in other social sciences.

Master of Science Degree in Psychology. Programs of study for this degree are planned in consultation with the major professor and an advisory committee. A well-balanced program planned to meet the student's professional objectives may be arranged to include courses both from psychology and pertinent fields. In preparation for meeting the requirements for the Professional School Counselor's Certificate, for example, courses mainly from psychology and education would be chosen. Lists of the prescribed courses for this certificate and for other special professional objectives may be obtained from the Department Head. Besides the courses required for a specific professional objective, the Master of Science degree in psychology should include, as a graduate or undergraduate student, study in the following fields: (1) general and experimental, (2) systems and history, (3) learning, (4) child and adolescence (included in educational), (5) clinical psychology, (6) mental hygiene, abnormal psychology and physiological, (7) social psychology, (8) personality, (9) statistics, and (10) research thesis. Besides additional courses from those listed in each of the above 10 areas, courses planned especially for graduate students are: Psychology 115, 123, 191, 202, 205, 208, 212, 214, 216, 217, 280, 281, 282, 284, 285, 286, 287 or 288. For students who have not majored in psychology thirty hours of approved courses in psychology or closely related fields are a prerequisite to begin graduate study in psychology.

Master of Science Degree in Guidance. Any able student who has a teaching certificate and a total of 30 credits in Education and, or in Psychology is eligible to begin study for this degree. Included in the courses required are: Education 110; Guidance 187, 213; and Psychology 123 or 140, 127, 183, 202 or 205, 281, 282, 285, 288; and a thesis in the field of guidance. These are also the courses required for a Professional Counselor's Certificate.

Personnel in Business and Industry: In cooperation with the Inter-Departmental Program in Human Relations, psychology students may earn a Master's degree in Personnel Psychology. This program would include the central courses outlined by the committee, and the following courses: Psy. 71, 80, 102, or 105, 112, 127, 140 or 145, 181, 183; Speech 9; Merchandising 63, 156; Sociology 130, 160, 161; and Social Work 165, 174.

Doctorate in Educational Psychology and Counseling. The Department of Psychology, in cooperation with the Department of Education has planned a program of advanced graduate study in counseling, school clinical psychology, and educational psychology that leads to the Ph.D. degree in Educational Psychology. The program requires two years of graduate study (partly supervision of individual study) beyond the M.S. degree, plus a six months' internship in school, mental hygiene clinic, hospital, or social agency. Prospective candidates interested in learning more about this program should confer with Dean E. A. Jacobsen or Professor Arden Frandsen.

Courses

33. Mental Hygiene for College Students. Deals with the common personal and social problems of normal people, that is, problems which arise when people try to get along together. It is intended as a basis for improving self-understanding, personal and social effectiveness, happiness and emotional health. (3F) Sharp

✓ **51. Psychology for Nurses.** () Time arranged.

Sharp

53. Elementary General Psychology. Principles of human behavior and experience including: nature of personality; factors of determining development; how we learn, observe, and think; motives of human conduct; dealing with people; maintenance of personal efficiency and mental health. For Lower Division students in all schools of the College. (5F, W. or S) **Staff**

71. Experimental Methods in Psychology. A study of the scientific methods and of specific experimental procedures applied in the study of fundamental problems in psychology. Prerequisite: General Psychology. (3W) **Sharp**

80. Reading and Study Habits. A practical course, highly individualized, designed to aid students in improving the efficiency of their work and study habits. Individual appointments arranged for one-third of the time. (3F, W, or S) **Stone**

102. Educational Psychology. A professional course for prospective high school teachers intended to increase understanding of adolescents and to develop insight into conditions for effective learning. Applications to development in adolescence of both normal and deviate personalities, to provisions for individual differences, and to learning junior and senior high school subjects are emphasized. Prerequisite: General Psychology. (5F, W or S) **Stone**

105. Child Psychology and Development. The roles of malnutrition, learning, and environmental conditions in the motor, mental, social, and emotional development in children from birth to adolescence. Generalizations with respect to dynamics of personality, individual differences, emotions, motivation, how children learn, observe, and think are applied to understanding and guiding children's behavior in home, school, and community. Opportunity for observation and applications of psychological methods of child study in the school is provided. Prerequisite: General Psychology. (3F, W, S) **Frandsen**

108. Educational Psychology for Elementary School Teachers. A study from the point of view of psychological theory and research, of the aims, selection and sequence of content, methods of teaching, provisions for individual differences, and measurement of outcomes in the elementary school curriculum. Tool subjects are emphasized. Prerequisite: General Psychology. (2F, W, S) **Frandsen**

112. Application of Statistics to Education and Psychology. Elementary study of statistical procedures used in handling test scores in schools and of the concepts needed to read current educational and psychological literature. May be taken by last quarter sophomores who have taken General Psychology. (3F or S) **Frandsen**

115. Seminar. Readings and Discussions on 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. Two credits each quarter. May be taken 1, 2, or 3 quarters. (2F, W or S) **Staff**

121. Individual Differences. The nature, extent, and causes of human differences and of the implications and applications of a recognition of these differences in several major life activities. The concepts of human differences have useful applications in the work of the students majoring in the other social and biological sciences. (3S) **Sharp**

123. Psychology of Exceptional Children. The development and behavior characteristics of exceptional children and of the education, home management, social control, and psychological treatment, suited to their needs. The groups included are the mentally deficient, physically handicapped, the gifted, and children having serious personality and conduct problems. (3W or Su.) **Sharp**

124. Curriculum and Teaching Methods for Mentally Retarded Children. A study of curricula and adaptations in methods of teaching especially suited to the needs and patterns of abilities of mentally retarded children. The course

should provide helpful guidance both for teachers of special classes for these children and for teachers who provide for them in "regular" school classes. Prerequisite: Psychology of Exceptional Children. (3S) Staff

127. Psychology of Learning. A comprehensive study of descriptions of learning, factors related to efficiency, explanatory theories of learning, and of applications of the facts and explanatory principles to guiding learning in school and out-of-school situations. Prerequisite: General Psych. (3S) Frandsen

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: General Psych. (3S) Sharp

145. Mental Hygiene. Designed for teachers and other workers in social occupations. Based on the philosophy that a knowledge of the factors which influence mental health should be in the possession of all who work with people. Intended to promote understanding of emotional and social adjustment and as a basis for guiding children, adolescents and adults toward improved mental health. Prerequisite: General Psych. (3W) Sharp

155. Psychology of Business and Industry. Methods and explanatory principles of psychology are applied to understanding several general problems of business and industry, including vocational choice; selection of employees; advertising and selling; marketing and consumer research; conditions for efficient work, and psychological aspects of training for work in business and industry. (See also Business Administration 155) Prerequisite: General Psychology or instructor's approval. (3F) Stone

161. Social Psychology. A study of the acquisition of personality or "self." The effect of society on the individual, and the individual's reciprocal effect on society are considered in terms of such topics as propaganda, institutional behavior, "social" neuroses, morale, leadership, and membership. Prerequisite: General Psych. (3W) Stone

162. Social Psychology of Teaching. An application of the concepts of "self" and of "group dynamics" to teaching, and to leadership and participation in other social situations. (3W) Stone

165. Psychology of Military Leadership. (3S)

Gardner

175. Physiological Psychology. Physiological mechanisms underlying normal and abnormal behavior, with special attention to those operating in both organic and non-organic disturbances. Prerequisite: General Psych. (3S) Sharp

183. Theory and Techniques of Counseling. Principles and techniques of counseling students on problems of curriculum planning and vocational choice, on problems of improving methods of study, and on problems of emotional and social adjustment will be studied. Applications will be made also to administrative, supervisory teaching, and other inter-personal relations situations. (3S) Staff

191. 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) Stone

202. Psychology of Adolescence. Growth, psychological and social characteristics and development, educational and guidance needs, and adjustment problems of adolescents as met in schools, homes, and communities. Prerequisite: Educational Psych. (This course and the Psychology of Learning provide training in advanced educational psychology for graduate students in secondary education and in psychology.) (3Su.) Stone

205. Problems in Child Psychology and Guidance. Elementary school child guidance problems—of the roles of teachers and child guidance specialists in promoting mental health and in diagnosing and treating problems of

achievement, social adjustment, and emotional maladjustment. The course may be considered as an advanced course either in child psychology or in elementary school guidance. Alternates with Psychology 280. (3F) Frandsen

208. Advanced Educational Psychology of the Elementary School. Advanced study, from the points of view of learning theory and experiments in elementary education and child psychology, of the aims, curriculum, methods of teaching, provisions for individual differences, and evaluation of outcomes in the elementary school. Intended especially for supervisors, principals, and teachers of the elementary school interested in graduate study. These topics are suggested. Provision is also made for undergraduate students who need the course Psych. 108 for certification. (3Su.) Frandsen

212. Treatment of Psychometric Results. Statistical methods of representation, and analysis of interrelationships of psychological test scores. (2W) Frandsen

214. Independent Readings in Psychology. For students who cannot participate in the discussions in Psychology 115, this course provides opportunity for independent readings and conferences on topics selected by the student. (2F, W or S) Staff

216. Research on Special Problems in Psychology. Credit and time arranged with the approval of a member of the Department of Psychology. (F, W or S) Staff

217. Research for Master's Thesis in Psychology. Credit and time arranged with the approval of a member of the Department of Psychology. (F, W or S) Frandsen, Stone, Sharp, Gardner

280. Personality. An advanced study of the organization, development, dynamics, and appraisal of personality. Theories and empirical investigations of personality will be studied as a basis for arriving at integrated concepts of the nature and development of personality. Both the biological and cultural determinants of personality will be considered. Alternates with Psych. 205. (3F) Frandsen

281. Psychometrics Applied to Guidance. For school counselors, personnel workers, social workers, and clinical psychologists. Consideration is given selection, evaluation, administration, interpretation, and practical uses of tests of intelligence, aptitudes, interests, personality and quality of personal and social adjustment. Prerequisites: General Psychology and Elementary Statistics. For seniors or graduate students. (5F) Frandsen

282. Individual Diagnostic Intelligence Testing. Theory and techniques of testing, including practice in the administration of (a) the Stanford-Binet and other individual tests especially suited to psychological examination of children, and (b) the Weschsler-Bellevue and related tests for use with adolescents and adults. Interpretation of test data. (5W) Frandsen

284. Hospital Treatment of Mental Patients. Seminar and staff conferences on personality appraisals, diagnoses, and treatment of mental hospital patients. Students observe and participate in treatment to the extent they are qualified in all of the hospital routines and "treatment" activities in which patients participate. (4F, W or S) Staff

285. Projective Methods for the Study of Personality. The dynamics of human adjustment and the common projective methods for revealing motives, attitudes, and adjustment mechanisms in individual personalities. (5S) Frandsen

286. Problems in Counseling and Clinical Psychology. Individual case studies of children and adolescents presenting problems of diagnosis, guidance, remedial teaching, and psychotherapy are studied. (2F) Frandsen

288. Practicum in Clinical Psychology. Arrangements are made for obtaining experience under staff supervision in vocational guidance; diagnostic testing and writing of interpretative reports; counseling; psychotherapy; diagnostic and remedial teaching. Subjects include children, adolescents, and adults in

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schools, institutions for the feeble-minded and for delinquents, and patients in mental hospitals. Psychological procedures and institutions are selected according to qualifications and interests of each student. Time and credit arranged. (F, W or S) **Staff**

Guidance

213. Organization and Administration of Guidance. Development and evaluation of plans for utilization of school and community resources in guidance. (3S) **Himes**

287. Occupational Information. Collection, classification and uses of occupational information in counseling. (2W) **Himes**

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. (3) **Staff**

SCHOOL OF ENGINEERING AND TECHNOLOGY

J. E. CHRISTIANSEN, Dean

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General Information

The School of Engineering and Technology consists of the Division of Engineering and the Division of Technology. The Division of Engineering offers both undergraduate and graduate curricula in professional engineering. The Division of Technology offers both two-year and four-year curricula in several specialized fields of Industrial Technology. It also offers undergraduate and graduate courses in Industrial Education.

Admission. For general requirements, see "Academic Regulations," in Introduction. For entrance in the Division of Engineering, students should have taken in high school Algebra B and Solid Geometry. The curricula are so arranged, however, that students may enter deficient in these subjects and still complete the requirements in four years.

Scholarship. All students must maintain an average grade of C or higher to remain in College and be eligible for graduation. The faculty reserves the right to accept toward graduation only credits with a grade C or higher. In the Division of Engineering, it is important that students make a grade of C or higher in all mathematics taken during the freshman and sophomore years. Students who fail to do this usually have difficulty in upper division engineering courses.

Graduation. Candidates for graduation must satisfy the general college requirements listed in "Academic Regulations," except those pertaining to group requirements. They must, in addition, satisfy the requirements of the prescribed curriculum of their elected major.

Opportunity for Graduates. The tremendous development in modern industry, the necessity for control and development of natural resources, the rapid advance of transportation and communication, and the development of structures to meet the needs of society, give assurance that graduates of the School of Engineering and Technology will have ample opportunity for remunerative professional employment.

Faculty Advisers. Personal contact with the student is provided through a system of advisers who assist the student when registering, and who are available for consultation at all times.

Personnel Service. The School of Engineering and Technology, through its faculty, establishes definite contacts with those industries, corporations, municipal, state and federal agencies that employ technically trained men. Employment assistance is given to members of each graduating class, to alumni who desire to change positions, and to undergraduates who wish summer employment.

DIVISION OF ENGINEERING

The Division of Engineering offers undergraduate curricula in Agricultural Engineering, Civil Engineering, Electrical Engineering (Electronics and Communications Option) and Tool Engineering. Graduate study for the Master of Science degree is offered in Agricultural Engineering, Civil Engineering, Electrical Engineering and Irrigation and Drainage Engineering. The Irrigation and Drainage Engineering Department provides a two-year graduate program for the professional degree of Irrigation Engineer and collaborates with other departments in offering the Doctor of Philosophy degree in Irrigation Science.

A department of Engineering Drawing provides service courses in drafting for all departments of the College. It also offers a two-year curriculum in drafting.

Objectives. The objectives of the four-year curricula in Engineering are to provide the student an opportunity to obtain the thorough, fundamental, and technical education necessary for professional work of the highest grade, and to insure the development of those physical, mental, moral, and social qualities that are essential to high professional attainment.

Upper Division Standing. A student must have completed 96 credits, including Chemistry 10 and 11, Physics 20, 21, 22, and Mathematics 99 or its equivalent, before he is admitted to upper division standing in engineering, and is eligible to take C.E. 101 and C.E. 196.

Engineering Societies. General professional association and advancement are promoted by activities of student branches of national engineering societies. The following are represented, either by faculty membership or student chapter, or both: American Concrete Institute, American Geophysical Union, American Road Builders Association, American Society of Agricultural Engineers, American Society of Civil Engineers, American Society for Engineering Education, American Society of Mechanical Engineers, American Society of Tool Engineers, the Institute of Radio Engineers, and others.

Honor Societies and Scholarships. The Alpha Delta chapter of Sigma Tau was installed at Utah State Agricultural College in February, 1951. Membership is elected from junior and senior Engineering students whose scholarship is in the upper third of their class.

Agricultural Engineering upper division students with high scholarship are eligible for membership in Alpha Zeta. Graduating Seniors in the upper ten percent of the class are eligible for membership in Phi Kappa Phi. Graduate students may be elected to Associate Membership in Sigma Xi, honorary scientific society.

Several scholarships are available to engineering students. (See "Scholarships, Fellowships, Awards" in Introduction to catalog.)

Summer Surveying Camp. Prior to registration for the junior year, a three-week survey camp is held where plane, topographical, and route surveying are taught. Completion of Summer Surveying Camp or acceptable substitution, is required of all civil and Agricultural Engineering students. Students taking this course should be immunized against Rocky Mountain Spotted Fever.

Engineering Seminars. Engineering seminars are a feature of the advanced engineering work. Course C.E. 198 is required of all Agricultural and Civil Engineering students in their senior year. EE. 175 and TE. 184 are required of Electrical and Tool Engineering seniors respectively.

Field Trips. Field trips to local construction projects, engineering works, and industries are arranged for engineering students. Seniors in engineering usually take a supervised field trip covering the major engineering works in the Western United States. This trip is usually scheduled in the Spring Quarter.

COMMON FRESHMAN CURRICULUM IN ENGINEERING

Dept. No.	Course Title	F	W	S
C.E. 1, 2, Electives ¹	Engineering Orientation	1	1	1
C.E. 65	Engineering Problems			1
E.D. 61, 62	Engineering Drawing	3	3	
E.D. 63	Descriptive Geometry			3
Math. 34 ²	Introduction to College Algebra	3		
Math. 35	College Algebra		5	
Math. 46	Plane and Spherical Trigonometry			5
Chem. 10, 11	General Chemistry	5	5	
Shop ³	.....			3
English 17, 18, 19	Freshman English	3	3	3
M.S. or A.S.	Basic Military or Air Science	1	1	1
		16	18	17

¹—Orientation taken in Spring Quarter is under direction of the major departments.

²—Students who have completed Algebra B in high school, and who make satisfactory grades on the mathematics entrance examination, may omit this course and begin with Math. 35 Fall Quarter.

³—See departmental curriculum for recommendation.

Engineering Drawing

Austin G. Loveless, Associate Professor and Head of Department; B. O. Willhite, Willis A. Tingey, Assistant Professors; Ross A. Nyman, Instructor.

Note: Students taking any of the courses in engineering drawing are advised not to purchase their instruments or supplies for these courses until after they have attended the first scheduled exercise and received instructions concerning materials.

The Engineering Drawing department offers service courses in drafting and blueprint reading to all departments of the College

The Department's four drafting laboratories have a total floor space of 5400 square feet and are equipped with 120 individual drafting tables. Modern instructional equipment such as drafting machines, reproduction facilities, moving pictures, slides, and other teaching devices are available to students. Since this is primarily a service department, basic courses are designed to meet needs of many departments.

Students may qualify for a minor in Engineering or Mechanical Drawing on completion of 18 credits, including Descriptive Geometry.

TWO-YEAR CURRICULUM LEADING TO CERTIFICATE OF COMPLETION IN DRAFTING

This two-year terminal curriculum is being offered for those people having drafting interest and ability, and who desire to prepare themselves as draftsmen. The curriculum will provide the student with the basic drafting techniques and the necessary related information to enable him to obtain a position in industry.

First Year				Second Year			
Course	F	W	S	Course	F	W	S
Math. 34, 35, 44	3	5	3	E.D. 63, 195, 197	3	3	5
English 17, 18, 19	3	3	3	E.D. 95	3	...	...
E.D. 61, 62, 93	3	3	3	T.E. 57, 58 .....	...	2	2
T.E. 51, 52, 53	3	3	3	Phys. 6, Chem. 10	5	5	...
Speech 5	3	...	...	English 112 .....	...	4	...
M.S. 1, 2, 3	1	1	1	I.E. 120	3	...	...
Electives	1	1	3	Econ. 51 .....	...	...	5
				M.S. or A.S.	1	1	1
				Electives	1	1	3
	17	16	16				
					16	16	16

Courses

59. Blueprint Reading and Industrial Drawing. Broad coverage for those desiring only one quarter's work in drafting. Reading and interpretation of blueprints, lettering, use of instruments, and basic drafting practices. Two lectures, two labs. (3S) Nyman

60. Elementary Drafting. For Forestry students. Use of instruments, simple lettering, and drafting fundamentals. One lab. (3W) Tingey

61, 62. Engineering Drawing. The use of drafting instruments, graphic solutions, applied geometry, lettering, principles of shape and size description, sectioning, and standard elements and symbols. Problems are included in sketching; pictorial illustrations are made from orthographic views. (3F, W, S) Staff

63. Descriptive Geometry. Principal and auxiliary views, points, lines, and planes, developments, intersections and warped surfaces. Engineering problems relating to cut and fill, mining, geology, and industrial design are selected. Prerequisites: E.D. 61 or L.A. 20. One lect., two labs. (3F or S) Staff

93. Mechanical Drawing. Advanced work for those interested in a drafting minor. Includes basic work in industrial drawing, including machine fasteners, developments for patterns, and fundamentals of architectural, structural, welding, piping, and electrical drawings. Prerequisite: E.D. 62. (3F, S) Willhite

94. Working Drawings and Specifications. An introduction to architectural drawing and specifications applied to building and construction problems. Scale drawings including plans, elevations, sections and construction details are completed with tracings and prints. Prerequisites: E.D. 62 (3W) Willhite

95. Machine Design. Mechanisms of power and motion and the design of machine parts incorporating standard methods consistent with industry. Prerequisite: E.D. 93. (3F) Willhite

120. Mechanical Drawing for Industrial Arts Teachers. Emphasis is given to the preparation of course work and the training of teachers to teach architectural, sheetmetal, machine, and electrical drawing, as applied to the junior and senior high school industrial arts program. Prerequisite: E. D. 62 or equivalent. (3F) Loveless

194. Mechanical Perspective. Practical problems in angular, parallel, and oblique perspective. Techniques in rendering finished drawings. Prerequisites: E.D. 94 or 95. (3S) Loveless

195. Industrial Production Illustration. Translation of working drawings into dimetric and trimetric projections, exploded views, and assemblies as a means of rendering industrial illustrations. Prerequisite: E.D. 94 or 95. (3W) (Taught alternate years with E.D. 194) Loveless

196. Aircraft Drawing. Aircraft techniques, numbering systems, change methods, and technical specifications are stressed. Prerequisite: E.D. 95. (3S) Willhite

197. Drafting Room Practice. Personnel and organization of drafting room and its position in industry. Preparation, reproduction and care of drawings and prints. Prerequisite: E.D. 95. (5S) Willhite

Agricultural Engineering

Spencer H. Daines, Associate Professor and Head of Department; O. W. Israelsen, Professor Emeritus; J. E. Christiansen, C. H. Milligan, *Joseph Coulam, A. Alvin Bishop, Melvin J. Greaves, Professors; Bertis L. Embry, Associate Professor, J. Donald Wadsworth, Assistant Professor; Con H. Jarrett, and Albert B. Smith, Instructors.

The Department of Agricultural Engineering offers courses involving application of engineering knowledge to solution of farm problems. The most important of these problems are related to farm machinery, farm power, farm structures, drainage, irrigation, soil erosion control, and modern farm and home equipment.

The four-year curriculum leading to a Bachelor of Science degree in Agricultural Engineering is fully accredited by the Engineers' Council for Professional Development. This curriculum includes all basic courses common to other engineering curricula, such as mathematics, physics, and mechanics, fundamental subjects in the different engineering departments; courses selected to familiarize the student with modern methods of agriculture; and a thorough treatment of Agricultural Engineering courses.

Graduates from this curriculum have opportunity to work in research, sales, or advertising in the farm machinery and farm motor industry; farm structure design, or promotional work with the building materials industry; soil erosion prevention; rural electric service; management of farms, and teaching, research and extension in colleges, experiment stations and in the United States Depart-

*On leave.

ment of Agriculture. Students majoring in Agricultural Engineering should be thoroughly acquainted with farm practices and have a real interest in agriculture.

In addition, the Department offers service courses in farm mechanics and forging, designed to give students practical training in use of hand and power tools and other mechanical skills related to farming and industry. Classes are open to all college students.

AGRICULTURAL ENGINEERING CURRICULUM

Degree: Bachelor of Science in Agricultural Engineering

Freshman				Sophomore			
Course	F	W	S	Course	F	W	S
C.E. 1, 2; A.E. 3	1	1	1	C.E. 84, 82, 85, 87	4	3	4
C.E. 65 .....	....	....	1	Math. 97, 98, 99	5	5	5
Math. 34 ¹ , 35, 46	3	5	5	Phys. 20, 21, 22	5	5	5
English 17, 18, 19	3	3	3	Agron. 56 .....	....	4	....
E.D. 61, 62, 63	3	3	3	Ag. Econ. 53	3	....	....
Chem. 10, 11	5	5	....	Speech 5 .....	....	....	3
A.E. 21 .....	....	....	3	M.S. or A.S.	1	1	1
M.S. or A.S.	1	1	1				
	16	18	17		18	18	18
Junior				Senior			
Course	F	W	S	Course	F	W	S
C.E. 101, 102, 103	4	4	4	C.E. 109, 110 .....	....	1	1
C.E. 196, 141, 142	4	4	4	C.E. 111, 112, 173	4	3	4
C.E. 192, 144 .....	....	3	3	I.D. 112, 146, 148	3	3	3
E.E. 104, 105 .....	....	4	4	A.E. 115, 116, 106	3	3	4
Agron. 107	5	....	....	A.E. 108 .....	....	4	....
Approved Electives	3	3	3	English 111	4	....	....
	16	18	18	C.E. 198	1	1	1
				Approved Electives	3	3	3
					18	18	16

¹—Students who have completed high school Algebra B and who make satisfactory grades on the mathematics entrance examination may omit Math 34 and begin with Math. 35. Fall Quarter.

TYPICAL PROGRAM OF STUDY FOR TWO-YEAR CERTIFICATE OF COMPLETION IN AGRICULTURAL MECHANICS

First Year				Second Year			
Course	F	W	S	Course	F	W	S
Math. 34, 35, 44	3	5	3	Agronomy 56	4	....	....
Engl. 17, 18, 19	3	3	3	Ag. Econ. 53 .....	....	3	....
E.D. 61, 62, 63	3	3	3	An. Hus. 10 .....	....	....	5
Welding 91, 94	3	3	....	Speech 3	3	....	....
A.E. 11, 21	2	....	3	E.E. 21, T.E. 56 .....	....	4	3
I.D. 10 .....	....	....	4	A.E. 14, 15	3	3	....
M.S. or A.S.	1	1	1	A.E. 113, 121, 105	3	3	5
Approved Electives	2	2	....	M.S. or A.S.	1	1	1
	17	17	17	Approved Electives	3	3	3
					17	17	17

This program is suggestive only. Variations are permitted according to a student's objectives so long as he has the approval of his advisor and department head.

Courses

3. Orientation. To familiarize freshman Agricultural Engineering majors with opportunities and requirements of an Agricultural Engineer. Lectures. Films and field trips. (1S) Staff

4. Dairy Mechanics. Basic equipment found in modern dairy plants; its accessories and upkeep. Three lectures, one lab. (4F) Daines

11. Forging and Bench Metal Work. (Especially for agricultural students). Instruction is divided equally between hot and cold metalwork. The first deals with fundamental forging operations. The second consists of the use of hand and power metalworking tools and layout work. Two labs. (2F, W or S) Smith

14. Farm Power for Agricultural Students. Principles, operation, care and maintenance of internal combustion engines and electric motors. Two lectures, one lab. (3F or S) Smith

15. Farm Machinery for Agricultural Students. Principles of mechanics and materials applied to farm machinery. Operation, adjustment, and care of agricultural machines. Two lectures, one lab. (3W or S) Embry

21. General Farm Mechanics. Basic course in use of hand and power tools, such as are used on the farm. Basic instruction in woodworking, welding, and forging. Three labs. (3W) Jarrett

82. Forge Practice. Fundamental operations. Recommended for Industrial Arts, Woodworking, and Building Construction students. Two labs. (2F, W or S) Jarrett

83. Forge Practice. A beginning course in forge practice, more extensive than 82. Three labs. (3F, W or S) Jarrett

105. Farm Woodwork and Building for Agricultural Students. Location, planning, and construction of farm buildings. Wood and metal preservatives, fences and fencing, and the farm workshop. Three lectures, two labs. (5F or S) Daines

106. Farm Structures. Economics of farm structures; insulation as it involves heating and ventilating; mechanics of farm structures; types of construction; building materials; location and planning of the farmstead; fundamental requirements and design of farm buildings. Prerequisite: C.E. 101. Three lectures, one lab. (4S) Daines

108. Engineering Aspects of Soil and Water Conservation. Extent and kinds of erosion, rate of water absorption, soil erodibility, soil vegetation and cultural practices. Erosion control structures, surveys for hydraulic design of terraces, terrace outlets and soil-saving dams. Tillage and farming methods, strip-cropping, erosion and alkali problems on irrigated land. Three lectures, one lab. (4W) Bishop

109. Farm Utilities. Modern methods of heating, lighting, ventilating, water supply and farm sanitation; farm electrical systems and appliances. Three lectures, one lab. (4W) Smith

113. Farm Machinery Repair. Applied problems in farm machinery repair and maintenance. Prerequisite: A.E. 82 and Weld. 96. Three labs. (3F or S) Jarrett

115. Farm Implements. Selection, operation, adjustment, and care of agricultural machines. Prerequisite: C.E. 101. Three lectures. (3F) Embry

116. Farm Tractors. A study of design, operation, and performance. Efficiencies and ratings as determined by the Nebraska Tractor Tests. Prerequisite: C.E. 101. Two lectures, one lab. (3W) Smith

121. Farm Tractor Maintenance. Operation, care, and maintenance. Does not include major overhaul and repair work. One lecture, one lab. (2W or S) Jarrett

184. Ornamental Iron Work. Designing and making of iron furnishings, interior and exterior railings, wrought iron furniture, trills, jardiniers, sign brackets, etc. Prerequisite: A.E. 82, 83, or 85. Two labs. (2S) Jarrett

230. Special Problems in Agricultural Engineering. Independent study of chosen problems in agricultural engineering. The student is expected to develop his own initiative in pursuing these problems. Standard formal type-written reports are required. Prerequisite: Senior or Graduate standing. Any quarter. Time and credit arranged. **Staff**

298. Thesis. Time and credit arranged. (F, W or S) **Staff**

Civil Engineering

J. E. Christiansen, Professor and Head of Department; C. W. Israelsen, Professor Emeritus; H. R. Kepner, C. H. Milligan, E. M. Stock, A. Alvin Bishop, Melvin J. Greaves, Professors; Spencer H. Daines, Bertis L. Embry, Reynolds K. Watkins, Associate Professors; Willis A. Tingey, Assistant Professor.

Civil Engineering consists of the economic application of the laws, forces and materials of nature to the design and construction of engineering structures, including irrigation and drainage systems, highways, railways, bridges, buildings, dams, water supply systems, hydro-electric plants, and many other works which are a part of the requirements of civilization today.

The carefully planned curriculum in Civil Engineering is accredited by the Engineers' Council for Professional Development. It is based upon a thorough training in English, mathematics, physics, and chemistry, combined with drawing, surveying, mechanics, hydraulics, and economics. Upon this substructure is built a superstructure consisting of the applications of these subjects to many phases of Civil Engineering. Special emphasis is placed upon work in Irrigation and Drainage.

A Summer Surveying Camp is offered, academic work is supplemented by local field trips during the junior year, and a major field trip of approximately one week duration, in the senior year. These field trips provide opportunity for first-hand study of projects under investigation, construction, and after completion. All field trips are carefully planned and are carried out under the joint direction of the faculty and representatives of the work being inspected.

The Civil Engineering department is housed mainly in the Engineering Building, where well-equipped laboratories and classrooms provide ample facilities for experimental work. The irrigation and hydraulics laboratories are equipped with pumps, turbines, water measuring devices, pipe lines, and models of hydraulic structures. A model hydraulic laboratory demonstration unit is available for instruction and laboratory use. The soil mechanics laboratory is equipped with the latest machines and instruments for determining the engineering properties of soil. The materials testing laboratories are equipped for testing both metallic and non-metallic materials. Standard testing equipment for determining the physical properties of timber, metals, clay products, concrete and bituminous materials are available. The structural laboratories are equipped for demonstration and investigation of statically indeterminate structures, using Begg's method and the Photo-elastic Polariscope.

CIVIL ENGINEERING CURRICULA

Degree: Bachelor of Science in Civil Engineering

Freshman				Sophomore				
Course	F	W	S	Course	F	W	S	Su
C.E. 1, 2, 3	1	1	1	C.E. 84, 82, 85, 87....	4	3	4	4 ^a
C.E. 65 .....	...	...	1	Math. 97, 98, 99	5	5	5	...
E.D. 61, 62, 63	3	3	3	Physics 20, 21, 22....	5	5	5	...
Chem. 10, 11	5	5	...	Speech 5	3	...	...	...
English 17, 18, 19	3	3	3	Economics 51 .....	...	5	...	...
Math. 34 ¹ , 35, 46	3	5	5	Geology 3 .....	...	...	5	...
T.E. 56, or Weld. 96 .....	...	...	3	M.S. or A.S.	1	1	1	...
M.S. or A.S.	1	1	1					
	16	18	17		18	19	20	4

Junior				Senior			
Course	F	W	S	Course	F	W	S
C.E. 101, 102, 103	4	4	4	C.E. 105, 106, 107	6	6	5
C.E. 196, 141, 142	4	4	4	C.E. 108, 109, 110	1	1	1
C.E. 120, 192	3		3	C.E. 150, 190, 173	4	3	3
I.D. 112		3		C.E. 130, C.E. 193 or I.D. 146	3	3	
E.E. 104, 105		4	4	C.E. 194 or I.D. 145			4
English 111	4			C.E. 198	1	1	1
Approved Elect. or M.S.	3	3	3	Options or M.S.	3	3	3
	18	18	18		18	17	17

Senior Options

General C.E.				Irrigation and Drainage			
Course	F	W	S	Course	F	W	S
C.E. 125, 131, 132	3	3	3	I.D. 149, 160, 147	3	3	3

Courses

1, 2, 3. **Engineering Orientation.** A preview of engineering; what engineering is, what engineers do, what aptitudes are essential to success, and philosophy of engineering education. (1F, 1W, 1S) **Christiansen**

65. **Engineering Problems.** Methods of computations include the use of logarithms, slide-rule, and calculating machines. Emphasis is placed upon the development of good habits of work and study. Prerequisite: Math. 35 and C.E. 2. One lab. (1F or 1S) **Tingey**

80. **Office Practice.** For Foresters. Practice in preparing office plans from surveys that are encountered by the forester in working up field notes. Prerequisite: C.E. 81 or equivalent. Two labs, one lecture. (3W) **Tingey**

81. **Plane Surveying.** Primarily for Forestry students. Use of tape, hand level, level transit, compass and plane table. Differential and profile leveling, traversing, plotting, mapping, and care of engineering instruments. Prerequisites: Math. 35 and 46. One lecture, two labs. (3F or 3S) **Tingey**

82. **Mapping and Office Practice.** Practice in mapping various kinds of surveys that may be encouraged by the engineer in working up field notes. Prerequisite: C.E. 81 or 84. One lecture, two labs. (3W) **Stock**

84. **Elements of Surveying.** Theory of surveying. Terminology, computations, areas, volumes, field astronomy, and general surveying. Prerequisites: Math. 35 and 46. Two lectures, two labs. (4F) **Stock**

85. **Advanced Surveying.** Problems in chaining, leveling, curves, spirals, stadia, plane table surveying, and city surveying. Prerequisites: C.E. 82 and 84. Two lectures, two labs. (4S) **Stock**

87. **Summer Surveying Camp.** Surveying office and field practice. Topographic, land, route, and geodetic surveying. Actual field surveys are made. Students pay their own transportation and living expenses and the regular summer quarter registration fee. Immunization against Rocky Mountain Spotted Fever recommended. Summer employment in engineering or surveying may be substituted for the Summer Surveying Camp when approved by Head of the Department. Whenever possible, approval should be obtained in advance. Following the summer experience, a report must be submitted outlining work done, and giving appraisal of experience gained. Substitution will be allowed only when such report is submitted. Prerequisite: C.E. 85 or equivalent. Daily, eight hours a day for three weeks preceding Fall Quarter. (4Su) **Tingey**

¹—Students who have completed high school Algebra B and who make satisfactory grades on the mathematics entrance examination may omit Math. 34 and begin with Math. 35 Fall Quarter.

²—May be selected from the following: B.A. 109, Geol. 103, Pol. Sci. 20 or 182, C.E. 181, Bact. 70, Math. 122, Adv. Military or Air Science, or other courses approved by Major professor.

³—See note under course description, page 204.

101, 102, 103. Engineering Mechanics. Includes statics, dynamics, and strength of materials. Fall Quarter and part of the Winter Quarter are devoted to study of resultants and equilibrium of force systems, friction, center of gravity, moment of inertia, and the kinematics and kinetics of bodies in translation, rotation and plane motion. The remainder of the year is devoted to study of properties of engineering materials, stress and strain in tension and compression members, shafts, beams, and columns, combined and principal stresses, fatigue, impact, and energy loads and special topics. Prerequisite: Math 90. Three lectures, one lab. (4F, 4W, 4S) **Watkins**

105, 106, 107. Structural Theory and Design. This sequence introduces the analysis and design of structures and their elements. C.E. 105 and 106 cover stress analysis and design in steel, timber, and reinforced concrete. In C.E. 107, students are given more comprehensive problems in the design of buildings and bridges. Prerequisites: Engineering Mechanics; C.E. 101, 102, 103. Fall and Winter Quarters, recitation daily, one lab. Spring Quarter, five recitations. (6F, 6W, 5S) **Kepner**

108, 109, 110. Materials Testing Laboratory. Strength, composition, and physical properties of engineering materials, including wood, concrete, metal and bituminous. One lab. (1F, 1W, 1S) **Watkins, Tingey**

111. Advanced Dynamics and Kinematics. Kinematics of linkages, belts, gears and cams. Design of machine elements subject dynamic loadings. Two lectures, one lab. Prerequisite: C.E. 103. (3F) **Kepner, Greaves**

112. Stresses in Machine Elements. A study of stresses in machine parts; theories of failure; statically indeterminate stresses and deflections; thermal stresses; stress concentration. Prerequisite: C.E. 103. Three lectures, one lab. (4W) **Kepner, Greaves**

120. Roads and Pavements. Elements of highway engineering. Types of roads and pavements, methods of construction and maintenance, jurisprudence, and finance. Prerequisite: C.E. 85. Three lectures. (3F) **Stock**

124. Introduction to Traffic Engineering. A study of the basic traffic problems; the route problems of transportation, indices of transportation inefficiencies, procedures of collecting and analyzing transportation survey data, and the resulting remedial actions for the solution to the problems. Prerequisite, C.E. 120. Two lectures, one lab. (3F) **Stock**

125. Highway Design. Theory and practice in design of rural highways. Preparation of highway plans and profiles, mass diagrams, right-of-way surveys, and drainage features. Prerequisites: C.E. 120. Two lectures, one lab. (3F) **Stock**

127. City Planning. Master plans, civic units, parks and playgrounds, utilities, housing, sub-divisions, zoning, civic centers and airports. Three lectures. Prerequisite: C.E. 120. (3S) **Stock**

130. Building Construction and Cost Estimating. Construction methods used in fabrication and creation of buildings and practice in estimating costs. (3F) 2 lectures, 1 lab. **Greaves; Kepner**

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 Civil Engineering. C.E. 103 is prerequisite for C.E. 131 and C.E. 105 and 106 are prerequisites for C.E. 132. (3W, 3S) **Kepner**

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 and selection of tangential and reaction turbines and pumps. Prerequisites: C.E. 196. Three lectures, one lab. (4W, 4S) **Greaves**

144. Applied Hydraulics and Pneumatics. Theory and practice in hydraulics and pneumatics as they apply to machine tools and controls. Prerequisite: C.E. 141. Two lectures, one lab. (3S) **Greaves**

150. Soil Mechanics. Elementary physics of soil as applied to engineering problems. Moisture, plasticity, and capillary relationships. Percolation and seepage, shear, stress, distribution, consolidation and stability as factors in the design of earth structures and foundations. Prerequisites: C.E. 103, 142. Three lectures, one lab. (4F) **Watkins**

171. Hydrology. (Primarily for Forestry Students.) Weather elements, factors influencing run-off, and influence of range and land-management practice on run-off and erosion. Three lectures. (3F) **Staff**

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. Prerequisites: C.E. 142, or by special arrangement. Three lectures, one lab. (4W, 4S) **Staff**

176. Application of Thermodynamics. For Aeronautics, and Automotive majors. Applications of laws of thermodynamics to combustion engines, compressors, vapor cycles, and refrigeration are studied. Prerequisites: Math. 35, 44; Physics 22. Three lectures, one lab. (4W) **Greaves**

181. Photogrammetry. The science or art of utilizing photographs of the earth's surface for making surveys, maps, and land utilization studies. Planimetric maps, mosaics 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. (3S) **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) **Stock**

190. Contracts and Specifications. Synopsis of the law of contracts. Prerequisite: Senior standing. Three lectures. (3W) **Watkins**

191. Senior Project. Research or testing project in some phase of engineering. Student conducts minor research project under direction of faculty. Conducted cooperatively with C. E. 198 and English 111. (1W, 1S) **Staff**

192. Engineering Economy. Financial and cost problems associated with engineering design, operation and construction. Determination of the economic alternative in engineering. Prerequisite: Econ. 50 or 51. Three lectures. (3S) **Watkins**

193. Municipal Water Systems. Elements of design construction, and maintenance of waterworks systems. Treatment of public water supplies. Prerequisite: C.E. 142. Three lectures. (3W) **Kepner; Stock**

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) **Stock; Kepner**

196. Elementary Engineering Thermodynamics. The general energy equations, principles of the thermodynamic cycles for internal combustion engines, processes of vapors, air compression, refrigeration, and flow of fluids. Prerequisites: Physics 22 and Math. 99. Three lectures, one lab. (4F or S) **Staff**

198. Senior Seminar. Discussion of engineering subjects. Provides opportunity for both oral and written expression. Talks by visiting engineers. Required of all Agricultural and Civil Engineering Seniors. One lecture. (1F, 1W, 1S) **Christiansen**

201, 202. Advanced Structural Theory. Review of elementary strength of materials; advanced topics in stress analysis involving central, torsional, and flexural loads. Open to graduate students in Civil Engineering and to qualified Senior students, with the approval of the instructor. (3F, 3W) **Kepner**

203. Advanced Structural Design. Individual problems in the design of modern structures. Checking of designs by model analysis may be selected. Prerequisite C.E. 132 (3F, 3W, or 3S) **Kepner**

210. Earth and Rock-Fill Dams. Design of flexible type (earth or rockfill) dams, utilizing naturally available materials. The theories of soil mechanics are used to check designs against criteria for structural stability and stability against seepage. Special attention is given to foundations and construction details. For graduate students and specially prepared seniors. Prerequisite: C.E. 150. (3W) **Milligan**

211. Masonry Dams. Design of right type dams. Stress analysis and design of gravity, gravity-arch, single arch, multiple arch, and deck types of masonry dams. Timber, steel, and miscellaneous types are also considered. For graduate students and specially prepared seniors. Time arranged. Prerequisite: C. E. 103 (3F) **Bishop, Milligan**

212. Appurtenances to Dams and Operation of Reservoirs. Hydraulic and structural design of tunnels, gates, outlet channels, trash racks, etc. Operation of reservoirs for flood control and irrigation. For graduate students and specially prepared seniors. Prerequisite: C. E. 142 (3S) **Milligan**

215. Hydro-Electric Design. Selection of plant capacity from hydrological information. Effect of storage on capacity. Economic height of dams. Selection of equipment. Layout and arrangement of power plants. For graduate students and specially prepared seniors. Prerequisite: C.E. 142. Time arranged. (3W) **Greaves**

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. 125. (3F, 3W, 3S) **Stock**

230. Special Problems in Civil Engineering. Independent study of chosen problems in Civil Engineering, given under direction of a member of the department staff. The student is expected to develop his own initiative in pursuing these problems. Standard formal typewritten reports are required. Prerequisite: Senior or Graduate standing. Any quarter. Time and credit arranged. **Staff**

241, 242. Advanced Fluid Mechanics and Hydraulics. Effects of pressure, inertia, gravity, viscosity, compressibility, and surface tension on the motion of fluids. Surface resistance, form resistance, and life and propulsion. Dynamic similarity. Non-uniform flow in open channels. Prerequisites: C.E. 142 and 196 or equivalents. (3F, 3W) **Staff**

243. Advanced Hydraulic Design. Design of pipe lines, special flumes, spillways, water control structures, and hydraulic machinery. Prerequisites: I.D. 147 and C.E. 142. (3S) **Staff**

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. For graduate students and specially prepared seniors. Prerequisites: C. E. 150 or its equivalent. (3S) **Staff**

251. Advanced Soil Mechanics Laboratory. Advanced laboratory work in soil mechanics. (1S) **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, and use and storage of groundwater. For graduates and specially prepared seniors. Prerequisite: C.E. 173. Three lectures. Arranged **Staff**

295. Sanitary Design. Principles of design, construction and operation of water purification and sewage treatment plants. Prerequisite: C.E. 193, 194. (3W or S) **Kepler**

298. Graduate Thesis. Time and credit arranged. Each quarter. **Staff**

299. Graduate Seminar. Time arranged. (1S) **Staff**

Irrigation and Drainage Engineering

C. H. Milligan, Professor and Head of Department; O. W. Israelsen, Professor Emeritus; J. E. Christiansen, A. Alvin Bishop, Wayne D. Criddle, Professors; Vaughn E. Hansen, Associate Research Professor; C. W. Lauritzen and Frank Haws, Collaborators, U. S. Department of Agriculture.

This department offers undergraduate courses for Agricultural Engineering and provides an option in Civil Engineering. A joint major in Irrigation and Soils is provided for students registering in the School of Agriculture.

A major function of the department is its graduate course offerings for Master of Science degrees in Agricultural Engineering, Civil Engineering, Irrigation and Drainage Engineering, and Irrigation and Soils. It also provides a two-year graduate curriculum for the professional degree of Irrigation Engineer, and collaborates with other departments in offering the Doctor of Philosophy degree in Irrigation Science.

A program of research is conducted in collaboration with Agricultural Research Service, of the U. S. Department of Agriculture under the direction of the Agricultural Experiment Station. This, together with activities of the Engineering Experiment Station, provides opportunities for qualified students to act as part-time research assistants and thereby obtain experience and compensation for their services.

Utah State Agricultural College is located in the heart of the Irrigation regions of the West. Emphasis is placed upon basic principles of engineering applicable to the design, construction, operation and maintenance of irrigation systems, and upon the solution of problems related to irrigation agriculture.

The program of study for either the degree of Master of Science in Irrigation and Drainage Engineering, or for the professional degree of Irrigation Engineer depends upon the student's previous training and experience. It should contain basic sequence courses to strengthen the undergraduate program and to provide adequate training in irrigation and drainage. Since students come to this institution with different degrees of preparation and with different objectives, no rigid curricula can be suggested for advanced degrees. Typical programs of study for students having the Bachelor of Science degree in either Agricultural Engineering or Civil Engineering for the Master of Science degree in either Agricultural Engineering or Civil Engineering or for the Master of Science degree in Irrigation and Drainage Engineering or the degree of Irrigation Engineer are as follows:

TYPICAL PROGRAMS OF STUDY FOR THE M. S. DEGREE IN IRRIGATION AND DRAINAGE ENGINEERING

Those with B.S. degree in A.E.

Course	Quarter		
	F.	W.	S.
C.E. 105, 106	6	6	....
I.D. 112, 231, 232	3	3	3
Agr. 207, I.D. 146, 148....	3	3	3
C.E. 299			4
I.D. 145			1
I.D. 298	2	4	5
	15	16	16

Those with B.S. degree in C.E.

Course	Quarter		
	F.	W.	S.
Agr. 207, C.E. 210, 273 ..	3	3	3
C.E. 241, 242, I.D. 245	3	3	3
I.D. 112, 146, 147	3	3	3
I.D. 149, 231, 232	3	3	3
C.E. 298	4	4	3
C.E. 299			1
	16	16	16

*Students who have had considerable professional experience may, on the approval of his graduate committee, substitute plan "B" reports for the Graduate Thesis. Most students will be required to satisfy the thesis requirement.

TYPICAL PROGRAMS OF STUDY FOR THE DEGREE OF IRRIGATION ENGINEER

First Year

Those with B.S. degree in A.E.

Course	Quarter		
	F.	W.	S.
C.E. 105, 106, 173	6	6	4
I.D. 112, 146, 147	3	3	3
Agr. 130, 131, 132	3	3	3
C.E. 150, Agr. 207, I.D. 145	4	3	4
I.D. 298 .....	...	...	2
	16	15	16

Those with B.S. degree in A.E.

Course	Quarter		
	F.	W.	S.
Math. 130, 131, 132	3	3	3
Agr. 130, 131, 132	3	3	3
I.D. 112, 146, 147	3	3	3
C.E. 241, 242, 243	3	3	3
C.E. 201, 202	3	3	...
C.E. or I.D. 298			4
	15	15	16

Second Year

Those with B.S. degree in A.E.

Course	Quarter		
	F.	W.	S.
Math. 130, 131, 132	3	3	3
I.D. 149, 160, 148	3	3	3
C.E. 241, 242, 273	3	3	3
I.D. 231, 232 .....	...	2	3
I.D. 298	6	4	4
	15	16	16

Those with B.S. degree in C.E.

Course	Quarter		
	F.	W.	S.
C.E. 211, 210, 212	3	3	3
I.D. 231, 232 .....	...	3	3
I.D. 149, 160, 245	3	3	3
Agr. 207, C.E. 273, I.D. 148	3	3	3
C.E. or I.D. 298	6	4	3
C.E. 299			1
	15	16	16

These typical programs are suggestive only. Variations are permitted according to a student's previous training and his objectives so long as the general requirements of the department and of the Graduate School are satisfied. These general requirements are described under "Graduate School."

Courses

10. Irrigation for Agricultural Students. Principles and practices underlying efficient and economic use of water in irrigation. Three lectures, one lab. (4F or S) Bishop

112. Irrigation Principles. For advanced students in Agriculture or Engineering who have not taken I.D. 10. Principles of irrigation including soil, water, and plant relations, irrigation methods, irrigation efficiency, salinity, etc. Two lectures, one lab. (3F, 3W) Milligan; Bishop

I.D. 145. Design of Drainage Systems. Drainage design in relation to soil properties, location of drains, flow into tile, properties of tile, drainage construction. Prerequisite: C. E. 142. Three lectures, one lab. (4S) Bishop

I.D. 146. Design of Water Conveyance Irrigation Structures. Application of principles of solid, fluid, and soil mechanics to the solution of engineering designs for earth canals, lined canals, flumes, transitions, and pipe lines. Prerequisites: C.E. 106, 142, and 150. Three lectures. (3W) Bishop

I.D. 147. Design of Water Control Structures. Design of dams, diversion works, drops and chutes, spillways, wasteways, headgates, and check gates. Prerequisite: I.D. 146. Three lectures. (3S) Bishop

I.D. 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 both surface and sprinkling methods. Prerequisite: I. D. 146, 112 (3S) Bishop

I.D. 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 affecting water. Three lectures. (3F) Milligan

I.D. 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, pipe lines, dams, weirs, and other irrigation structures. (3W) Milligan

I.D. 231, 232. Irrigation Science. Advanced study in irrigation including such topics as consumptive use of water; soil moisture; irrigation, erosion, and land management; infiltration; permeability; and other irrigation engineering principles and practices. (3W, 3S) Criddle, Milligan

I.D. 241. Special Problems in Irrigation and Drainage Engineering. Regular research activities of irrigation and drainage staff members afford excellent opportunities for direction of student projects. A qualified student may elect a problem in any phase of irrigation or drainage engineering for study at the college or elsewhere. This course also provides for research other than that for the graduate thesis. (I.D. 298 or C.E. 298.) Credit according to work done. Each quarter. Time arranged. Staff

I.D. 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

I.D. 298. Graduate Thesis. Time and credit arranged. Each quarter. Staff

Electrical Engineering

(Electronic and Communications Option)

Larry S. Cole, Professor and Head of Department; Clayton Clark, Professor; Bertis L. Embry, Bruce O. Watkins, Associate Professors; William L. Jones, Assistant Professor.

The course of study offered by the Department of Electrical Engineering has been designed with emphasis in Electronics and Communications. The curriculum thus permits both a wide range of courses and thorough treatment of the work in these fields at the undergraduate level. At the same time, provision is made for inclusion of a sufficient number of basic engineering courses to provide a well-rounded engineering education.

The objective of the curriculum is to provide the necessary background and training to enable the student, on graduation, to qualify for positions available in Electronics and Communications. Former graduates have found excellent employment opportunities and have been successful in the following general fields: electronic research and development, broadcast and communications (including television), electronic and radio manufacturing industry, and industrial electronics. Positions in these and related occupations have been available in both Civil Service and private industry.

Departmental courses provide a maximum possible amount of laboratory experience; the senior laboratory program duplicates, as closely as possible, actual types of work the student may expect to perform after employment; e.g., carrying out typical engineering assignments in design, development and testing with a minimum of direction.

Laboratory facilities available in the department of Electrical Engineering include: Communications laboratory with transmitters up to 1000 watts and modern communication receivers (W7TMK) radar laboratory with Mark-16

50-KW cm. set; UHF laboratory, including 10, 3 and 1 cm, equipment; field antenna laboratory for study on full scale broadcast and communication systems; broadcast studio with audio control and recording equipment; instrument rooms for measurement work; electrical machinery laboratory.

A graduate course of study leading to the M.S. degree in E.E. including courses number 200 and over together with suitable related work in other departments is offered. A typical program is listed below. This suggested course of study may be modified as required depending on the individual student problems.

ELECTRICAL ENGINEERING CURRICULUM

Degree: Bachelor of Science in Electrical Engineering
(Electronics and Communications Option)

Freshman				Sophomore			
Course	F	W	S	Course	F	W	S
C.E. 1, 2	1	1	...	E.E. 79, 80, 81	3	4	4
E.E. 26 .....	...	...	1	Math. 97, 98, 99	5	5	5
C.E. 65 .....	...	...	1	Physics 20, 21, 22	5	5	5
Math. 34, ¹ 35, 46	3	5	5	C.E. 84	4	...	...
E.D. 61, 62, 63	3	3	3	Speech 5 .....	...	...	3
English 17, 18, 19	3	3	3	Economics 50 .....	...	3	...
Chem. 10, 11	5	5	...	M.S. or A.S.	1	1	1
T.E. 56 .....	...	...	3				
M.S. or A.S.	1	1	1				
	16	18	17		18	18	18
Junior				Senior			
Course	F	W	S	Course	F	W	S
E.E. 124, 125, 126	5	5	5	E.E. 131, 129, 120	3	5	5
E.E. 107, 108, 110	4	4	4	E.E. 139, 140, 141	3	5	5
C.E. 101, 102, 103	4	4	4	E.E. 151, 152	2	2	...
Math. 122	3	...	...	E.E. 160, 142	4	3	...
E.E. 150 .....	...	2	...	E.E. 175, 176, 177	1	1	1
Electives or A.S.	3	3	3	C.E. 196 .....	...	...	4
				English 111	4	...	...
				Electives or A.S.	3	3	3
	19	18	16		20	19	18

¹—Students who have completed high school Algebra B and who make satisfactory grades on the mathematics entrance examination may omit Math. 34 and begin with Math. 35 Fall Quarter.

Suggested Course of Study Leading to the Degree of Master of Science in Electrical Engineering

Course	Quarter		
	F	W	S
E.E. 211, 212	4	4	...
E.E. 231, 251	3	...	4
E.E. 222, 223 .....	...	3	3
E.E. 298 (thesis) .....	...	5	5
Math. 257, 258, 259	3	3	3
Approved elective	5	...	...
	15	15	15

Courses

21. Fundamentals of Electricity. A service course for students in Industrial Arts, Automotive, Welding, etc. Basic principles of practical and applied electricity; DC and AC circuits; power; wire and wiring; motor, generator and transformer principles; batteries; meters. Prerequisites: Math. 34 or equivalent. Three lectures, one demonstration lab. (4F, 4W, 4S) **Staff**

26. Electrical Engineering Orientation. A preview of Electrical Engineering study and practice. Required training, abilities and aptitudes for professional employment. Laboratories, power plants, radio stations, etc. will be visited. Various electrical and electronic systems are demonstrated. One Lab. (1S) **Staff**

79. Introduction to Electrical Engineering. Basic electricity and magnetism; Ohm's Law and circuits; circuit components; batteries, motors and generators; alternating currents; electron tubes and circuits; communication systems. Prerequisite: Math. 46. Three lectures. (3F) **Jones**

80. Direct Current Circuits. Applications of Ohm's Law, Kirchoff's Laws, and network theorems to the solution of DC circuits; introduction to magnetic and electric fields and circuits. Prerequisite: (or concurrent registration in) Math. 98. Three lectures, one lab. (4W) **Watkins**

81. Alternating Current Circuits. Fundamentals of AC; application of vector algebra to solution of AC circuits; application of network theorems to AC circuits; resonant circuits; introduction to reactive matching networks; elements of complex wave analysis. Prerequisite: E.E. 80. Three lectures, one lab. (4S) **Watkins**

E.E. 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. Prerequisites: Physics 21 and elementary calculus. Three lectures, 1 lab. (4F) **Jones**

104. Electrical Circuits and Machines. For non-electrical engineers. DC and AC circuit analysis. Electrical energy and power. Principles and characteristics of DC and AC machines. Transmission and utilization of electric power. 3 lectures, 1 lab. (4W) **Embry**

105. Engineering Electronics. For non-electrical engineers. Fundamentals of electron tubes and tube circuits. Industrial electronic systems and devices. Electrical methods of measurement of physical quantities. Prerequisite: E.E. 104 or equivalent work in circuit analysis. 3 lectures, 1 lab. (4S) **Embry**

107. Electrical Machinery I. An introductory course covering principles and operation of DC and AC machines; transformers; power transmission and distribution. Prerequisite: E.E. 81. Three lectures, one lab. (4F, 4W, 4S) **Embry**

108. Electrical Machinery II. A continuation of E.E. 107 with special emphasis on AC machinery. Single and polyphase systems and machines; transformers; control equipment. Three lectures, one lab. (4W) **Embry**

110. Lines and Filters. Principles and characteristics of transmission lines, networks, matching sections and filters. Prerequisite: E.E. 81. Three lectures, two labs. (5S) **Cole**

120. Antennas. Fundamentals of radio antennas, radiation and wave propagation; directional arrays; feed lines and matching and phasing networks; antenna and field strength measurements. Prerequisite: E.E. 110. Three lectures, two labs. (5S) **Clark**

124. Electron Tubes. Fundamentals of thermionic emission and operation of vacuum and gas-filled tubes; basic principles and methods of analysis of electron tube circuits; measurements and testing in electronic circuits; elements of power supply design. Prerequisite: E.E. 81. Three lectures, two labs. (5F) **Jones**

125. Electron Tube Circuits I. Principles and design of R-C and transformer coupled amplifiers; class A, AB, and B power amplifiers; principles of

inverse feed-back; distortion and gain measurement techniques. Prerequisite: E.E. 124. Three lectures, two labs. (5W) Cole

126. **Electron Tube Circuits II.** Principles and design of RF voltage and power amplifiers; neutralization methods; modulation; RF oscillators; detectors. Prerequisite: E.E. 125. Three lectures, two labs. (5S) Watkins

129. **Electroacoustics.** Elements of architectural acoustics; principles of direct radiator and horn loudspeakers; microphones and pickups; recording equipment and methods; audio system planning and design; acoustic and special audio measurement problems. Prerequisite: E.E. 125. Three lectures, two labs. (5W) Cole

131. **Transient Analysis.** Elementary study of transient phenomena in linear systems; formulation of differential equations and their solutions. Includes an introduction to the Laplace transform method of solution. Prerequisites: E.E. 110 and Math. 122. (3F) Cole

139. **Fundamentals of Electric Waves.** Introduction to vector analysis; elementary electromagnetic field theory; Maxwell's equations; radiation and wave guides. Prerequisite: E.E. 110 and Math. 122. (3F) Clark

140. **UHF Circuits.** Principles and design of pulse and wide-band RF amplifiers; transmission networks for UHF modulating signals; regulated power supplies; oscilloscope measurements; application of transmission line theory in the UHF spectrum. Prerequisite: E.E. 131, 139. Three lectures, two labs. (5W) Clark

141. **UHF Techniques.** UHF generators, cavity resonators, wave guides; parabolic and horn radiators; applications of UHF transmissions to radar and other complete systems. Laboratory work includes study and operation of the complete Mark 16 10 cm radar set. Prerequisite: E.E. 140. Three lectures, two labs. (5S) Clark

142. **Television and F.M. Systems.** A survey of the elements of present television and F.M. transmission and receiver systems; principles of other special systems as facsimile and teletype. (3W) Clark

150. **Instruments and Measurements.** A laboratory course covering the principles and application of electrical and electronic instruments; methods and techniques of measurements. Prerequisite: E.E. 124. Two labs. (2W or S) Jones

151, 152, 153. **Advanced Laboratory.** Individual engineering assignment involving design, development, construction and testing of various types and units of electronic and communications equipment. Prerequisite: Senior standing in E.E. Two labs. (2F, 2W, 2S) Cole; Clark

160. **Industrial Electronics.** Application of electronics methods and devices to the measurement, control and regulation of production and testing processes; servo mechanisms, R.F. heating. Prerequisite: E.E. 126. Three lectures, one lab. (4F) Clark

175. **E.E. 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 a technical paper on a suitable topic. (1F, 1W, 1S) Staff

200. **Special Studies in Electrical Engineering.** Preparation of professional papers and reports, research, and special problems. Open to senior E. E. students of high standing or graduate students. Time and credit arranged. Staff

211, 212. **Advanced Electron Tube Circuits.** Pulse techniques and recurrent electrical transients. Generator, trigger, multivibrator and similar circuit theory and design. Theory and design of high-speed pulse amplifiers. Wideband and band-pass amplifiers. Amplifier noise problems. Prerequisite or concurrent registration in E.E. 221 or equivalent. Three lectures, one lab. (4F, 4W) Cole

222, 223. **Network Synthesis.** The mathematical basis and design methods for two and four terminal passive networks having physically realizable driving point immittances. Prerequisites: Math. 254 and E.E. 131. Three lectures. (3W, 3S) Jones

231, 232, 233. Electromagnetic Waves and Fields. Vector analysis, field theory and Maxwell's equations. Field equation and boundary value problems. Application to antennas, wave guides and propagation. Three lectures. (3F, 3W, 3S) Clark

251. Servo-Mechanisms and Automatic Controls. Basic theory and design of servo systems. Transient response and stability problems. Computer fundamentals. Prerequisite: E.E. 131 or equivalent. Three lectures, one lab. (4S) Watkins

298. Graduate Thesis. Time and credit arranged. Each quarter. Staff

Tool Engineering

Frederick Preator, Professor and Head of Department; Rawson D. Child, Assistant Professor; B. O. Willhite, Assistant Professor.

The department offers a four-year curriculum that leads to the degree of Bachelor of Science in Tool Engineering. The present demand for capable tool engineers is greater than the supply of personnel qualified to take over production responsibilities.

Tool Engineering is a branch of engineering devoted primarily to planning the processes of economic manufacture; the art and science of analyzing, planning, designing, construction, and producing tools for manufacturing industries. The tool engineer handles the more specialized activities of process engineering, machine design, tool design, plant and layout engineering, gage engineering, manufacturing cost estimating, machine tool building, and maintenance engineering.

The Tool Engineering laboratories are equipped with eighteen engine lathes, three universal and one vertical milling machine, one planer, three shapers, four precision tool grinders, six drill presses, five tool grinders, one carbide tool grinder, one Doall machine, two punch presses, and one power hack saw. The laboratory is well supplied with all the necessary hand tools for precision work. The heat treatment laboratory is equipped with five electric furnaces, draw baths, tensile testing, impact testing, and hardness testing machines. A modern inspection laboratory has gage blocks, sine bars, electric comparators, polishing heads and microscopes for mechanical inspection work.

A joint program of cooperative training with Utah industries has been worked out for advanced students which permits registration for summer periods. Field trips to industrial plants are conducted each year for junior and senior students.

Student Chapter No. 2 of the American Society of Tool Engineers, promotes the professional and social interests of the tool engineering majors. Members of the teaching staff are qualified members of the national society.

TOOL ENGINEERING CURRICULUM

Degree: Bachelor of Science in Tool Engineering

Freshman

Course	F	W	S
C.E. 1, 2, 65	1	1	1
T.E. 50	---	---	1
T.E. 56	---	---	3
Math. 34, ¹ 35, 46	3	5	5
English 17, 18, 19	3	3	3
E.D. 61, 62, 63	3	3	3
Chem. 10, 11	5	5	
M.S. or A.S.	1	1	1

16 18 17

Sophomore

Course	F	W	S
Math. 97, 98, 99	5	5	5
Physics 20, 21, 22	5	5	5
T.E. 52, 53	4	4	
T.E. 57, 58		2	2
Econ. 50	3		
Speech 5			3
M.S. or A.S.	1	1	1

18 17 16

¹—Students who have completed high school Algebra B and who make satisfactory grades on the mathematics entrance examination may omit Math. 34 and begin with Math. 35 Fall Quarter.

Junior				Senior			
Course	F	W	S	Course	F	W	S
T.E. 151, 152, 153	4	4	4	T.E. 181, 182, 183	5	5	5
T.E. 150	3			E.D. 95, 195, 196	3	3	3
C.E. 101, 102, 103	4	4	4	C.E. 111, 112, 192	4	3	3
C.E. 196, 141	4	4		T.E. 184, 158		1	3
E.E. 104, 105		4	4	B.A. 155	3		
Weld. 96			3	English 112		4	
Electives or M.S.	3	3	3	Approved Electives or M.S.	3	3	3
	18	19	18		18	19	17

Courses

50. Orientation. Lectures, films, and field trips to acquaint the student with diverse opportunities for the tool engineer in industry. (1S) **Staff**

51, 52. Machine Tool Operation. Training in use of hand tools, and in bench work and tool sharpening, together with elementary training on drill press and engine lathe. Reading assignments on machine tool operations, and applications of mathematics to machine tool problems are included. (4F, W or S) **Child**

53, 54. Machine Processes. (Shaper and Milling Machines) Introduction to work on the shaper, planer, and milling machines prepares the student for advanced operations. (4F, W) (54 taught fall quarter only) **Preator**

56. Machine Practice for Engineers. Acquaints engineering students with basic machine tool operations. (3S) **Child**

57. Precision Control. Theory and practice of precision control of the manufactured product is given in lecture and demonstration. Students learn the use of precision equipment, to read material specifications, and to maintain quality control during the production cycle. Prerequisite: Math. 44 (2W) **Preator**

58. Manufacturing Processes. Teaches the student the fundamentals of such manufacturing processes as foundry work, die casting, forming, molding, welding, broaching, and various assembly methods; shows possibilities and limitations of these processes and their application to fabrication of industrial products. (2S) **Child**

150. Metals and Heat Treatment. Physical properties, composition, constituents, and heat treatment of metals used in industry, including cast iron, wrought iron, plain carbon steel, alloy steels, brasses, bronzes, aluminum alloys and magnesium alloys Prerequisite: Chemistry 10. Three lectures. (3F, S) **Preator**

151. Tooling Operations. Develops for the student an understanding of the capacity and versatile usefulness in production operations of the fundamental machines and equipment used in the manufacturing operations. Prerequisite: T.E. 52 and 53. Two lectures, two labs, (4F, W) **Preator; Child**

152. Tool Planning. Analyzes machining processes and organization of operational sequence. Tool planning procedures and routing for production control. Prerequisite: T.E. 151. Two lectures, two labs. (4W) **Child**

153. Tool Processes. Introduction to tool and gage and die processes. The student studies and makes specialized tools and equipment necessary for the design and construction of projects in the tool and die industry. Required of all major students. Two lectures, two labs. (4S) **Child**

158. Manufacturing Analysis. Economics of tooling operations; the productivity of machines, different tooling methods, fabrication techniques, breakdown of operations, tool maintenance, tool costs, and job estimating. (3S) **Staff**

181, 182. Tool Design. The study and design of such production tools as gages, jigs and fixtures, punches and dies. Includes tool design standards, tolerances, springs, details of jigs, cam layouts, and techniques of preparing tool drawings. Each student designs and constructs a set of tools for production of a specific workpiece. Emphasis on development of creative ability and originality. Prerequisite: C.E. 103. Two lectures, three labs. (5F, 5W)

Preator; Child

183. Plant Layout. Study of the utilization of space, machining, and equipment for economical production in manufacturing operations. Laboratory consists of organizing and planning details for layout of production operations. Two lectures, three labs. (5S)

Preator

184. Seminar. A review of current technical literature dealing with the latest production methods. Oral and written reports presented for discussion. (1W, or S)

Preator

185, 186. Co-operative in Plant Training. A co-operative training course conducted by the college and industry to supplement the student's academic work with plant experience and to qualify him for industrial opportunities. Arranged (6).

Staff

TWO-YEAR CURRICULUM LEADING TO CERTIFICATE OF COMPLETION IN MACHINE TOOL TECHNOLOGY

The two-year terminal curriculum prepares young men who have mechanical interests and abilities to become skilled craftsmen and technicians. Operations performed in the two-year terminal course are the same as those required in industrial shops. Mechanical drawing and blueprint reading are essential in the Machine Tool curriculum. Capable and efficient craftsmen are rarely out of employment in the manufacturing industries.

First Year				Second Year			
Course	F	W	S	Course	F	W	S
English 17, 18, 19	3	3	3	T.E. 54, 151, 162	4	4	4
T.E. 51, 52, 53	4	4	4	E.D. 63, 95	3	3	
Math. 34, 35, 44	3	5	3	T.E. 57, 58		2	2
E.D. 61, 62, 93	3	3	3	Weld. 91, 94	3		3
P.S. 20, Speech 5	3		3	Phys. Sc. 31, 32		5	5
M.S. 1, 2, 3	1	1	1	Physiol. 4	5		
				M.S. or A.S.	1	1	1
	17	16	17		16	15	15

Engineering Experiment Station

J. E. CHRISTIANSEN, Director

By act of the Board of Trustees of the Utah State Agricultural College, December 2, 1918, the Utah State Engineering Experiment Station was established to serve the State in a manner broadly outlined as follows:

(1) To serve those industries and utilities affecting the agricultural and rural populations of the State and to aid public officials and teachers by making engineering investigations of significance and interest to them.

(2) To further the development of methods of processing and use of waste products from agriculture.

(3) To develop methods of processing and making available for use the undeveloped agricultural and industrial raw materials of the State.

(4) To further develop the science of Irrigation and Drainage to the end that the land and water resources of the State may be most fully utilized.

(5) To stimulate a greater use of native materials in rural housing and farm structures.

(6) To develop applications and uses of power equipment and to help solve problems relating to the water supply and sanitation of the farm home.

(7) To develop new tillage, harvesting, and weed control equipment.

(8) To develop new methods and uses of native materials in the construction of farm-to-market roads and highways.

(9) To cooperate with the Federal government in the conducting of investigations along these and other lines of engineering in harmony with the functioning of the Land-Grant College.

(10) To publish and distribute through bulletins, circulars, and technical articles in periodicals the result of such studies, surveys, tests, investigations and researches as will be of greatest benefit and interest to the people of Utah.

The Engineering Experiment Station is an integral part of the School of Engineering and Technology, and the laboratory facilities and shops of the School of Engineering are available for the investigational work of the Station to extent of sums allocated for their operation and support.

The Dean of Engineering is Director of the Station; and the staff consists of members of the teaching staff, School of Engineering and Technology.

DIVISION OF TECHNOLOGY

The Division of Technology includes six departments: Aeronautics, Automotive, Industrial Education, Woodwork and Building Construction, and Welding. Beginning as a Department of Mechanic Arts in 1888, the division has expanded and developed as a result of efforts of the College to provide for the "liberal and practical education of the industrial classes" as outlined in the original charter for Land-Grant Colleges and Universities.

This division offers three major programs:

I. Industrial Technology Program. Present-day industry requires services of engineers, technicians, and skilled craftsmen. The Industrial Technology program is a four-year technical program leading to the degree of Bachelor of Science in Industrial Technology. The training provided combines technical knowledge and manual skills with a broad general college education. This program prepares technicians for technical, supervisory, or managerial positions in modern industry and is an excellent foundation for entrance into industrial Civil Service positions, or for private business. Prescribed curricula under this program are described under the departments in which they are offered.

II. Industrial Education Program. This program, offered by the Department of Industrial Education, gives professional training for teachers, supervisors, and administrators in Industrial Education positions. Courses are offered during the regular school year and the Summer Season. Completion of the under-graduate curriculum leads to the degree of Bachelor of Science in Industrial Education with majors in Industrial Arts Education for junior and senior high school positions, and Trade and Industrial Education for junior college and vocational school positions.

Graduate study leading to the degree of Master of Science in Industrial Education is also offered.

III. Vocational Technical Program. This program prepares skilled technicians for modern industry. Completion of the two-year curricula, listed under the departments in which they are offered, leads to a Certificate of Completion in the specific field. This program is briefer and more specialized than the degree program.

This program is offered in close co-operation with the State Department of Public Instruction, and with industry. Problems of training and placing of students are considered jointly with advisory committees representing the trade. Instruction covers the practices of industry with emphasis on latest methods, modern equipment, and live productive work. The instructors all have years of successful trade experience in their field.

The Vocational Technical Program offers many distinct advantages to students desiring terminal education. Students completing this program are not only well prepared with the skills of their trade to enter modern industry, but they are also prepared, through their association and activities on a college campus, to take their place in society. Students entering industry from

this training program have opportunities for further progress and advancement in industry, as has been demonstrated by many industrial leaders. By returning to this institution for further training, qualified students may apply most of the credit earned under this program toward a degree, and thus better prepare themselves for supervisory and managerial positions.

The Division of Technology, as an integral part of a Land-Grant College of Agriculture and Mechanic Arts, is providing the types of training specified in the Morrill Act of 1862, establishing the Land-Grant Colleges.

Aeronautics

H. A. Buntine, Associate Professor and Head of Department; Lowell P. Summers, Assistant Professor; Louis Klein, Jr., Instructor.

This department offers instruction for thorough training of skilled aircraft engine mechanics and aeronautical technicians.

The Aeronautics Department is a fully certified Air Agency complying with Civil Aeronautics Authority regulations and holds Certificate No. 1175 covering training of combined Airframe and Aircraft Engine mechanics. The curricula, equipment, and instructors have been properly certified in compliance with regulations for the training of Airframe and Aircraft Engine Mechanics.

Satisfactory completion of the two-year curriculum qualifies graduates to apply for both Civil Aeronautics Administration Airframe and Aircraft Engine Mechanic Ratings. This training prepares graduates for both airframe and aircraft engine maintenance, and manufacturing employment. The degree curriculum combines a thorough technical training in aeronautics with a general college education. Training is based upon the objective of scientifically and systematically developing students to a point where they can assume responsible positions in the industry. Students graduating in the four-year curriculum are required to have successfully accomplished the written and practical C.A.A. examinations for Airframe and Aircraft Engine Mechanic ratings.

Facilities include a new building with complete laboratories and modern equipment for instruction in aircraft engines, propellers and accessories, aircraft construction, and maintenance and repair, including hydraulic systems and instruments.

The department is equipped with the latest type aircraft engines and related units necessary for training. Also included are electro-plating, sand-blast, magneto and carburetor testing equipment. Training in the aircraft laboratories is supplemented by courses in the Machine Shop, Sheet Metal, Welding and Woodwork offered by the separate departments.

CURRICULUM

Degree: Bachelor of Science in Industrial Technology

Major: Aeronautics

Freshman

Course	F	W	S
Aero. 5, 6, 7	5	5	5
Aero. II .....	...	...	1
Aero. 55, 56, 57	5	5	5
Math. 34, ¹ 35, 44 or 46 ...	3	5	3
Weld. 92, E.E. 21 .....	...	3	4
T.E. 51	3	...	...
M.S. or A.S.	1	1	1

17 19 19

Sophomore

Course	F	W	S
Aero. 8, 9, 10	5	5	5
Aero. 58, 59, 60	5	5	5
Aero. 12 .....	...	...	1
English 17, 18, 19	3	3	3
E.D. 61, 62, 63	3	3	3
C.E. 2 .....	...	1	...
M.S. or A.S.	1	1	1

17 18 18

¹—Students who have completed high school Algebra B and who make satisfactory grades on the mathematics entrance examination may omit Math. 34 and begin with Math. 35 Fall Quarter.

Junior				Senior			
Course	F	W	S	Course	F	W	S
Aero. 100, 104, 105	3	2	2	Aero. 101, 132, 126	4	3	2
Phys. 17, 18, 19	5	5	5	Aero. 37, 131, 133	3	2	2
Chem. 10, 11	5	5	---	Econ. 125	3	---	---
Aero. 134	---	---	4	B.A. 109, 147, 148	3	3	3
Approved Electives	3	3	5	English 111 or 112	---	---	4
				T.E. 150	---	---	3
				C.E. 176	---	4	---
				Approved Electives	3	3	3
	16	16	16				
					15	15	17

Two-Year Vocational Technical Program
Certificate of Completion in Aircraft and Engine Mechanics

First Year				Second Year			
Course	F	W	S	Course	F	W	S
Aero. 5, 6, 7	5	5	5	Aero. 8, 9, 10	5	5	5
Aero. 55, 56, 57	5	5	5	Aero. 58, 59, 60	5	5	5
Math. 34*	3	---	---	English 17, 18, 19	3	3	3
T.E. 51	3	---	---	E.D. 61, 62	3	---	3
Weld. 92, 93	---	3	3	E.E. 21	---	4	---
M.S. 1, 2, 3	1	1	1	M.S. or A.S.	1	1	1
Ind. Ed. 21	---	---	3				
Approved Electives	---	3	---				
	17	17	17		17	18	17

Courses**

5, 55. Composite Aircraft Structure. (Technical and Shop) 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. (Tech. 5; Shop 5; F) Klein

6, 56. All-Metal Aircraft Structures. (Technical and Shop) 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. Adaptation of stressed skin aircraft construction; study of strength, weight, and use of aluminum alloys, design factors; methods of fabrication; fittings, forgings, and extrusions; monocoque, and semi-monocoque structures; stress analysis; materials and processes. (Tech. 5; Shop 5; W) Klein

7, 57. Aircraft Maintenance. (Technical and Shop) The maintenance, repair, and alteration of modern aircraft and miscellaneous related equipment, including aircraft hydraulics, instruments, 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. (Tech. 5; Shop 5; S) Klein

8, 58. Aircraft Powerplants. (Technical and Shop) Repair, maintenance, and operation of modern air-cooled and liquid-cooled aircraft engines, including design, disassembly and reassembly procedures, special tools and their application, power sections, accessory sections, supercharged sections, cylinder and valve mechanisms, and pertinent Civil Air regulations. Basic related material

*Students who have completed high school Algebra B and who make satisfactory grades on the mathematics entrance examination may omit Math. 34 and begin with Math. 35 in Fall Quarter.

**First number is for Technical or lecture course, second number for Shop or laboratory course.

includes a study of specifications and tolerances, horsepower curves, M.E.P., B.M.E.P., B.H.P., design factors, inspection methods, materials and processes, volumetric efficiency, and compression ratios. (Tech. 5; Shop 5; F) Summers

9, 59. Aircraft Powerplant Accessories. (Technical and Shop) Operation, repair and maintenance of modern aircraft engine accessories, including design, fuel systems, carburetion and carburetors, fuel injection systems, lubricating systems, magnetos, generators and voltage control systems, batteries and starters, and fuel pumps. Application and compliance with pertinent Civil Air regulations. Basic related material includes combustion and combustible mixtures, electricity and magnetism induction systems and superchargers, fuels and lubricants. (Tech. 5; Shop 5; W) Summers

10, 60. Aircraft Powerplant Maintenance. (Technical and Shop) Training in repair and alteration, maintenance, and operation of modern aircraft powerplants, including periodic inspections, maintenance servicing, diagnosis of engine manufacturing; engine installation, test and servicing; installation and maintenance of propellers, hydromatic, constant speed, controllable and wood; use of special tools; engine repair and alteration; time and material costs; and pertinent Civil Air regulation. (Tech. 5; Shop 5; S) Summers

11. Aircraft Mechanic Problems. Relating to C.A.A. regulations and procedures and changes in the industry. Prerequisite: Aero. 7 (1S) Klein

12. Aircraft Engine Mechanic Problems. Relating to C.A.A. regulations and procedures and changes in the industry. Prerequisite: Aero. 10. (1S) Summers

100. Fundamentals of Turbo-Jet Propulsion. History, development and general principles of jet propulsion. Thrust and performance, combustion systems, metallurgy, American, British and foreign gas turbines; aerodynamic problems; application. Prerequisite: 10. (3F) Buntine

101. Flight Engineering. Principles underlying relationships between altitude, power output, airplane performance, and the use of engine power curves, takeoff and climb charts, cruising charts and flight logs. (4F) Summers

104. Advanced Aircraft Design and Construction. Latest methods in design and manufacturing of stressed skin aircraft. Correction of design requirements and manufacture. Pertinent Civil Aeronautics Administration regulations covering design. (3W) Buntine

105. Aircraft Woods and Plastics. Analysis of materials as applied to aircraft. Emphasis on investigation and development of methods involving design criteria, applications of elastic theory, and effects upon structural analysis. (2S) Klein

126. Airline Maintenance and Fixed Base Operations. Administrative problems of airline and airport management; unit organization; personnel problems; relationships with Civil Aeronautics Administration; interline agreements; promotion and publicity. (2W) Buntine

130. Aeronautics Seminar. Current topics in production methods, cost, design, supply and organization of interest to aeronautical technicians. (2S) Buntine

131. Time and Motion Study. Techniques of time and motion study and their inter-relationship. Detailed discussion and practice with process charts, multiple-activity charts, micromotion study. Therblig check list, motion economy and stop-watch time study. Methods of application and personnel problems involved. (2W) Klein

132. Airport Planning. The airport and the community. Present and future aircraft. Airway and airport traffic control. Airport types, fundamental airport requirements. Airfield planning and construction. Lighting. Building and hangar design. Special services. Special problems and miscellaneous facilities. (3S) Buntine

133. **Certificated Repair Station Operation.** Operation of an approved C.A.A. repair station. (2S) Klein

134. **Aircraft Electrical Systems and Equipment.** The more complex electrical systems used in larger aircraft. Three lectures, 2 labs. (4W) Summers

GROUND SCHOOL COURSES

31. **Civil Air Regulations, Radio and Airway Procedures.** Rules and regulations pertaining to operation of aircraft, radio, and airway procedures. Two lectures. (2F, W or S) Summers

32. **General Service and Operation of Aircraft.** Aeronautical Ground School (Primary). Theory of flight, inspection, care and maintenance of aircraft and engines. Two lectures. (2F, W or S) Klein

34. **Navigation.** Maps, charts, and navigational problems. Required by the C.A.A. for any pilot rating above private. (3F, W or S) Buntine

135. **Aeronautical Ground School (Advanced).** Intensive course in aircraft, aircraft engines, propellers, construction, inspection, and general maintenance. Prerequisite: Aero. 32. (3W) Buntine

FLIGHT COURSES

Students interested in flight courses should take Physics 16, Introductory Meteorology, which is required by C.A.A. for pilot rating above Private Pilot Certificate.

37. **Private Pilot Certificate.** Flight school Primary. Flight training to meet C.A.A. requirements. Satisfactory completion of C.A.A. tests required for satisfactory completion. Prerequisites: Aero 31 and 32. (3F, W or S) Staff

137. **Commercial Pilot Certificate.** Flight training to meet C.A.A. requirements. Satisfactory completion of C.A.A. tests required for certification. Prerequisites: Aero 31, 32, 33, 34, or Private Pilot Certificate and Aero 33, 34. (10F, W or S) Staff

138. **Flight Instructor Certificate.** Flight School (advanced). Flight training to meet C.A.A. requirements. Satisfactory completion of C.A.A. tests required for certificate. Prerequisite: Aero 137. (2F, W or S) Staff

Automotive Technology

Owen Slaugh, Assistant Professor and Head of Department; Vern R. Beecher and Lynn R. Willey, Assistant Professors; Clyde Hurst and Ivan E. Lee, Instructors.

This department offers a Bachelor of Science Degree in Industrial Technology with majors in Automotive Technology, Auto Body Reconditioning, or Diesel Technology. It also provides general service courses for students in other departments who desire to become familiar with various phases of automobile education. In cooperation with the Industrial Education Department courses are offered in Driver Educational Teacher Training.

Training facilities include a new 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.

A major in Automotive, Diesel, or Auto Body Technology prepares a student to be a technician who can better interpret the designs of the engineers and direct the work of repairmen. This major also prepares students to become shop foremen, shop superintendents, and with special preparation, school instructors. Excellent background is provided for entrance into civil service, private business, and managerial positions with large companies.

Students desiring to more thoroughly prepare themselves for advanced or graduate study in automotive or related engineering, may do so by registering for mathematics and engineering courses as electives during their junior and senior years.

CURRICULUM

Degree: Bachelor of Science in Industrial Technology

Major: Automotive Technology

Freshman

Course	F	W	S
Auto 1, 2, 3	6	6	6
Math. 34*, 35, 44	3	5	3
English 17, 18, 19	3	3	3
E.D. 61, 62, 93	3	3	3
C.E. 65	---	---	1
M.S. or A.S.	1	1	1
	16	18	17

Sophomore

Course	F	W	S
Auto 4, 5, 6	6	6	6
Physics 17, 18, 19	5	5	5
Weld. 91, 94	3	3	---
T.E. 51	---	3	---
E.E. 21	4	---	---
Auto 54	---	---	3
M.S. or A.S.	1	1	1
	19	18	15

Junior

Course	F	W	S
Auto. 101, 102, 103	3	3	3
Auto. 61, 162	3	---	3
Econ. 51	5	---	---
Chem. 10, 11	5	5	---
Weld. 190	---	3	---
C.E. 176	---	4	---
English 112	---	---	4
I.E. 120 or Psy. 155	---	---	3
Electives or M.S.	3	3	3
	19	18	16

Senior

Course	F	W	S
Auto. 151, 152, 154	3	3	3
P.H. 155	---	3	---
Econ. 125	3	---	---
Aero. 131	---	2	---
I.E. 113	---	---	3
B.A. 109, 147, 148	3	3	3
T.E. 150	---	---	3
A.E. 82	---	2	---
Chem. 125	5	---	---
Electives or M.S.	3	3	3
	17	16	15

Diesel Technology Major

Substitute Auto 21, 22, 23, 122, and 123 for Auto 1, 2, 3, 102, and 103.

Auto Body Reconditioning Major

Substitute Auto 52, 53, for Auto 2; Auto 12, 13, and 16 for Auto 4, 5, and 6; E.D. 63 for C.E. 176; and Auto 113 for Auto 102. Interchange E.D. 62 and 93 with Weld. 91 and 94. Complete E.D. 63 before taking E.D. 93.

Two-Year Vocational Technical Program

Certificate of completion in Automotive Repair, Diesel and H. D. Mechanics, and Auto Body Reconditioning will be granted, upon application and payment of diploma fee, to students completing the Freshman and Sophomore years of the respective curricula.

Service Courses

Courses open to any students: Auto 51, 52, 53, 54, 61, 62 and 162.

Courses

1. Steering Correction. (Technical and Shop) Construction, operation, and repair of all parts of the automobile chassis. Units studied are axles, wheels, control linkage, wheel suspension, steering gears, wheel alignment, and hydraulic brakes. Modern methods of repair. (6F) Lee

2. Automotive Engines. (Technical and Shop) Construction, operation, and repair of the modern automobile engine, including cylinder blocks, piston assemblies, crankshaft assemblies, valve assemblies, cooling and lubricating systems. Modern methods of repair. (6W) Lee

*Students who have completed high school Algebra B and who make satisfactory grades on the mathematics entrance examination may omit Math. 34 and begin with Math. 35 in Fall Quarter.

3. **Driving Mechanisms.** (Technical and Shop) Construction, operation, and repair of clutches, transmissions, overdrives, universal joints, drive shafts, differentials and rear axles. Modern methods of repair. (6S) Beecher; Lee

4. **Fuel Systems.** (Technical and Shop.) Construction, operation, and repair of gasoline tanks, fuel systems, carburetors, manifolds, controls and such special devices as superchargers, governors, and auto diesel engine fuel systems. Modern methods of repair. (6F) Slaugh

5. **Auto Electrics.** (Technical and Shop) Construction, operation, and repair of electric systems used on modern automotive equipment, including the battery, lighting system, ignition systems starting and generating systems. Modern methods of repair. (6W) Beecher

6. **Motor Tune-up.** (Technical and Shop.) Correlates the work covered on engines, carburetion and electrics. Tests for troubles are made with modern tune-up equipment; these troubles remedied by trade-accepted methods. Prerequisites: Auto 2, 4, 5. (6S) Slaugh; Beecher

12. **Fender Reconditioning.** (Technical and Shop.) Roughing out, shrinking, leading, buffing, sanding, and metal finishing of fenders. General use of the spray gun in applying primer surfaces. (6F) Willey

13. **Body Reconditioning.** (Technical and Shop.) Construction and repair of automobile bodies. Units include checking and alignment of automobile bodies and repair and replacement of damaged body panels such as the dash, cowl, trunk, rocker, floor, side, top and door panels. Prerequisite: Auto 12. (6W) Willey

16. **Automotive Refinishing.** (Technical and Shop.) Preparation of body metal and application of lacquer and synthetic enamels, including metal preparation, and repair of automotive diesel and heavy-duty chassis. Units covered aration, priming, surfacing, and application of color. Practice in spotting, stripping, and graining. (6S) Willey

21. **Heavy Duty Chassis.** (Technical and Shop.) Construction, operation, and repair of automotive diesel and heavy-duty chassis. Units covered are heavy duty axles, wheels, control linkage, wheel suspensions, steering gears, wheel alignment, frame straightening, and brakes. (6F) Hurst

22. **Automotive Diesel Engines.** (Technical and Shop.) Construction, operation, and repair of automotive diesel engines, including two-stroke cycle and four-stroke automotive, truck and tractor engines and their accessories. (6W) Hurst

23. **Heavy-Duty Drives.** (Technical and Shop.) Construction, operation, and maintenance of driving mechanisms powered by automotive diesel and other heavy duty engines. (6S) Hurst

51. **Automobile Chassis.** Principles and practice in construction, operation, and servicing of the modern automobile chassis. Units of the course include axle, wheel suspension, steering gears, frames, springs, universals, drive shafts and brakes. Open to any college student. Two lectures, two 2-hr. labs. (3F) Lee

52. **Automobile and Farm Power Plants.** Principles and practice in construction, operation and servicing of the modern automobile and farm power plants. Units of the course include cylinder block assemblies, piston assemblies, piston assemblies, crankshaft, assemblies, valve assemblies, clutches, transmission, overdrive, fuel, cooling and lubrication systems. Two stroke, four stroke and diesel cycles considered. Open to any college student. Two lectures, two 2-hr. labs. (3F, W, S) Lee

53. **Automobile and Farm Engine Electricity.** Principles and practice in the construction, operation, and servicing of electrical systems used on modern automobiles and farm engines. Units studied include starting, generating, lighting, ignition, and special accessory systems. Open to any college student. Two lectures, two 2-hr. labs. (3S) Slaugh

54. Service Techniques. Theory and practice in service station and shop management records. Professional ethics. Selling and installing automobile accessories. Minor repairs and lubrication. (3W, S) Lee

61. Body and Fender Repair. Principles and practice in fundamentals of fender and body repairing, including work in metal finishing, light welding, door and body alignment. Open to any college student. Two lectures, two 2-hr. labs. (3F,S) Willey

62. Upholstering. Principles and practice in repair of modern upholstery. Rebuilding and recovering of automobile upholstery and home furniture. A practical course in upholstery repair. Open to any college student. Two lectures, two 2-hr. labs. (3S) Willey

101. Frame, Suspension and Steering Systems. (Technical and Shop.) Geometry and design factors of the various types of steering units including power steering, differential and brake steering, wheel balancing, frame alignment, and power brakes are studied in relationship to steering facility. Prerequisite: Auto 1, Math. 34, 44. (3W) Hurst

102. Internal Combustion Engines. (Technical and Shop.) Design and operational characteristics of different engine types. Attention is given such items as combustion chamber design, precision cylinder and bearing boring, engine balancing, valve actuating mechanisms, determination of bearing loads, inertia and centrifugal forces and production of engine parts. Prerequisite: Auto 2, Math. 35, 44. (3W) Lee

103. Automatic Transmission. (Technical and Shop.) Development of fluid couplings, torque converters, transmissions, electric clutches, and hydraulic valve control systems. Tests and trouble diagnosis procedures emphasized. Prerequisite: Auto 3. (3W) Beecher

113. Body Mechanisms. (Technical and Shop.) Modern mechanical, electrical, and hydraulic body regulating devices, windshield wipers, body wiring, heaters, and lights. Includes radio replacement. Prerequisite: Auto 13. (3W) Willey

122. Fuel Injection Systems. (Technical and Shop.) Design, operation, and servicing of diesel and gasoline injection systems. Includes air and solid types injection. Turbulence requirements of induction are considered. Prerequisite: Auto 22, Physics 19. (3W) Hurst

123. Hydraulic Drives and Special Differentials: A study of history and development of hydraulic clutches and transmissions used on trucks and buses. Consideration is given to unique gear designs, strength tests of materials, torque arms, radius rods, angular drives, and the evolution of differential gear design. (3S) Hurst

151. Carburetion. Technical training in fuels and combustion processes related to internal combustion engines. Emphasis is given to cycle analysis and associated carburetor problems affecting combustion. Prerequisite: Auto 52 or equivalent. Two lectures, one 3-hr. lab. (3F) Slaugh

152. Motors, Generators, and Magnetos. Technical training in construction and operation of electrical testing equipment used with the major electrical units of the automobile. Emphasis is given in industrial testing procedures and practices. Principles and practices in construction, operation, and repair of magnetos. Prerequisite: Auto 53 or equivalent. Two lectures, one 3-hr. lab. (3W) Beecher

154. Seminar and Special Problems. A systematic review of the automotive field with discussions and reports on recent developments. Lab. analysis of special problems encountered in automotive work. Prerequisites: Auto 151 and 152. Two lectures, two 2-hr. labs. (3S) Slaugh

162. Metal Refinishing. Principles and practice in preparing metal for refinishing. Fundamental procedures in priming, surfacing, and applying lacquer, enamel, and other special finishes. Two lectures, two 2-hr. labs. (3F, 3W) Willey

Industrial Education

William E. Mortimer, Professor and Head of Department; C. D. McBride, Charles W. Hailes, Vern R. Beecher, Assistant Professors.

This department offers professional training for teachers, supervisors, and administrative staff in Industrial Education. It also offers training for management positions in industry. Students who complete their undergraduate courses receive a Bachelor of Science degree in Industrial Education with a major in Industrial Arts Education, Trade and Industrial Education, or Industrial Management.

The Master of Science degree in Industrial Education is offered with majors in Industrial Arts Education or Trade and Industrial Education or Industrial Management. The following courses in the 100 series may be used for graduate credit by majors in Industrial Education and by majors in closely related departments: I.E. 102, 104, 107, 110, 111, 120, 121, 123, 124, 145, 154, and 167. Courses in the 200 series are intended strictly for graduate work. Registration in these courses requires approval of the major professor and the instructor concerned.

INDUSTRIAL ARTS

The curriculum in Industrial Arts is designed to meet state certification requirements for the General Secondary and Class A Industrial Arts certificates, and is comprised of courses in Arts and Science, Education, Industrial Arts Technical and Professional, and basic shop skills. The catalog description of each course in the curriculum is printed in the description of courses for each department offering the various courses.

CURRICULUM

Degree: Bachelor of Science in Industrial Education
Major: Industrial Arts Education

Freshman				Sophomore			
Course	F	W	S	Course	F	W	S
English 17, 18, 19	3	3	3	Econ. 51		5	
Math. 34*, 35, 44	3	3	3	Physics 31, 32, 33	3	3	3
E.D. 61, 62	3	3		Bot. 1, Physiology 4		5	5
W.W. 61, 62, 63	3	3	3	T.E. 51	4		
Art 1, 2	3	3		Psychology 53	5		
Soc. 70			5	I.E. 40	2		
W.W. 70			3	Speech 5, Art 2		3	3
M.S., or A.S., or P.E.	1	1	1	E.E. 21			4
				M.S., A.S., or P.E.	1	1	1
	16	18	18		15	17	16
Junior				Senior			
Course	F	W	S	Course	F	W	S
Psy. 102	5	---	---	I.E. 107, 112	3	8	---
Public Health 155	---	---	3	I.E. 129, 121, 123	3	3	6
I.E. 141	---	---	3	I.E. 145, 102	3	---	3
I.E. 142, 143	3	---	2	I.E. 110	---	3	---
I.E. 144, Art 114	2	---	3	E.D. 120	3	---	---
Educ. 113	---	3	---	Approved Electives			
Educ. 114, A.E. 184	---	3	2	or M.S.	4	3	7
Wel. 96	---	3	---				
Approved Electives							
or M.S.	6	7	3				
	16	16	16		16	17	16

*Students who have completed high school Algebra B and who make satisfactory grades on the mathematics entrance examination may omit Math. 34 and begin with Math. 35 in Fall Quarter.

TRADE AND INDUSTRIAL EDUCATION

Designed primarily for instructors and supervisors in Vocational Technical Education and/or Vocational Industrial programs. A candidate for the degree of Bachelor of Science in Industrial Education must show evidence of successful trade and teaching experience, together with the general education requirements necessary for state certification in his 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 the department heads concerned.

CURRICULUM

Degree: Bachelor of Science in Industrial Education

Major: Trade and Industrial Education

		Credits
A. Trade Training		30-60
Individuals who have trade experience or other qualifying training may secure a maximum of 18 credits by special examination.		
	Total Required	30-60
B. English Composition		
English 17, 18, 19, or English 10 and 110		9
	Total Required	9
C. General Group requirements		
Biological Science		
Botany 1 or Zoology 1	5	
Physiology 4	5	10
Exact Science		
Math. 34	3	
Physics 3 and Chemistry 1, or Physics 31, 32, 33	9	12
Language and Arts		
Speech 1	5	
Choice of Art 1, Art 3, Music 1, L.A. 3, or any lower division literature course	3	8
Social Science		
Economics 51	5	
Psychology 53	5	10
	Total Required	40
D. Courses for Major		
Industrial Education 102, 107, 129, 110, 112, 118, 120, 121....	29	
Education 113	3	
Psychology 102	5	
English 111	4	
Economics 125	3	
Woodwork 6	3	
	Total Required	47
E. Advanced Trade and Technical Education		26
Consists usually of upper division trade and technical courses, drafting, or other work closely related to the selected trade.		
F. Recommended Electives, including Sociology 70		36
G. Military Science & Tactics or Physical Education		6
Total Required for A, B, C, D, E, F, G		192
If a high school teaching certificate is desired, Education 114 and Public Health 155 must be included among the electives.		

Industrial Management

The degree program in Industrial Management provides courses in executive development for people who desire to prepare for supervisory and executive work in industry, and who have a foundation of training in one or more departments of technology or engineering.

In addition to completing the required curriculum in college it is recommended that the student have at least thirty weeks of practical work experience in industry. This is made possible during the summer through a cooperative arrangement with industrial organizations in the region.

CURRICULUM

Degree: Bachelor of Science in Industrial Education
Major: Industrial Management

Freshman				
Course	F	W	S	
English 17, 18, 19	3	3	3	
Math. 34, 35	3	5		
Economics 51	5			
Psychology 53		5		
Political Science 1			5	
Sociology 70			5	
Approved electives	3	3	3	
M.S., A.S., or P.E.	1	1	1	
	15	17	17	

Work experience in Industry, 10 wks.

Sophomore				
Course	F	W	S	
Chemistry 31, 32, 33	3	3	3	
Soc. 40, Physiology 4	3	5		
Pol. Science 11, 12, 13	3	3	3	
E.D. 59, T.E. 58	3		2	
Botany 1, I.E. 21		5	3	
Approved electives	3		3	
M.S., A.S., or P.E.	1	1	1	
	16	17	15	

Work experience in Industry, 10 wks.

Junior				
Course	F	W	S	
I.E. 104, 102, 120	3	3	3	
I.E. 121		3		
Psychol. 155, 161, 127	3	3	3	
Econ. 125, 126, 127	3	3	3	
B.A. 1, 2	5		5	
Electives or M.S.	3	3	3	
	17	15	17	

Work experience in Industry, 10 wks.

Senior				
Course	F	W	S	
I.E. 117, 118, 119	3	3	3	
I.E. 264	3			
B.A. 133, 134, 135	3	3	3	
Psychology 121			3	
Econ. 180, 150		2	3	
Electives or M.S.	7	9	3	
	16	17	15	

Courses

13. Driver Training. For persons who desire to learn to drive an automobile correctly and safely. Traffic rules and regulations essential to sound driving; physical qualifications and tests of drivers; general mechanics, operation, and servicing of automobile; highway safety engineering; and actual supervised training in dual-control cars. Two lectures, lab arranged. (2F, W, S) Beecher

21. Industrial and Labor Relations. The nature and problems of the employee class today; and nature and problems of industry and management in America; the principles, objectives and processes of collective bargaining; government policies; and the economics of income and security. An orientation course for students preparing for industry and business. Three lectures. (3F, S) McBride

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

40. Sheet Metal. Fundamental operations and tool processes of sheet metal-work. Articles are made from black iron, galvanized iron, and bright tin that give practice in pattern developing, cutting, soldering, seaming, riveting, and wiring. Two 3-hour labs. (2F) **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. Prerequisites: I.E. 107 and 129. Three lectures. (3W) **Mortimer**

104, 204. Occupational Analysis. Principles and practice in analyzing occupations in order to determine teaching content. Students complete an analysis of one unit for a trade or occupation. Three lectures. (3 Arr.) **Staff**

107. Principles and Objectives of Industrial Education. Philosophy and purposes of Industrial Education. Students study and compare general principles and objectives of Industrial Arts Education and Trade and Industrial Education with those of other educational programs. Three lectures. (3F) **Mortimer**

110. Shop Organization and Management. Teaches students to organize and manage an Industrial Education shop of the unit, general, or multiple activity type. Each student prepares, 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. Prerequisites: I.E. 107, 129. Three lectures. (3W) **Hailes**

111. The General Shop. Comprehensive study of the types of "General Shop," its advantages and applications; content and organization of subject matter; methods of teaching and shop plans. General shop projects, shop plans and new trends in content and equipment are given special consideration. Prerequisite: I.E. 107. Three lectures. (3 Arr.) **Hailes**

112. Observation and Directed Teaching. Students observe and teach in Industrial Arts shops throughout the state. Each student, under close supervision, does practice teaching in various Industrial Arts courses recommended by the state in junior and senior high schools. (8W) **Mortimer; 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 road. Supervised practice is arranged for each student. (3F, W or S) **Beecher**

117. Foremanship and Supervision. A comprehensive study of the place and functions of the foreman or supervisor in industry and business. Emphasizes foremanship as an important part of management. Provides the practical information a foreman or supervisor needs in his work. Prerequisite: I.E. 120. Three lectures. (3F) **McBride**

118. Industrial Safety Education. A practical course for technical workers, supervisors, and foremen in fundamentals of plant planning and operation for accident prevention. Special consideration is given to planning safety programs to meet needs of particular situations as they are experienced by the members of the class. Three lectures. (3W) **McBride**

119. Job Evaluation and Wage Incentives. The place of job evaluation and wage incentives and their use in successful management. How to set up these techniques and put them into operation. A practical course for both students and employed personnel for direct application in all levels of management. Prerequisites: I.E. 120 and 117. Three lectures. (3S) **McBride**

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. Three lectures. (3F or S) **McBride**

121. Methods in Industrial Education. Latest techniques of teaching applied to individual and group instruction in Industrial Education. Each student has opportunity to use these different methods in presenting lessons before the class. Prerequisites: I.E. 107, 129. Three lectures. (3W) **Mortimer**

123. Curriculum Problems in Industrial Arts. To teach prospective junior high school Industrial Arts instructors the application of skills and knowledge acquired in basic shop courses. Each student constructs projects suited to the work recommended by the State Department of Education. He prepares lesson plans and teaching aids that supplement and aid teachers in carrying out the program. Prerequisites: I.E. 129 and basic shop courses in Wood, Drawing, Metal, Electricity, and Crafts. Three lectures, five 2-hours labs. (6S)

Mortimer; Hailes

124. 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. Three lectures. (3 Arr.)

Mortimer

129. Organization and Development of Instructional Materials. Selection and arrangement of teaching materials to be used in industrial arts and trade and industrial shop work. Three lectures. (3F)

Mortimer

141. Art Metalwork. Laboratory work in embossing, sinking, engraving, etching, and metal spinning operations. Work is done in copper, brass, and aluminum on projects designed for utility and artistic merit. Prerequisites: Art 2, Machine Tool Technology. Three 3-hour labs. (3S)

Hailes

142. Plastics. Acquaints students with the new and important group of plastic materials now produced and the fundamental operations used in working these materials. Students complete projects in hand and machine work. Special emphasis is given to the place of plastics in modern industrial arts programs. Three 3-hour labs. (3F)

Hailes

143. Recreational Crafts. Especially for students majoring in recreational leadership. Consists of: (1) planning and organizing craft work as part of community recreational programs, (2) laboratory work in crafts, such as wood, leather, plastics, metals, and others. Two 3-hour labs. (2S)

Hailes

144. Foundry Principles and Practices. Principles and practices of basic foundry work. Castings will be made using common non-ferrous metals, such as aluminum, copper, brass, and bronze. Two 3-hour labs. (2F)

Hailes

145. Industrial Arts Applied Electricity. Provides the prospective teacher with an understanding of how the basic principles and applications of electricity in the home and in industry should be prepared for the industrial arts program of secondary schools. Prerequisite: E.E. 21. One lecture, two 3-hour labs. (3F)

Mortimer

167. Special Problems in Industrial Education. For qualified students majoring in Industrial Education who wish to do specialized work not covered by other courses. Time and credit arranged.

Staff

207. Philosophy of Vocational Education and the Practical Arts. Designed to enrich and expand the student's 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. Three lectures. (3 Arr.)

Staff

209. Course of Study Building in Industrial Education. Teaches students to prepare and use a course of study consisting of the outline, analysis, progress charts, lesson plans, instruction sheets, reference, tests, and instructional schedule. Each student completes this work for one unit of instruction. Prerequisite: I.E. 107. Three lectures. (3 Arr.)

Mortimer

251. Administration and Supervision of Industrial Education. The laws, regulations, and policies affecting Industrial Education programs; organization, supervision, and management necessary for successful operation of these programs. Three lectures. (3 Arr.)

Staff

254. Measurement in Industrial Education. Construction and use of the various types of tests and rating scales used in industrial education. Emphasis is placed upon 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 are covered. Prerequisite: Psychology 102. Three lectures. (3 Arr.)

Mortimer

255. Techniques in Writing Instruction Sheets. Principles underlying development of instruction sheets for use in industrial arts and trade and industrial education programs. Prerequisite: I.E. 129. Three lectures. (3 Arr.)

Staff

259. Planning and Equipping School Shops. Principles and practice in planning and equipping modern industrial arts laboratories and trade and industrial shops. For administrators, supervisors, directors, architects, and others interested in planning new or remodeling existing facilities. Students study basic plans of laboratory or shop design and arrangements of equipment, and apply these principles to solution of their particular problems. Prerequisite: I.E. 110. Two lectures. (Arr.)

Staff

261. Part-time Education. Content, methods, and special devices to be used in part-time education programs. Emphasis upon pertinent problems and their solutions. Workshop or lecture. (3 Arr.)

Staff

263. Evening School Programs. Development, organization, and improvement of evening school programs in Industrial Education. Workshop or lecture. (3 Arr.)

Staff

264. Conference Leading. Principles and practice in conference leading applied to methods used in industry. Emphasis given to preparation, use and evaluation of this method as it affects industrial education programs. Workshop or lecture. (3 Arr.)

Staff

265. Apprenticeship. Development, organization, and improvement of apprentice training programs for industry. Workshop or lecture. (3 Arr.)

Staff

266. Related Instruction. Content, methods, and special devices used in teaching related subjects in vocational programs. Emphasis on pertinent problems and their solutions. Workshop or lecture. (3 Arr.)

Staff

267. Reading and Conference. Provides for study in advanced and specialized problems in Industrial Education. Problems are selected with approval of the department head; investigation is carried on under direction of the major professor. (Arr.)

Mortimer

270. Seminar in Industrial Education. Gives opportunity for investigation and reporting of individual problems. (1-2 Arr.)

Mortimer

271. Research and Thesis Writing. Provides for individual work in thesis writing in industrial education. The thesis is written in accordance with standard thesis requirements and under the direction of the major professor. (Arr.)

Mortimer

290, 291, 292. Advanced Studies Under Plan "B." Special library and seminar problems or studies designed to meet requirements for reports under plan "B." (2-3 Arr.)

Mortimer

Welding

A. B. Kemp, Head of Department and Instructor; Ross W. Eskelson, Instructor.

Modern manufacturing methods of today require the services of the welding engineer, technician, and skilled craftsman.

The Welding Department is so set up as to give progressive instruction in welding to supply the demands of industry with four-year curricula leading to degrees in Welding Engineering and in Industrial Technology, and a two-year curriculum leading to a Certificate of Completion.

Trained men in all three fields are in great demand by all manufacturers of metal products. Service courses are offered to all on the campus who wish to explore this field of science.

WELDING ENGINEERING CURRICULUM

Degree: Bachelor of Science in Welding Engineering

Freshman				Sophomore			
Course	F	W	S	Course	F	W	S
C.E. 1, 2, 65	1	1	1	Math. 97, 98, 99	5	5	5
Math. 34, 35, 46	3	5	5	Physics 20, 21, 22	5	5	5
Engl. 17, 18, 19	3	3	3	Weld. 91, 92, 94	3	3	3
Chem. 10, 11	5	5	....	C.E. 84	4	....	....
Weld. 96 .....	....	....	3	Econ. 51 .....	....	....	5
E.D. 61, 62, 63	3	3	3	Speech 5 .....	....	3	....
M.S. or A.S.	1	1	1	M.S. or A.S.	1	1	1
<hr/>				<hr/>			
	16	18	16		18	17	19

Junior				Senior			
Course	F	W	S	Course	F	W	S
Weld. 153, 154, 155	3	3	3	Weld. 161, 162, 163	3	3	3
C.E. 196, 141, 144	4	4	3	C.E. 105, 190, 192	6	3	3
C.E. 101, 102, 103	4	4	4	C.E. 111, 112, 130	4	3	3
T.E. 150	3	....	....	Weld. 193 .....	....	....	2
E.E. 104, 105 .....	....	4	4	C.E. 109, 110 .....	....	1	1
Electives or M.S.	3	3	3	I.E. 118 .....	....	....	3
<hr/>				Engl. 111 or 112 .....	....	4	....
	17	18	17	Electives or M.S.	3	3	3
	<hr/>				<hr/>		
					16	17	18

WELDING TECHNOLOGY CURRICULUM

Degree: Bachelor of Science in Industrial Technology

Major: Welding Technology

Freshman				Sophomore			
Course	F	W	S	Course	F	W	S
Weld. 41, 42, 43	5	5	5	Weld. 44, 45, 46	5	5	5
Engl. 17, 18, 19	3	3	3	Econ. 51	3	....	....
E.D. 61, 62	3	3	....	Physics 17, 18, 19	5	5	5
Math. 34, 35, 44	3	5	3	Speech 5 .....	....	3	....
Psy. 80 .....	....	....	3	Sociology 70 .....	....	....	5
A.E. 82	2	....	....	S.S. 65, 30, 86	3	3	1
T.E. 51 .....	....	....	3	M.S. or A.S.	1	1	1
M.S. or A.S.	1	1	1	<hr/>			
<hr/>					17	17	17
	17	17	18		<hr/>		

Junior				Senior			
Course	F	W	S	Course	F	W	S
Weld. 153, 154, 155	3	3	3	Weld. 161, 162, 163	3	3	3
T.E. 52, Physio. 4, .....	....	....	....	Weld. 193 .....	....	....	2
T.E. 58	5	5	2	C.E. 130, 190, 192	3	3	3
Chem. 10, 11	5	5	....	B.A. 109, 147, 148	3	3	3
Zool. 1 .....	....	....	5	I.E. 117, 118, 119	3	3	3
Eng. 111 .....	....	....	4	Econ. 125, 126	3	3	....
I.E. 120 .....	....	3	....	Electives or M.S.	3	3	3
Electives or M.S.	3	1	3	<hr/>			
<hr/>					18	18	17
	16	17	17		<hr/>		

Two-Year Vocational Technical Program**Certificate of Completion of Welding**

First Year				Second Year			
Course	F	W	S	Course	F	W	S
Weld. 41, 42, 43	5	5	5	Weld. 44, 45, 46	5	5	5
English 17, 18, 19	3	3	3	Physics 31, 32, 33	3	3	3
W.W. 6 or Math. 34	3	...	...	I.E. 21 .....	...	...	3
E.D. 61, 62	3	3	...	T.E. 51 .....	...	4	...
A.E. 83 .....	...	...	3	I.E. 40	2	...	...
M.S. or A.S. 1, 2, 3	1	1	1	Auto. 52	3	...	...
Electives	2	5	5	M.S. or A.S.	1	1	1
				Electives	3	3	3
	17	17	17		17	16	15

Courses

In all of the following courses, various techniques and welding 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. Acetylene welding of ferrous and non-ferrous metals as used by industry. (5F, 5W, 5S) **Eskelson**

44, 45, 46. Electric Welding. Electric welding as used in industry. (5F, 5W, 5S) **Kemp**

91. Acetylene Welding. Principles and practice in fundamentals of oxy-acetylene welding and cutting. A general service course open to all college students. Two lectures, two 2-hour labs. (3F, 3W, 3S) **Eskelson**

92, 93. Aero Welding. Principles and practices in fundamentals of aircraft welding. Prepares for C.A.A. tests. (3W, 3S) **Eskelson**

94. Electric Welding. Principles and practices in use of the latest types of electric-arc welding equipment. Safety measures and methods used in arc-welding of steels. Two lectures, two 2-hour labs. (3F, 3W, 3S) **Kemp**

96. Engineers' Welding. Exploration in modern welding. Students receive basic instruction and practice in use of oxy-acetylene welding and cutting, electric-arc welding, and spot welding equipment. (3S) **Kemp; Eskelson**

153, 154, 155. Advanced Acetylene Welding. Hard surfacing, special brazing problems, pipe welding, and other problems. Qualifies for code, tests. Prerequisite: Weld 43 or 92. (3F, 3W, 3S) **Eskelson**

161, 162, 163. Advanced Electric Welding. Special problems in arc-welding and qualifies students for code test. Prerequisite: Weld. 46. (3F, 3W, 3S) **Kemp**

190. Advanced Acetylene Welding. Vertical and overhead steel welding. Special problems. Prerequisite: Weld. 91. (3F, 3W, 3S) **Eskelson**

191. Advanced Electric Welding. Vertical and overhead arc-welding. Special problems. Prerequisite: Weld. 94. (3F, 3W, 3S) **Kemp**

193. Welding Seminar. Current topics in production methods, cost, design, and manufacture of welded products used in modern industry. (2S) **Kemp**

Woodwork and Building Construction

*Joseph Coulam, Professor and Head of Department; Charles N. Merkley, Associate Professor; Dan H. Swenson, Assistant Professor; Ross A. Nyman, Lynn A. Thompson, Instructors.

D. A. Swenson, Professor Emeritus.

*On Leave.

This department offers courses in joinery and millwork, building construction, estimating and contracting, pattern making, wood turning, wood finishing, home mechanics, and cabinet work. It offers a curriculum leading to the degree of Bachelor of Science in Industrial Technology with a major in Building Construction. It provides general courses that may be used toward satisfying the curriculum in Industrial Arts.

CURRICULUM

Degree: Bachelor of Science in Industrial Technology
Major: Building Construction

Freshman				Sophomore			
Course	F	W	S	Course	F	W	S
W.W. 61, 62, 63	3	3	3	W.W. 64, 65, 66	3	3	3
English 17, 18, 19	3	3	3	W.W. 72, 68, 60	2	3	2
En. Dr. 61, 62, 93	3	3	3	Chemistry 10, 11	5	5	
Math. 34, 35, 44	3	5	3	E.E. 21	4		
Art 3, 26	3	3		En. Dr. 94, 63		3	3
Speech 5			3	Econ. 51			5
M.S. or A.S.	1	1	1	Electives	3	3	3
	16	18	16	M.S. or A.S.	1	1	1
					18	18	17
Junior				Senior			
Course	F	W	S	Course	F	W	S
W.W. 161, 162, 163	3	3	3	W.W. 171, 172, 173	3	3	3
W.W. 73, 70		3	3	C.E. 130, 190, 192	3	3	3
B.A. 109, 147, 148	3	3	3	Econ. 125	3		
Physics 17, 18, 19	5	5	5	English 111 or 112	4		
C.E. 84	4			History 14 or 135		5	
Electives or M.S.	3	3	3	Forestry 130			4
	18	17	17	Zoology 111			4
				Electives or M.S.	3	6	3
					16	17	17

Two-Year Vocational Technical Program Certificate of Completion in Carpentry

Certificate of Completion in Carpentry will be granted, upon application and payment of diploma fee, to students completing the Freshman and Sophomore years of the curricula. Some substitutions of specific courses will be allowed with the approval of the Department Head and Dean.

Courses

6. Shop Problems. Simple mathematical formulas are used in solving problems in mechanical work. These include speed ratios, steel square, micrometer reading, and area and volume problems. Prerequisite: High school algebra and geometry. Three lectures. (3F or W) Coulam; Nyman

60. Elements of Plumbing. Includes specifications, codes, layouts, installations, inspections, cutting and fitting pipe, and repairs. One lecture, one lab. (2S) Merkley

61, 62, 63. Joinery and Millwork. Basic training for students preparing to enter the woodworking trades, and those who wish a general knowledge of woodwork. Includes study of proper use, care and sharpening of hand tools, machine processes, safety measures, machine operation, care and repair of machines, and sharpening of machine cutters. Assigned reading and applica-

tion of mathematics to woodwork problems. Projects in bench work and wood turning to give practice in fundamentals of wood construction. Three labs. (3F, 3W, 3S) Swenson; Nyman

64, 65, 66. Building Construction. Laying out and constructing buildings, stressing carpenter work. Includes concrete forming, framing, roof framing, roofing, scaffolding, siding, exterior and interior trim, window and door work. Special attention is given to trade construction methods. Prerequisite: W.W. 63. Three labs. (3F, 3W, 3S) Merkley

68. House Wiring. For students in building construction courses. 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) Thomson

70. Wood Finishing. Fine wood finishing such as natural finished, French polishing, hand polishing, stains, paints, enamels, gun work, interior and exterior wood finishes, plaster paints, brick stains, and stucco paints. Students are required to practice in each type of finishing. One lecture, two labs. (3F, W, or S) Staff

72. Concrete and Clay Products. Composition of concrete for various purposes. Composition of bricks and tile; their strength and thermal conductivity. Projects are built in the laboratory during the course. One lecture, one lab. (2F) Merkley

73. Materials of Industry. Wood and wood products, commercial veneered panels, roof coverings, wall boards, insulating materials, siding, composition panelings, glass products and other non-metal materials used in building trades. Three lectures. (3W) Merkley; Mortimer

74. Home Service Course. Upkeep and general repairs in the home, such as frequently are needed on electrical, plumbing, and other home equipment. Woodwork repairs and furniture refinishing as well as fitting of window blinds and screens, calcimining, and wallpaper cleaning receive attention. Minor repairs to heating, ventilating and refrigeration equipment are also considered. Open to men and women students. Prerequisite: High school physics or equivalent. Five labs. (2-5 F, W or S) Staff

160. Pattern Making. Simple patterns illustrating construction and choice of materials and principles of shrinkage. Prerequisite: W.W. 61. Five labs. (5S, W or S) Swenson

161, 162, 163. Building Construction. Estimating and contracting. Construction and design of homes, farm buildings and apartments. Covers porch work, stairways, dormers, special roofs, insulation and other special construction, specification writing, cost estimating, construction methods, allowable loads, and drawing of special sections and details. Problems in actual bidding on sets of plans are worked out by students. Prerequisites: W.W. 66, E.D. 94. One lecture, two labs. (3F, 3W, 3S) Staff

171, 172, 173. Cabinet Work. Design and construction of furniture and cabinets, including a study of woods suitable for furniture and cabinet making, wood turning, inlaying, and types of wood finishing. Projects are built which include inlaying and overlaying. Prerequisite: W.W. 63. All lab. (3F, 3W, 3S) Nyman; Coulam

174. Art Work. Decorative means that craftsmen employ for artistic appeal. Art turning, chip carving, band saw shaping, scrolling, twisted turning, inlaying and overlaying. Consideration is given decorative effects obtained by two-tone staining, bright colored stains and lacquers, burning and fine polishing. Prerequisite: W.W. 63. Two 3-hour labs. (3F) Nyman, Swenson

SCHOOL OF FOREST, RANGE, AND WILDLIFE MANAGEMENT

LEWIS M. TURNER, Dean

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General Information

The comparative newness of 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 enter these fields of public service. The purpose of this school 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 School 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. Forests and range lands in Utah comprise more than 90 per cent of the total state area. The Cache National Forest, within two miles of the school, the Bear River Migratory Bird Refuge within 40 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 a half day to one day's driving distance.

A regional office of the U. S. Forest Service is in Ogden, 45 miles distant, and offices of the U. S. Bureau of Land Management, U. S. Bureau of Reclamation, U. S. Indian Service, and U. S. Soil Conservation Service are in Salt Lake, 85 miles from Logan.

RECOMMENDED ENTRANCE QUALIFICATIONS

Normally, graduation from high school is prerequisite to entrance in the school. Veterans and certain others, not high school graduates, may be admitted if they make acceptable scores on the General Education Development (G.E.D.) Tests.

Students entering the School of Forestry, Range, and Wildlife Management will make more satisfactory progress if they have had high school algebra, chemistry, physics, typing, botany, zoology, and geometry. Students who have not had high school algebra or geometry should make up these deficiencies by taking their equivalent within the college as soon as possible.

COURSES OF STUDY

The curricula of this school prepare men for positions with federal or state agencies and for private work in (1) forest management, (2) range management, and (3) wildlife management. Forest management students may choose between two options: one designed to train for general forestry work, as with the public land managing agencies, and one more strictly for timber management. Range management students may choose, in the junior year, to take in soil conservation and watershed management, or the regular, basic range management course. Wildlife management students may select a curriculum to train for management of big game; a curriculum in general wildlife management with emphasis on small game and fur-bearers; or, a curriculum in fishery management.

SUMMER CAMP

The School has purchased and leased approximately 3,000 acres of forest and range land 22 miles from the campus within the Cache National Forest, where training facilities have been established. Field instruction is required for graduation in addition to the regular 12 quarters of classroom work. Also, at least one summer season of practical experience in this field of specialization is expected of all students.

Attendance at summer camp is required between the sophomore and junior years. The camp opens soon after the close of the spring quarter and continues for 8 weeks. Nine credits are allowed for the complete program. In addition to the regular summer school fees, a \$5.00 fee is charged for each of the four courses. Board is provided on a cost basis, lodging is without cost. Students attending camp must be inoculated against Rocky Mountain spotted fever.

Students in other colleges or universities who wish to transfer to this school should consider carefully the following: Successful completion of all courses offered in the summer camp is (a) required for graduation in all three departments in the school, and (b) prerequisite to most of the professional courses in the junior and senior years. In planning a course of study for the junior and senior years, transfer students should note in the description of courses those for which the summer training is prerequisite. It should be recognized that some transfer students coming to this school with two or more years of college work may require more than two years to graduate. Transfer students should also note that to be eligible to attend summer camp they should have completed approximately two years college work, essentially duplicating the courses required of freshmen and sophomores in this school. It is especially important that they have had courses in systematic botany and engineering surveying.

FIELD TRIPS

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; this trip is required of all students. The trip for students majoring in wildlife usually is scheduled over the first week of May, and for range management juniors over the second or third week of May. The trip for forest management 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 \$35.00 is charged each student to defray the general expenses of the trip.

LOAN FUNDS

Two sources of funds are available on a loan basis to worthy, deserving students in the School of Forest, Range, and Wildlife Management. These are the W. B. Rice Memorial Loan Fund, and the Bureau of Land Management Fund. Loans are made for short periods. The funds are administered by a faculty committee and application should be made to the Dean's office.

GENERAL REQUIREMENTS FOR GRADUATION

The following general requirements must be met by all students graduating from the School of Forest, Range, and Wildlife Management:

- A. Two hundred and one credits (quarter hours) exclusive of basic Military Science and/or Physical Education.
- B. Successful completion of summer camp, for which 9 credits are earned.
- C. All courses prescribed under the study program of the chosen field.
- D. All of the following general requirements:
 1. English and Speech, 16 credits, of which at least 3 must be Speech.
 2. Social Science, 8 credits, of which 5 are General Economics.
 3. Military Science or Physical Education—6 quarters.
- E. All students must demonstrate reasonable proficiency in written and spoken English; students showing marked deficiency are required to pass successfully certain supplementary or corrective courses in addition to the requirements stated above.

BASIC COURSES

Required of all students in the School of Forest, Range, and Wildlife Management.

Freshman

Course	F	W	S
¹ Military Science 1, 2, 3..	1	1	1
English 17, 18, 19	3	3	3
Chemistry 10, 11, 12	5	5	5
² Mathematics 34, 35, 44 ..	3	5	3
Speech 5	3	...	...
Forestry 1	3	...	...
³ Animal Husbandry 1 ....	...	...	3
⁴ Animal Husbandry 2 ....	...	...	2
Engineering Draw. 60 ..	1	...	...
Forestry 2, 3	1	1	...

Sophomore

Course	F	W	S
¹ Military Science 4, 5, 6 ..	1	1	1
Botany 24, 25, 30	5	5	5
Civil Engineering 81, 80	3	3	...
Physics 6	5	...	...
Agronomy 58 .....	...	...	5
Economics 51 .....	...	5	...
⁵ Geology 3	5	...	...
⁶ Botany 120 .....	...	...	5
⁷ Zoology 3, 4, 13	5	5	5
⁸ Animal Husbandry 10....	...	...	5
Forestry 4, 5	1	1	...

SUMMER CAMP

Required courses at summer camps:	Credits
Forestry 96, Forest Surveying	3
Forestry 97, Forest Practice	2
Range Management 98, Range Practice	2
Wildlife Management 99, Wildlife Practice	2

It should be noted that junior standing (the equivalent of 90 quarter hours or 60 semester hours of college work) is prerequisite to all courses offered by the School of Forest, Range, and Wildlife Management except Forestry 1, 2, 3, 4, 5, 10, 11, 26, 96, and 97, and Range 98, and Wildlife 99.

Forest Management

J. Whitney Floyd, Professor and Head of Department; Lewis M. Turner, T. W. Daniel, Professors; R. R. Moore, Associate Professor and Director of Summer Camp; Stewart Ross Tocher, Assistant Professor; Grant A. Harris, Extension Forester; James L. Mielke, Collaborator in Forest Pathology.

Upon completion of either of the curricula prescribed below, students are granted the degree of Bachelor of Science in Forest Management. The courses are designed to give the student comprehensive training in all branches of forest management, including growing, protecting, harvesting and utilizing of timber crops. Two options are offered by this Department. It is desirable that the student know by the end of his sophomore year which he will follow. The option in general forestry provides training in timber management, and in addition training is provided in range management, wildlife management, recreation, and watershed management. This type of curriculum is particularly well adapted to the needs of personnel of the land managing agencies such as the Forest Service, Bureau of Land Management, Park Service, Soil Conservation Service, and comparable state agencies. The second option, timber management, provides major emphasis on the growing, harvesting, and utilizing of timber crops and is more appropriate training for employment in private forestry or much more specialized timber work with the public agencies.

It is highly desirable that every student engage in field work related to forestry in the summer following the freshman and junior years. Students are urged to obtain employment with such agencies as the U. S. Forest Service, Park Service, or comparable state agencies, or in private forest industries. There is maintained a working agreement with the Forest Service which pro-

1—Not required of men who have served with the U. S. Armed forces.

2—Students presenting 1½ units of high school algebra or otherwise qualified to take Math. 35 are not required to take Math. 34.

3—Required only of students taking the general forestry option.

4—Required of range majors and students taking the general forestry option.

5—Required of forest and range management majors only.

6—Required of the sophomore year of forestry majors only.

7—Required of wildlife majors only.

8—Required of range majors, excepting soil conservation students. Wildlife management majors may substitute Physiology 4.

vides supervised and planned training jobs in the summer, at regular wages, and gaining for the student three hours credit. The school maintains an employment service to aid students in obtaining such summer work.

Electives: Electives necessary to complete the program of the first two years should be chosen with the object of improving the student's cultural as well as professional background. In the junior and senior years, electives should be chosen with the object of broadening a specific field of study. Courses selected must meet the approval of the student's advisor.

The degrees of Master of Science in Forest Management or Master of Forestry are given upon completion of a prescribed course of study and fulfillment of other requirements listed by the Graduate School. The Master of Science degree requires that the candidate obtain a Bachelor's degree in Forest Management and in addition one or two years residence study depending upon his ability and his thesis problem. The Master of Forestry degree is designed for those who have a Bachelor's degree in some other field and who wish to earn a degree in Forestry. It normally requires from two to three years, depending upon how close the candidate's original field was related to Forestry. Applicants should submit an official transcript of their college courses.

Two teaching assistantships are available to graduate students in Forest Management.

FOREST MANAGEMENT

Freshman and Sophomore Years—See Basic Courses

A. General Forestry

Course:	Junior Year		Number			Credit		
	Dept.							
			F	W	S	F	W	S
Forest Measurements I, II	For.	Mgmt.		106	107		4	4
Dendrology I, II	For.	Mgmt.	112	113		3	2	
Silviculture I, II	For.	Mgmt.		114	115		3	3
Forest Protection I,*II	For.	Mgmt.	118	119		3	3	
Public Land Administration	For.	Mgmt.		132			3	
Junior Field Problems	For.	Mgmt.			146			3
Plant Ecology	Range	Mgmt.	126			5		
Range Management	Range	Mgmt.	162			5		
General Wildlife Management	Wildlife	Mgmt.			150			5

Course:	Senior Year		Number			Credit		
	Dept.							
			F	W	S	F	W	S
Forest Management	For.	Mgmt.	121			4		
Forest Valuation	For.	Mgmt.		122			3	
Forest Economics	For.	Mgmt.			123			3
Wood Technology	For.	Mgmt.	126			3		
Forest History and Policy	For.	Mgmt.		133			2	
Improvements and Recreation	For.	Mgmt.			137			3
Silviculture III	For.	Mgmt.		120			3	
*Range Forage	Range	Mgmt.		176			4	
*Watershed Management	Range	Mgmt.	180			4		
Junior English	English				112			4
Aerial Photo Interpretation	For.	Mgmt.			134			3

B. Timber Management

Students who choose the timber management option will substitute the following courses for those marked (*) above:

Course:	Dept.	Number			Credit		
		F	W	S	F	W	S
Seeding and Planting	For. Mgmt.			116			2
Logging	For. Mgmt.	125			3		
Mechanical Properties	For. Mgmt.		129			2	
Milling and Products	For. Mgmt.			130			4
Forest Entomology	Zoology	105			3		
Forest Pathology	Botany		140			4	

Description of Courses

1. General Forestry. Survey of professions of forest management, range management, soil conservation, recreation and wildlife management; character of the work; and relation of conservation and multiple uses of wild land to welfare of state and nation. Open to all students. (3F, 3S) Turner

2, 3. Natural Resources Management. Required of all first and second year students in School of Forest, Range, and Wildlife Management. (1W, 1S) Staff

4, 5. Natural Resources Management. Required of all second year students in the School of Forest, Range and Wildlife Management. (1W, 1S) Staff

10. Forest and Range Conservation. Introduction to conservation problems designed to acquaint students with the nature and extent of the organic resources of the United States and methods of conserving them. Open to all students except those majoring in the School of Forest, Range, and Wildlife Management. (2F) Turner

11. Winter Woodcraft. Lectures, field trips designed to train student in proper way of living in wilderness. He must furnish his own field equipment and have suitable outdoor clothing. Lecture, field trips. (3W) Kelker

26. Wood Technology and Mechanical Properties of Wood. For vocational education majors or industrial arts majors. Covers structure, identification, mechanical properties of commercial woods of United States. (3W) Tocher

96. Forest Surveying. Practical field problems in surveying methods commonly employed in forest, range, and wildlife management. Practice in various forest and range land developments. Type mapping. Lab. fee \$5.00. Summer Camp (3) Staff

97. Forest Practice. Field studies in inventories, successful stages and growth of stands of trees. Study of forest soils and related land use. Lab. fee \$5.00. Summer Camp (2) Staff

101. Forest Survey I. Identification and range of the major commercial species of the United States. Elementary principles of silviculture and forest management. Not open to students majoring in the Forest Management Department. Prerequisite: Summer Camp (3F) Daniel

102. Forest Survey II. Forest improvements and recreation; log scaling, timber cruising, study of growth and yield; logging, milling, and seasoning of lumber. Some attention will also be given to identification, properties and uses of the major commercial woods of the United States and to the major wood products. Not open to majors in the Forest Management Department. Prerequisite: Summer Camp (3W) Tocher

106. Forest Measurements I. Measurements of timber in log, tree, and stand. Log rules and volume tables. Timber cruising practices. Prerequisite: Summer Camp. (4W) Moore

107. Forest Measurements II. Statistical methods useful in analyzing forest data. Volume and yield table compilation. Growth of even-aged, all aged, and residual cut over stands. Prerequisite: For. 106. (3S) **Moore**

112. Dendrology I. Hardwoods. Identification, distribution, and silvics of the more important forest trees in the United States. Prerequisite: Summer Camp. (3F) **Daniel**

113. Dendrology II. Conifers. Identification, distribution and silvics of the more important forest trees in the United States. Prerequisite: Summer Camp. (2W) **Daniel**

114. Silviculture I. Characteristics of the tree species which influence silvicultural practice in the United States. Prerequisite: Summer Camp, Range 126, For. 112, and 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: For 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: For. 115. (2S) **Daniel**

118. Forest Protection I. Prevention, presuppression and suppression of forest and range fires, including economic and physical effects. Fire behavior. Field trips. Prerequisite: Summer Camp. (3F) **Floyd**

119. Forest Protection II. Problems of administration and economics in protecting forests from biological enemies. (3W) **Floyd**

120. Silviculture III. Regional silviculture of United States. (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. The first week of the quarter will be spent in the school forest collecting basic management data. It is important and necessary that all students enrolled in the course attend all of this camp. Prerequisites: Summer Camp, For. 106, 107, 115. (4F) **Moore**

122. Forest Valuation. Determination of monetary values in forest growing stock and land. Analysis of alternative management methods by use of standard valuation techniques. Prerequisites: For. 121. (3W) **Moore**

123. Forest Economics. Economic problems involved in the utilization of forest land and timber, and in the distribution of forest products. Prerequisite: For. 122. (3S) **Moore**

125. Logging. Principles and methods of harvesting wood products. Emphasis on cost, values and the application of forestry to the harvesting process. (3F) **Moore**

126. Wood Technology. Structure and identification of the economic woods of United States. (3F) **Tocher**

129 Mechanical Properties. Factors affecting the strength of wood. (2W) **Tocher**

130. Milling and Products. Manufacturing, grading, seasoning, and preserving lumber, including a study of the wood-using industries and their products. (4S) **Tocher**

132. Public Land Administration. History, organization and functions of conservation agencies affecting range, forest, and wildlife administration. Personnel management problems. (3W) **Floyd**

133. Forest History and Policy. Development of federal, state, and private forest policy. (2W) **Turner**

134. Aerial Photo Interpretation. Elements of photogrammetry. Use of aerial photographs in mapping vegetation types and estimating timber volumes. Construction of planimetric maps from vertical photographs. (3F) **Tocher**

137. Improvements and Recreation. Roads, trails and structures necessary in forest management. Recreational use of forests and the classifications and planning of areas suitable for this purpose. Prerequisite: Summer Camp (3S)

Floyd

138. Recreational Planning. Mapping and designing plans for the various forms of forest recreational use. (3S)

Floyd

145. Forest Problems. Individual study and research upon a selected forestry problem approved by the instructor. (1-3 F, W, S)

Staff

146. Junior Field Problems. Study of forest operations. (3S) Junior year. Fee, \$35.00

Floyd

201, 202, 203. Advanced Forestry Seminar. Review and discussion of advanced current literature. For students in the graduate school. (1F, 1W, 1S)

Turner

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)

Turner

205. Silviculture. Intensive study of a particular region by individuals. Group work consists of advanced treatment of silvics and silviculture with emphasis on physiological aspects of both subjects. (3W)

Daniel

206. Forest Management and Valuation. Application of forest management principles; forest organization and development; forest regulation, valuation, and control of operations. (2F)

Moore

207. Forest Protection. Advanced study in specialized fields of forest protection. (2F)

Floyd

208. Forest Measurements. Application of statistical measurements to forest problems. (3F)

Moore

210. Forest Problems. Individual advanced study upon a selected forestry problem. (2-10 credits)

Staff

211. Thesis. Original research on a problem in forest management to be concluded by preparation of a thesis. (10-15 credits)

Staff

Range Management

L. A. Stoddart, Professor and Head of Department; Arthur D. Smith and C. Wayne Cook, Associate Professors; Max E. Robinson, Assistant Professor; Grant A. Harris, Assistant Professor and Extension Range Manager.

A 4-year program leading to the degree of Bachelor of Science in range management is available in the School of Forest, Range, and Wildlife Management. Opportunity is given under this program to specialize in general range management or in range soil conservation and watershed management.

The range management option acquaints the student with methods of operating a ranch in the western range area and of managing range lands for private operators or for the federal or state governments. Graduates under the soil conservation and watershed management program are especially qualified for work with the Soil Conservation Service in the western states.

Graduates from either of these programs are qualified for positions such as Forest Ranger, Soil Conservationist, and Range Manager under the United States Civil Service with such federal agencies as the Forest Service, Soil Conservation Service, Indian Service, and Bureau of Land Management. At present an acute 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 unusually good.

The graduates from these programs are qualified for many private jobs such as operating a livestock ranch, technical foreman for livestock companies, adviser to land management companies, and range land appraiser.

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, ani-

mal husbandry, botany, wildlife, economics, or agronomy. 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 their eligibility for study toward this degree.

There are available to advanced senior students and to graduate students a number of assistantships which will defray most of the costs of attending school. Such assistantships involve part-time work for the department as research or teaching assistants and generally pay one hundred dollars per month or more. Several of these assistantships are available each year and interested students at Utah State Agricultural College or other accredited colleges should apply to the department head for further details.

COURSE OF STUDY

Freshman and Sophomore

Students majoring in range management take the same course as all other students of the School of Forest, Range, and Wildlife Management during the freshman and sophomore years (see pages 3 and 4.) This enables students to transfer without penalty from one department to another within the School at any time previous to their junior year.

Junior

		F	W	S
*Botany 108	Agrostology		4	...
Range	Plant Ecology	5	...	...
Range 162	Range Management	5	...	...
Wildlife 150	General Wildlife Management .....	...	...	5
*Range 177	Forbs and Browse .....	...	...	3
*Range 179	Poisonous Plants	2	...	...
For. Mgmt. 132	Public Land Administration .....	...	3	...
*A.H. 110	Beef Cattle Production	3	...	...
*A.H. 125	Sheep Production .....	...	3	...
Botany 120	Plant Physiology .....	...	5	...
Range 196 or 197	Range Field Problems .....	...	...	3
*English 112	Junior English .....	...	...	4

Senior

		F	W	S
Range 164	Technical Problems in Range Mgmt. ....	...	3	...
*Range 181	Range Economics .....	...	3	...
Range 192, 193, 194	Range Seminar	2	2	2
*For. Mgmt. 101, 102	Forest Survey	3	3	...
Range 180	Watershed Management	4	...	...
*An. Hus. 150	Animal Nutrition .....	...	4	...
Range 163	Range Improvement	2	...	...

Suggested Electives

		F	W	S
Agron. 131, 132	Applied Statistics	3	3	...
Agron. 114	Soil Conservation and Survey .....	...	...	5
W. L. 155	Economic Wildlife .....	...	3	...
For. Mgmt. 118	Forest Protection I	3	...	...
Agron. 103	Forage Crops	3	...	3
Ag. Econ. 106	Land Economics and Utilization .....	...	...	5
Vet. Sci. 120	Animal Hygiene .....	...	...	4
Agron. 155	Soil and Plant Relations .....	...	3	...
Bot. 121	Water Relations of Native Plants	3	...
Geol. 115	Adv. Physical Geology	5

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Agron. 160	Genesis and Morph. of Soils	3	...
Chem. 90	Biochemistry	5	...
Zool. 2	Zoology	5	5
Zool. 112	Genetics	5	5 5

SOIL CONSERVATION AND WATERSHED MANAGEMENT

An option in soil conservation and watershed management is allowed with substitution of the Following courses for those marked (*) above and for An. Hus. 10 in the sophomore year.

		F	W	S
Agronomy 103	Forage Crops	...	...	3
Agronomy 114	Soil Conservation and Survey	...	...	5
Agronomy 155	Soil and Plant Relations	...	3	...
Ag. Eng. 108	Eng. Aspects of Soil and Water Cons.	...	...	4
Geology 115	Advanced Physical Geology	5	...	...
C. Eng. 171	Hydrology	3	...	...
Range 176	Range Forage Plants	...	4	...
Botany 121	Water Relations of Native Plants	...	3	...

MINOR—RANGE MANAGEMENT

The following courses in Range Management are suggested for students who wish to minor in this field. (Requirements subject to change upon approval of the department head.): Range 126, Plant Ecology, 5 credits; Range 160 or 162, Principles of Managing Range Lands, 5 credits; Range 176, Range Forage Plants, 4 credits; Range 181, Range Economics, 3 credits; Range 192, 193, 194, Range Seminar, 6 credits.

Description of Courses

98. Range Practice. Field practice in problems of range land analysis and correlation of land uses. Lab. fee \$5.00. Summer Camp (2) **Smith**

126. Plant Ecology. Analysis of habitat factors that influence plant growth and distribution. Attention to plant succession and competition and to plant indicators. Prerequisites: Bot. 30; Agron. 56 or 58. (5F) **Stoddart**

160. Principles of Managing Range Lands. A general course designed to give students not majoring in the field a knowledge of how to evaluate, increase, and perpetuate range. Field trips and laboratory work on range plants. Credit not allowed students having credit in R.M. 162. Prerequisite: Bot. 25. Four lectures, one lab. (5S) **Cook**

162. Range Management. Problems met in managing native range lands; revegetation of range lands; maintenance of production; utilization of range forage; and range livestock management. Prerequisite: Bot. 30 and Range 98. (5F) **Cook**

163. Range Improvement. Methods and problems involved in seeding range lands, improving stock watering facilities, and fencing ranges, terracing, water spreading and use of dams on range lands. Prerequisites: Range 160 or 162. Two lectures. Field trips arranged. (2F) **Harris**

164. Technical Problems in Range Management. Specialized problems in range management and range administration encountered by the technician. Prerequisites: Range 160 or 162. (3W) **Stoddart**

176. Range Forage Plants. Native forage plants, including poisonous plants, their identification, distribution, ecology, and economic value. Prerequisite: Bot. 30. (4W) **Harris**

177. Forbs and Browse. A study of forbs and browse including identification, region of growth, ecology, and forage value. Prerequisite: Bot. 30. (3S) **Harris**

1—English 111 may be substituted for English 112.

179. Poisonous Plants. Important poisonous plants, including general methods of livestock handling and range management practices, identification, region of growth, ecology, poisoning symptoms, remedies, and control methods. Prerequisite: Botany 30. One lecture, one laboratory. (2F) **Harris**

180. Watershed Management. Floods, soil erosion and runoff on range and forest lands, effects of vegetation in equalizing runoff and preventing erosion, and methods of rehabilitating damaged watersheds. Prerequisite: Range 126. Three lectures, one lab. (4F) **Smith**

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) **Smith**

192, 193, 194. Range Seminar. A systematic review of range management and related subjects. Prerequisite: Range 160 or 162. (2F, 2W, 2S) **Staff**

195. Range Problems. Individual study and research upon a selected range problem. (1-3 F, W or S) **Staff**

196, 197. Range Field Problems. Field study of range management operation and research. Courses 196 and 197 given alternate years. (3S) Fee \$30.00 **Smith**

200. Range Thesis. Original research and study on a problem in range management. Open only to graduate students. (1-15F, W or S) **Staff**

204. Land Use Seminar. Current problems and practices in wildland management and research with especial emphasis on the western range. Required of all range management graduate students each fall quarter. (1F) **Harris**

205. Seminar in Range Nutrition. Problems in management and research in the field of plant and animal nutrition on the western range. (2W) **Cook**

206. Research Methods. A study of research methods in range management and related subjects. (2W) **Stoddart**

281. Advanced Range Economics. Advanced study of economics of various systems of range management, range seeding, land operation, and livestock management. Prerequisite: Range 181. (2S) **Smith**

282. Vegetation Influences. Advanced study of influences of vegetation upon the hydrological cycle, influence of vegetation on percolation of ground waters, runoff, and the regimen of streams. Prerequisite: Range 180. (2W) **Smith**

Wildlife Management

W. F. Sigler, Professor and Head of Department; G. H. Kelker, Professor; A. W. Stokes, Assistant Professor. J. B. Low, Professor and Biologist; O. B. Cope, Professor and Fishery Biologist; O. P. Ball, Associate Professor, Fishery Biologist; and M. Laakso, Associate Professor and Fishery Biologist, U. S. Fish and Wildlife Service.

Upon completion of basic courses and the upper-division requirements outlined in the study program, students are granted the degree of Bachelor of Science, major in Wildlife Management. Prospective wildlife management majors should elect Zoology 3, 4 and 13 in the sophomore year. These classes are prerequisite to all wildlife classes.

Course work of the junior year provides comprehensive basic training in general wildlife management. The student shall choose one of three options to be completed in the senior year. The option in management of big game stresses the economic and ecological relationships of large mammals to forest and range, with emphasis on western conditions. The second option, featuring

small game and furbearers, considers representative areas of the United States for illustrative purposes in the management of each game bird or mammal. The fishery option considers the production of both cold water and warm water fish in relation to land use. Land utilization often seriously affects the water habitat. Training is, therefore, given in survey work of the water and the land from which it drains. Also, the student participates in creel censuses, measures the growth and productivity of fish in inland waters, and helps in various forms of habitat improvement.

Any one of the programs trains students for both general administrative and investigative work with state and federal agencies.

Graduate standing is required in order to take courses numbered over 200.

Upon completion of a prescribed course and fulfillment of the requirements listed by the Graduate School, a Master of Science or Doctor of Philosophy degree in Wildlife Management or Fishery Management is granted. A period of one to three or more years, depending upon the thesis problem and the amount of time that the student can devote to his studies, is necessary to complete all requirements for these degrees.

Through co-operation of the Fish and Wildlife Service, the Utah State Fish and Game Department, the Wildlife Management Institute, and the College, one of the co-operatively sponsored Wildlife Research Units was established at Utah State Agricultural College in 1935.

Wildlife Research Unit funds are available for eight graduate research assistantships for students working toward a Master's degree of the Ph.D. degree in Fish and Game Management. The Wildlife Management department also has one teaching assistantship. Candidates for assistantships are chosen from applicants who have a bachelor's degree in Wildlife Management or a related field from a college of recognized standing, and who submit formal application with transcript of college credits and references on or before April 1.

A small number of part-time fishery positions are available during the school year with the Rocky Mountain Fishery Investigations of the U. S. Fish and Wildlife Service. Positions in summer work are filled through this and other agencies to give valuable practical experience in fishery techniques which may be gained by working in this capacity.

COURSES OF STUDY

For Freshman and Sophomore years, see basic courses for
Forest, Range, and Wildlife Management

Wildlife Management

Courses required for graduation

		F	W	S
Wildlife 145	Principles of Wildlife Mgmt.	3	...	...
Wildlife 157, 158, 159	Seminars	1	1	1
Wildlife 160	Animal Ecology	5	...	...
Wildlife 171	Junior Field Problems .....	...	...	2
Wildlife 172	Problem Orientation .....	...	3	...
Wildlife 175	Wildlife Law Enforcement .....	...	3	...
Range 126	Plant Ecology	5	...	...
Agronomy 131	Applied Statistics	3	...	...
¹ English 112	Junior English .....	...	...	4

The student must complete all course work in one of the three options to meet requirements for graduation. He may choose suitable electives from the other two groups to broaden his training.

A. Big Game Management:

		F	W	S
Wildlife 146	Management of Upland Game	---	---	3
Wildlife 153	Management of Big Game	---	5	---
For. Mgmt. 101, 102	Forest Survey	3	3	---
Range 162	Range Management	5	---	---
Range 176	Range Forage Plants	---	4	---
Range 180	Watershed Management	4	---	---
Zoology 122	Mammalogy	---	4	---

B. Small Game Furbearer Management:

		F	W	S
Wildlife 146	Management of Upland Game	---	---	3
Wildlife 147	Mgmt. of Waterfowl and Furbearers	---	---	5
Wildlife 161	Limnology	4	---	---
Botany 112	Aquatic and Marsh Plants	3	---	---
Range 162	Range Management	5	---	---
Zoology 121	Ornithology	---	---	4

C. Fishery Management:

		F	W	S
Wildlife 147	Mgmt. of Waterfowl and Furbearers	---	---	5
Wildlife 161	Limnology	4	---	---
Wildlife 165	Fishery Management	---	---	3
Wildlife 169	Techniques in Fishery Management	---	5	---
Bot. 112	Aquatic and Marsh Plants	3	---	---
² Range 180	Watershed Management	---	4	---
Zoology 155	Ichthyology	---	4	---

Description of Courses

99. Wildlife Practice. Integrated studies of wildland populations in relation to other forms of life and to other land uses. Lab. fee \$5.00. Summer Camp. (2) **Staff**

145. Principles of Wildlife Management. Properties of animals and their habitats in relation to general management practices. Field trips. Prerequisite: Summer Camp. (3F) **Stokes**

146, 246. Management of Upland Game. Taxonomy, life histories, distribution, environmental needs, enemies, and plans for management of game birds and small mammals. Prerequisites: Wildlife 99 and 145. Additional work required of graduate students. (3S) **Stokes**

147, 247. Management of Waterfowl and Furbearers. Taxonomy, life histories, habitat requirements, economic importance, and plans for management of waterfowl and furbearers, especially the muskrat and beaver. Prerequisites: Wildlife 99 and 145. Additional work required of graduate students. (5S) **Stokes**

150. General Wildlife Management. Principles of animal ecology and wildlife management; life histories, ecology, economics and management phases of important species of big game, upland game, waterfowl, and fish. No credit allowed wildlife majors. Field trips arranged. (5S) **Kelker**

153. Management of Big Game. Life histories, distribution, numerical variation, enemies, and management activities for native big game animals. (5W) **Kelker**

155. Economic Wildlife. General importance of wildlife resources; natural history, economic values and control methods for rodents and predators; iden-

¹—English 111 may be substituted for English 112.

²—Or Hydrology Civil Engineering 171.

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tification of skulls and skins; a brief evaluation of hawks and reptiles. Particularly adapted for students in forest management, range management, and agriculture. (3W) Kelker

157, 158, 159. Wildlife Seminar. Discussion of current developments in wildlife management. (1F, 1W, 1S) Staff

160. Animal Ecology. Distribution and behavior of animals as affected by various environmental factors. Special attention to interrelationships of biotic communities. (5F) Kelker

161, 261. Limnology. Physical, chemical, and biological factors affecting occurrence and productivity of fishes and other aquatic animals in fresh waters. Prerequisites: Bot. 30 and Zool. 13. (4F) Sigler

162. Fishery Ecology. Importance of the animal environment of fresh water fishes. Food organisms, predation, parasitism, and economic importance. Prerequisites: Zool. 3, 4, 13. Field trips, laboratory, lectures. (3F) Cope

164. Fish Populations. General population characteristics, methods of enumeration, and determination of mortalities. Paper required. Prerequisite: Permission of instructor. (2W) Laakso

165, 265. Fishery Management. Principles and techniques of lake, pond, and stream improvements; ecology of game fishes, propagation methods, and common fish diseases. Prerequisites: Zool. 155 and Wildlife 99. (3S) Sigler

166. Marine Fish and Fisheries. Ecology of marine environment-chemical, physical and biological characteristics of the oceans. Each group of marine fish is evaluated from a taxonomic, ecological, and economic viewpoint, emphasizing the commercial marine fisheries of the world. Special consideration to oceanographic investigations and techniques designed to evaluate problems associated with commercial fisheries. Lecture and laboratory periods. Prerequisite: Zoology 155. (3F) Ball

169, 269. Techniques in Fishery Management. Mechanics of collecting and analyzing life history material of fishes. Prerequisites: Zool. 155, and Wildlife 99 and 161. (5W) Sigler

170. Wildlife Problems. Individual study and research upon a selected wildlife problem approved by the instructor. (1-3F, W, or S) Staff

171. Junior Field Problems. Study of wildlife management operations by various agencies in the Intermountain Region. (2S) Fee \$35.00. Sigler

172. Problem Orientation. A discussion of needs of and approach to wildlife investigations: analyzing the problem, presenting data, 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 the court. Offered in alternate years. (3W) Sigler

253. Advanced Studies in Big Game Management. Population dynamics, census methods, hunting regulations, and management plans. Prerequisite: Knowledge of Big Game biology. Field trips. (5W) Kelker

257. The Research Approach. The application of elementary logic and the scientific methods to wildlife investigations. (2F) Kelker

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 pertaining to the completion and publication of technical papers. (2S) Sigler

260. Advanced Animal Ecology. Population dynamics, animal behavior, and other ecological aspects not covered in W.M. 160. Prerequisite: W.M. 160 or equivalent. (3W) Stokes

270. Research and Thesis. A research problem chosen, the project outlined, and data collected, analyzed, and summarized, and thesis prepared by the student. (5-15F, W, S, SS) Staff

SCHOOL OF HOME AND FAMILY LIVING

ETHELYN O. GREAVES, Dean

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General Information

All home and family living courses are planned to provide well-rounded personal development, to help students become more effective members of the home and the community and to train for a professional career.

Home and family life is related to all areas in home economics. Thus courses are planned to prepare young women to carry the art and science of skilled home living into the various institutions of modern complex society. During the first two years, emphasis is placed on general education and on basic training for home and family living. In the junior and senior year the student follows a program in one of the professional curricula, directed toward a career in some phase of home economics. Accordingly students may elect majors leading to a Bachelor's Degree in the following divisions: Child Development and Parent Education, Clothing, Textiles and Related Arts, Foods and Nutrition, Household Administration, and Home Economics Education.

The chief professional opportunities open to graduates in the School of Home and Family Living are in homemaking, teaching, extension service, institutional management, research, and home economics in business.

GENERAL REQUIREMENTS

Lower Division Requirements—See "Academic Regulations" page 52.

Core Requirements—All curricula in the School of Home and Family Living are based on a required core of courses designed to give a broad education for family and community living. They emphasize practical aspects of home economics and are planned to give students desirable basic training in activities related to successful management of a home. These requirements make up a large proportion of the work of the freshman and sophomore years. Courses which meet core requirements of the School of Home and Family Living are:

H. Ad. 10 Introduction to Home Economics	1 credit
*CTRA 8 Clothing for the College Girl	5 credits
FN 5 Nutrition	3 credits
FN 24 Food Preparation	5 credits
CD 67 Child in the Family	3 credits
CD 68 Pre-School Laboratory	2 credits
H. Ad. 149 Home Management	3 credits

TWO-YEAR TERMINAL COURSE IN HOME AND FAMILY LIFE

A two-year terminal course in home economics is offered for students who, for any reason, do not expect to complete any of the four-year majors in the homemaking group. The course is so planned, however, that students may without undue delay, complete later the work required for a four-year course.

While the course offers a broad foundation in homemaking, it also makes possible a concentration of effort on phases of home economics that prepare the student for employment in specific occupations.

Requirements for two-year terminal course are as follows:

1. Complete a major of 30 credits in one or more closely related departments of the School of Home and Family Living.
2. Complete a minor of 15 credits related to or basic to the major—not necessarily in the School of Home and Family Living.
3. Twenty-four credits in basic groups:
 - (a) Language, 9 credits; (b) Exact Science, 5 credits; (c) Biological Science, 5 credits; and (d) Social Science, 5 credits.
4. Electives—21 credits.
5. Physical Education—6 credits.

*Pre-testing—a pre-test in clothing construction will be given entering students majoring in H.F.L. to determine if CTRA 8 should be taken. CTRA 4 and 25 will take the place of CTRA 8 in meeting core requirements if CTRA 8 is waived.

Child Development and Parent Education

Bruce Gardner, Associate Professor and Head of Department; **Ruby Eames**, **Dorothy Lewis**, Assistant Professors.

A Bachelor of Science degree and a Master of Science degree may be earned in Child Development.

Students majoring in Child Development and Parent Education must complete, in addition to the Home Economics core courses, the following: Child Development 80, 138, 174, 175, and 190; Speech 118 or English 24; Psychology 105; H. Ad. 150; Zoology 111; Sociology 60. The remaining credits may be selected, in conference with the major adviser, from the approved courses listed below: C. T. & R. A. 185; Woodwork 74; Psychology 123 and 145; Art 34; Music 131.

Students expecting to teach in kindergarten or elementary grades must meet the state requirements for certification. It is recommended that they adopt a major in Elementary Education as well as a major in Child Development. These majors relieve the student of the requirement for a minor. Arrangements for practice teaching in the Nursery School (C.D. 175) should be made in advance with a Child Development staff member. Arrangements for practice teaching in the elementary grades should be made in advance with the supervisor of the Whittier School. State requirements for certification include the following courses: Education 50, 103, 104, 105, 106, 114; Public Health 155; Psychology 105 and 108; English 24.

CURRICULUM IN CHILD DEVELOPMENT AND PARENT EDUCATION

Junior Year		Senior Year	
Course	Cr.	Course	Cr.
English 110	4	C.D. 174, 175 and 190	10
Psych. 105	3	Household Adm. 149 and 150	7
Zool. 111	4	Ed. 105	3
Pub. Health 155	3	Ed. 106	12
Psych. 108	3	Education Electives	2-3
Ed. 103	4	Other Electives	16
Ed. 104	3		
Ed. 114	3	Total	50-51
C.T.&R.A. 185	3		
C.D. 138	5		
Electives	16		
Total	51		

Courses

67. The Child in the Family. To help students develop a philosophy of family living as desirable background for the child; understanding of reproduction, prenatal care; fundamentals of growth and development; and a beginning concept of guidance. (3F, W, S) **Gardner; Lewis**

68. Preschool Laboratory. Directed Observation in the College Preschool Laboratory. May parallel CD 67, (2F, W, S) **Gardner; Lewis**

80. Guidance of the Young Child. Review of developmental principles with special emphasis on social-emotional growth; fostering growth through creative materials and play equipment; guidance philosophy, principles and techniques. Three lab. hours weekly arranged at time of registration. Especially recommended for Home Economics majors. Prerequisite: C.D. 67. (3F, W, S) **Lewis; Eames**

115. Growth of the Infant. Readings in development from conception to fifteen months of age, with discussion of the implications for infant care. Prerequisite: C.D. 67. (3W) **Lewis**

125. Parent Education. Application of fundamental principles of child development and family relationships to educational programs for parents. For students who have some background in child development or related areas. (3F) **Gardner**

138. Survey in Child Development. History of the child development movement, present agencies and programs operating to further the welfare of children; nursery school administration, a two-hour nursery school teaching laboratory weekly. Recommended for all majors, spring quarter of junior year. **Eames; Lewis**

140. Special Problems in Child Development. For qualified students, upon consultation with instructor. Any quarter. Time and credit arranged. **Staff**

174. Nursery School Methods. This must parallel 175. Study and collection of materials used in nursery school teaching, such as stories, pictures. Special consideration to understanding the needs of individual children in the Nursery School and evaluation of procedures used in guiding them. (3F, W, S) **Eames; Lewis**

175. Practice Teaching in the Nursery School. An opportunity to apply principles of child guidance in the nursery school. (6F, W, S) **Staff**

176. Advanced Practice Teaching in the Nursery School. Continuation of course 175; additional opportunity to work with young children. One conference weekly with instructor. Prerequisite: C.D. 175. (4-6F, W, S) **Staff**

210. Research for Master's Thesis. **Staff**

290. Seminar in Child Development. Discussions and reports of current readings in Child Development. (2S) **Staff**

Clothing, Textiles, and Related Arts

Florence Gilmore, Associate Professor, and Head of Department; ***Mignon Perry**, Assistant Professor; **Rhea Gardner**, Associate Professor, Extension Home Furnishings Specialist; **Theta Johnson**, Associate Professor, Extension Clothing Specialist; **Oleta P. Moore** and **Ruth V. Clayton**, Instructors.

Effie Barrows, Professor Emeritus.

A Bachelor of Science degree and a Master of Science degree are offered in Clothing Textiles, and Related Arts.

Students who elect Clothing, Textiles and Related Arts as their majors are required to complete the following courses in addition to the Home Economics core courses: Clothing 24, 25, 105, 115, 125, 140, 165, 170, 175, 185, 191; Household Administration 150; 18 credit hours in the art department to include Art 1, 2, 3, 32 with the additional hours in 111, craft or studio classes.

Students who elect to minor in Clothing, Textiles and Related Arts are required to complete the following courses in addition to Home Economics core courses: C.T.&R.A. 24, 115, plus 7 hours of electives.

The Clothing, Textiles, and Related Arts Department in co-operation with other departments offers majors in the following fields: Costume Design, Textile Design and Research, Teaching of Clothing and Textiles, Home Decoration, and Fashion Merchandising.

In addition to major requirements and Home Economics core, it is recommended that the following courses be taken when planning for a definite occupation:

Fashion Merchandising. Those preparing for Fashion Merchandising may wish to complete a major in Clothing, Textiles and Related Arts and add the following courses: Bus. Ad. 62, 63, 109, 149, 151, 153, 156; Psy. 155; Art 1, 2, 3, 32, 110, and other art courses to complete a minor; Econ. 51.

*On leave.

Costume Design. Those preparing for costume design may wish to complete a major in Clothing, Textiles, and Related Art and add the following courses: Art 1, 2, 3, 110, 111, 132, 135.

Education Majors in Clothing and Textiles who desire to teach in secondary schools should complete a double major of Vocational Home Economics and Clothing and Textiles.

Textile Research. Those preparing for Textile Research should complete a double major in Clothing, Textiles and Related Arts and Exact Science.

Textile Design. Those preparing to design textiles may wish to complete a double major of Clothing, Textiles and Related Arts and Art. The following courses in Art are required: Art 1, 2, 3, 32, 111, 127 and additional work to complete a major.

***Home Decoration.** Those preparing for Home Decoration may wish to complete a major in Clothing, Textiles, and Related Art and add the following courses: Household Adm. 65, 100, 149; Landscape Arch. 3; Art 1, 2, 3, 26, 32, or 132, 122, 123.

Field Trip. A two-day field trip to be taken in the Spring quarter is required of juniors and elective for seniors majoring in Clothing, Textiles and Related Arts. The purpose is to study process related to manufacturing and retailing of fabric and apparel; also to become acquainted with opportunities and requirements for employment in designing, manufacturing, merchandising, advertising, and home decoration.

Home Project. A home project carried out during the summer between the sophomore and junior years is required of all majors in Home Economics Education and Clothing, Textiles and Related Arts. Clothing 25 is a prerequisite. The project is turned in to the department within the first two weeks of the Fall quarter to be scored. The purpose is to develop speed and skill in techniques of construction and fitting through more experience than can be given in class time.

CURRICULUM IN CLOTHING, TEXTILES, AND RELATED ARTS

Junior Year		Senior Year	
Course	Cr.	Course	Cr.
C.T.&R.A. 105	3	C.T.&R.A. 125	5
C.T.&R.A. 115	3	C.T.&R.A. 170	3
C.T.&R.A. 140	3	C.T.&R.A. 185	5
C.T.&R.A. 165	3	C.T.&R.A. 191	2
English 110	4	C.T.&R.A. 175*	3
Art Electives	5		
Other Electives	27		
Total	48	Total	18

Courses

4. Dress and Personality. Open to all college girls desiring assistance in planning and selecting clothes to suit personality. No construction. Girls who expect to major in Home Economics should take 8 instead of this course (2F, W) Staff

6. Dress Construction. Open to all college girls not majoring in Home Economics who wish to develop skill in construction techniques. Construction of a speed project, and a tailored dress, and a skirt. (5F, W, S) Moore

*Given in alternate years; given in 1956-57.

8. Clothing for the College Girl. Designed to assist the college girl in selecting and adapting her clothes in terms of campus activities. The course includes a unit on dress and personality besides a speed project and a tailored dress. Required of all students majoring in Home Economics. (5F, W, S)

Gilmore; Moore

15. Clothing Selection and Appreciation for Men. Men's apparel as related to the wearer. Consideration is given fundamentals of fabric selection. Organized to meet the needs of men from all schools of the college. (2W) Gilmore

24. Textiles. A study of fibers, yarns, fabrics, and finishes related to consumer problems. (3F, W, S)

Gilmore

25. Clothing Selection and Construction. Consideration is given to alteration of commercial patterns, fitting of a basic pattern in muslin, and techniques of designing from a basic pattern. One garment is constructed with emphasis upon selection, fitting, good procedures and finishes. Prerequisite: Clothing, Textiles and Related Arts 8, 24, and prerequisite or parallel Art 2. (3W, S)

Gilmore

33. Home Furnishings. Planned to develop skill in selecting and techniques in making, remodeling, and caring for home furnishings. Laboratory includes instruction on making draperies, refinishing and upholstering furniture. Open to all college students. (3F, W, S)

Clayton

41. Weaving. Designing and weaving of personal and household articles. Aim of the class is to develop understanding of basic fabric construction and skill in various techniques of hand weaving. (F, S) Credit arranged.

Clayton

105. History of Costume. Shows social, economic, political influence on dress and fabric. Modern fashion is interpreted in terms of historic and national costumes and world events. (3F)

Clayton

115. Art in Everyday Living. Study of art elements and principles of design as applied to dress, the home and daily living. Prerequisites: Clothing, Textiles, and Related Arts and Home Economics majors: Art 1 and 2; Clothing, Textiles, and Related Arts 8. For others interested, Art and Clothing to satisfy the instructor. (3F, W)

Clayton

125. Applied Costume Design. Creative experience in dress designing by draping on the dress form. Emphasis placed on fitting and understanding the effect of pattern, grain, and texture on design and dress. Problems consist of making a French lining and draping two garments. Prerequisites: Clothing, Textiles, and Related Arts 25, 115. (5W) Not taught 1955-56.

Clayton

140. Decorative Textiles. Historic textiles including printed and hand-woven textiles, tapestries, damasks, oriental rugs, and laces. Laboratory work consists of weaving, needlecraft and various means of developing decoration for garments, accessories, and household furnishing. (3W)

Clayton

141. Weaving. Advanced problems in weaving. Aim of the class is to develop an understanding of different weaves. Instruction in pattern draft reading. (F, S) Credit arranged.

Clayton

165. Tailoring. Application of techniques used in tailoring suits and coats. Prerequisite: Clothing, Textiles and Related Arts 25, 115. (3F, W)

Gilmore

170. Flat Pattern Designing. Principles underlying design and construction of patterns for various figures. Includes drafting a basic pattern and provides opportunity for further study in designing, fitting, and alteration of patterns. Prerequisites: Clothing, Textiles, and Related Arts 25, 115, and 125. (3S)

Staff

175. Textile Testing. Physical and chemical properties of textiles, fibres, laboratory and household tests used in their identification, and application of these factors to choice and care of the fabrics. Consideration to use of microscope, physical testing and quantitative analysis. Prerequisites: Clothing, Textiles, and Related Arts 24; Chem. 10, 11, and 12 recommended. Outside work required. Alternate years only; offered in 1956-57. (3S)

Gilmore

185. Family Clothing Problems. Emphasis on economic, sociological and psychological problems. Practical problems will include: clothing budgets, selection and construction of children's clothing and care and renovation of clothing. Prerequisite: Clothing, Textiles and Related Arts 8; 24, recommended. (3F, S) **Gilmore**

190 or 290. Special Problems. Independent study under direction of professor of a problem in Clothing, Textiles or Related Arts in which upper division or graduate student has special interest or need. Consult department head before enrolling. Any quarter. Time and credit arranged. **Staff**

191. Readings. Reports and discussions on current literature in Clothing, Textiles, and Related Arts. (2) **Gilmore**

210. Research for Master's Thesis.

Gilmore

Foods and Nutrition

Ethelyn O. Greaves, Dean and Head of Department; **Una Vermillion**, **Ethelwyn Wilcox**, Professors; **Priscilla Rowland**, **Margaret B. Merkley**, **Joan Barber**, Assistant Professors; **Elna Miller**, Extension Nutritionist, Professor.

Students majoring in Foods and Nutrition are required, in addition to the Home Economics core, to complete the following courses: Foods and Nutrition 25, 107, 140, 141, 144, 145, 146, 180, 191; Household Administration 150; Chemistry 10, 11, 12; Biochemistry 90 or 190.

Students majoring in Dietetics or Institutional Management must meet the requirements for the Foods and Nutrition major. In addition, the following courses are required: Bacteriology 10; Physiology 4; Psychology 53; Economics 51; Sociology 70; Business Administration 109; Psychology 102; Education 120; Foods and Nutrition 182 and 183.

CURRICULUM IN FOODS AND NUTRITION

Junior Year		Senior Year	
Course	Cr.	Course	Cr.
F.&N. 107	3	F.&N. 140 and 141	5
H. Adm. 150	4	F.&N. 144	2
F.&N. 180	5	F.&N. 145	4
Biochemistry	5	F.&N. 146	2
English 110	4	F.&N. 191	1
Electives		Electives	

Courses

5. Principles of Nutrition. The relation of food to the health of the individual; factors influencing the body's nutritive requirements; problems applicable to the interest of the individual student. Open to all students. (3F, W, S) **Rowland**

10. Nutrition and Food Preparation. (For men) Nutritive value of foods; present-day problems in nutrition; selection of an optimal diet for health. Principles of food preparation and meal service. Open to men in all schools. Two lectures, one lab. (3W) **Rowland**

24. Food Selection and Preparation. Principles of food selection and preparation. Open to all students. Three lectures and two labs. (5F, W, S)

25. Meal Preparation for the Family. Planning, preparing and serving meals for the family. Consideration is given to nutritional adequacy of meals at different income levels and for special occasions. Prerequisite: Foods 24. (3F, W, S) **Barber, Rowland, Merkley**

Rowland

100. Quantity Food Preparation for School Lunch and Special Occasions. Meets needs of Home Economics Education students. Emphasis on planning balanced school lunches and on organization, preparation, and service of foods in large quantities for special events. (3S) **Vermillion**

107. Experimental Cookery. Development of experimental methods; their application to investigation in cookery and food preservation; literature of the field; preparation of the student for independent investigation in foods. Prerequisites: Organic Chemistry, Foods 24 and 25. Offered in 1955-56. (3S) **Barber**

140. Advanced Nutrition. The fundamental principles of human nutrition and their application to the individual and family group. Prerequisite: Biochemistry 190 or equivalent. (3F) **Wilcox**

141. Advanced Nutrition. Nutritional requirements of the mother during pregnancy and lactation; nutrition of child through infancy to adolescence. (2W) **Wilcox**

142. Nutrition and Dietetics. Fundamentals of chemistry and biology applied to human nutrition with practice in calculation of dietaries. Required of all Home Economics Education students. Prerequisite: Organic Chemistry. (3F) **Barber**

144. Laboratory Methods in Foods and Nutrition. Problems in foods and human nutrition including nitrogen, mineral, and vitamin determinations, a dietary study, and a project in animal experimentation. Prerequisites: Biochemistry 190, or permission of instructor. (2F) **Wilcox**

145. Diet Therapy. Application of dietetic principles to problems of disease with calculation of dietaries in disease. Prerequisite: Nutrition 141. (4W) **Staff**

146. Food Technology. Manufacture and preservation of food products and influence of these processes on physical, chemical, and nutritive values of foods. Prerequisites: Bacteriology 10, Foods 24 (2F) **Greaves**

160. Special Problems. Open to qualified students majoring in Foods and Nutrition upon consultation with instructor. (F, W, S), time and credit arranged. **Staff**

180. Quantity Food Preparation. Application of the principles of food cookery applied to large quantity preparation. Standardization of food quality, production costs and menu planning studied. College food service units used as laboratories. Open to juniors majoring in dietetics or institutional management. (5W) **Vermillion**

182. Institutional Organization and Management. Principles of Scientific management applied to food service unit. Emphasis of organization, personnel relationships, records and sanitation. One unit on specification writing and purchasing methods. (4F) **Vermillion**

191. Seminar in Foods and Nutrition. Reports, discussions, and review of recent scientific literature in nutrition. Prerequisite: Foods and Nutrition 141 or 142. (1S) **Staff**

201. Laboratory Methods in Foods and Nutrition. Problems in foods and human nutrition including nitrogen, mineral and vitamin determinations. Prerequisite: Chemistry 190 or 191, or equivalent. (F, W, or S), time and credit arranged. **Wilcox**

202. Biological Assay of Foods. Problems in biological assay of vitamins in foods. (F, W, S), time and credit arranged. **Wilcox**

103 or 203. Nutrition Laboratory. Microchemical determinations of vitamins and other constituents in small amounts of blood. Prerequisite: Chemistry 190 or 191, or equivalent (F, W, S), time and credit arranged. **Wilcox**

207. **Advanced Experimental Foods.** Development of experimental method and its application to cookery. (F, W, S), time and credit arranged. **Barber**
210. **Research for Master's Thesis.** Credit arranged. **Wilcox**
243. **Recent Developments in Nutrition.** Study of problems in nutrition selected according to needs of students. Prerequisite: Nutrition 140. (2W, S) **Wilcox**
260. **Special Problems.** Open to graduate students in Foods and Nutrition. (F, W, S), time and credit arranged. **Staff**
291. **Graduate Seminar.** Open to graduate students in Foods and Nutrition. (F, W, S), time and credit arranged. **Staff**

Household Administration

Ethelyn O. Greaves, Professor; Waneta Wittler, Assistant Professor; Rhea H. Gardner, Associate Professor, Extension Home Management Specialist; Marjorie P. Bennion, Research Instructor.

A Bachelor of Science degree is granted in Household Administration. Opportunity is offered for studying the effects of social and economic forces on the home and its management.

Students majoring in Household Administration are required, in addition to the Home Economics core, to complete the following courses: Household Administration 55, 65, 100, 150; C.T.&R.A. 33, and 115.

CURRICULUM FOR HOUSEHOLD ADMINISTRATION

Junior Year		Senior Year	
Course	Cr.	Course	Cr.
H. Ad. 149	3	H. Ad. 150	4
H. Ad. 100	2	C.T.&R.A. 115	3
Electives	43	English	4
		Electives	37
Total	48	Total	48

10. Introduction to Home Economics. A course designed to help freshmen students to become better adjusted to college life. Includes help with the library, studying, and how to understand the use of the college catalog. Special help is given on the selection of a major in Home Economics. (1F) **Wittler**

55. Family Finance. Includes the study of personal and family finance with emphasis on finance plans and investments. (2F, or W) **Wittler**

65. Housing. Presents housing needs and practices affecting housing construction and home ownership, also includes evaluation of house plans. (3F, W, or S) **Wittler**

100. Household Equipment. Selection, method of operation, and maintenance of equipment used in the home, with emphasis on kitchen and laundry equipment. (2WS) **Wittler**

149. Home Management. Principles of household management. Includes a philosophy of homemaking, use of human and material resources, and improvement of housing as is related to family living. (3F, W, or S) **Greaves**

150. Home Management House. Residence students are directed in practical management of home experiences. Required of all Home Economics majors. Elective for other students upon consultation with the advisor of Home Management House. Prerequisites: H. Ad. 149; F.&N. 24 and 25. Time arranged. (4F, W, or S) **Wittler**

160. Special Problems. Individual study of management problems in which upper division student wants special help. Consult department head for arrangements. (F, W, or S), time and credit arranged. **Staff**

Home Economics Education

Helen L. Cawley, Associate Professor, and Head of Department; Margaret B. Merkley, Instructor.

A Bachelor of Science degree and a Master of Science degree may be earned in Home Economics Education.

The following professional program prepares graduates for teaching courses in homemaking. It certifies graduates to teach all phases of homemaking in Utah schools, including high schools having George-Barden (vocational homemaking) courses.

It is important that students register with the instructor for Education 121 and 122 two quarters before they plan to do their student teaching. This provides the time necessary to obtain co-operation of schools to provide enough teaching assignments for those registering in these courses.

FRESHMAN AND SOPHOMORE YEARS

In addition to the Home Economics core courses, the following lower division courses are required to meet Utah certification requirements in Home Economics Education: Child Development 80; Sociology 60; Clothing, Textiles and Related Arts 24 and 25 and 33; Household Administration 55 and 65; Foods and Nutrition 25.

Other elective courses in Home Economics and related subjects should be selected carefully by the student.

To meet college group requirements, the student planning to major in Home Economics Education needs to keep in mind:

1. Prerequisites: Art 1, 2; Chemistry 10, 11, 12; Psychology 53.
2. Group requirement recommendations: Zoology 1 or Botany 1 (Principles of Biology); Bacteriology 10 or Physiology 4; Economics 51 or Agricultural Economics 62; English 24; Music 1; Speech 1; History, Literature, Political Science and Sociology 10 or 70.
3. Elective recommendations: Students are advised to consider:
 - a. Developing a subject interest into a teaching minor; e.g., Art, Commerce; English, Music, Physical Education, and Social Science.
4. Home Project: A home project carried out during the summer between the sophomore and junior years is required of all majors in Home Economics Education and Clothing Textiles and Related Arts. Clothing 25 is a prerequisite. The project is turned in to the department within the first two weeks of the Fall quarter to be scored. The purpose is to develop speed and skill in techniques of construction and fitting through more experience than can be given in class time.

CURRICULUM IN HOME ECONOMICS EDUCATION

Junior Year		Senior Year	
Course	Cr.	Course	Cr.
C.T.&R.A. 115	3	C.D. 125	3
C.T.&R.A. 165	3	F.&N. 142	3
F.&N. 146	2	H. Ad. 150	4
H. Ad. 149	3	Edu. 112, 121, 122	15
Soc. 60	3	Electives	23
English 110	4		
Edu. 114, 120	6		
Public Health 155	3		
Psych. 102	5		
Electives	16		
Total	48	Total	48

Courses to complete requirements for professional education may be elected. (Check with major professor to be sure requirements for certification are being met.)

The following upper division courses in Home and Family Living and related departments are recommended as electives: Foods and Nutrition 100; Clothing, Textiles and Related Arts 185; Sociology 160, 162, or 262.

EXTENSION SERVICE CURRICULA

Requirements for entering the Extension Service as County Home Demonstration Agents:

Completion of Home Economics Education curriculum as outlined, and in addition:

Journalism 12	3
Public Speaking 4 or 5	5 or 3
Sociology 141	3
Extension Methods 151	3

A 3-month training period in a county under supervision is advised of prospective Home Demonstration Agents. Plans for this training are made with Director of Extension Service.

Courses

Education 120. Methods in Teaching Home Economics. Contributions of Home Economics to the educational program. Analysis of teaching situations based upon observation of school activities. Prerequisite or parallel: Psych. 102. (3F or S) Staff

Education 121. Problems in Teaching Home Economics. Study of recent investigation in Home Economics and General Education and their bearing upon Home Economics curriculum and teaching methods. (Especially for students who are to qualify for a Vocational Certificate.) This course should be blocked with Education 122 and with one other 3-hour Education course so that concentrated work may be participated in on the campus prior to and following the off-campus student teaching experience. Prerequisite: Ed. 120. (4F, W or S) Cawley

Education 122. Student Teaching in Home Economics. Observation and teaching of homemaking under supervision in public schools having cooperative arrangement with College. Student teacher leaves campus the middle five or six weeks of Fall, Winter, or Spring quarter and teaches a full homemaking program each day in an approved school. An occasional student may find it impossible to do student teaching on this block plan. Such a student must receive approval of the instructor of Ed. 121 and 122, preferably at beginning of her junior year, to make other arrangements for student teaching. In the latter case, the student teacher will teach at least two hours daily in an approved local school. Prerequisites: Ed. 120, 121. (8F, W, or S) Staff

199. Special Problems in Home Economics Education. Developed around individual needs of students not otherwise provided for in curriculum. (1-2F, W, S) Staff

210. Research for Master's Thesis. Credit arranged.

Cawley

237. Seminar. Opportunity for investigation and reporting on individual problems.

CERTIFICATION REQUIREMENTS FOR TEACHERS OF VOCATIONAL HOMEMAKING IN SECONDARY SCHOOLS

Follow the Home Economics Education curriculum. For transfer students, credits are evaluated by staff members and equivalent course work is accepted. Requirements for certification follow:

Group I

Nine credits in courses which assist in understanding young people of school age.

†Psychology 102	5
†Public Health 155	3
Psychology 112	3
Education 113	3

Group II

Six credits in understanding for school.

†Education 114	3
†Education 111 or 112	3

(Educ. 112 is usually blocked with Educ. 121)

Group III

Fifteen credits in Student Teaching, including methods.

†*Education 120	3
†*Education 121	4
†*Education 122	8

A total of thirty-three credits in professional education, including Public Health 155, must be presented to meet the requirements for the General Secondary Certificate and the Vocational Homemaking in Secondary Schools Certificate. Special courses recommended for Certification in Vocational Homemaking Education are listed above. These professional courses plus the prescribed subject matter courses in Home Economics are necessary for certification in Vocational Homemaking Education in Secondary Schools.

Types of service available to teachers:

1. Special guidance and help are given teachers who wish to return to school to meet requirements for renewing their certificates.
2. Opportunity to meet certification requirements is offered teachers or other persons.
3. Advanced study leading to Master of Science degree in Home Economics Education is offered.

*It is necessary to make arrangements for specific Education course with Major professor at time when plans are made for Ed. 121 and 122.

†Required courses.

SCHOOL OF HUMANITIES AND SCIENCES

CARLTON CULMSEE, DEAN

School of Humanities and Sciences	228
General Studies	229
Philosophical Literature	231
Pre-Medical Training	232
Pre-Dental Training	233
Bacteriology and Public Health	234
Botany and Plant Pathology	235
Chemistry	236
English	239
Journalism	243
Photographic Journalism	245
Geology	245
History	247
Landscape Architecture and Planning	249
Mathematics	250
Military and Air Science and Tactics	251
Modern Languages and Latin	252
Physics	255
Speech	257
Zoology, Entomology, Physiology	262

General Information

Besides training students for studies in the technical divisions of the Institution, the School of Humanities and Sciences enables all students in the College to lay the foundation for a liberal education. The need to understand our own culture as well as the cultures of other nations has never been so urgent as now. Such understanding is the surest path to permanent peace. Many courses in Humanities and Sciences qualify the student directly to play his part as an informed citizen in attempts to realize that great hope. The curricula of Humanities and Sciences also enable students to major in its departments and thus begin preparation for their careers.

The School of Humanities and Sciences includes the departments of Bacteriology and Public Health, Botany and Plant Pathology, Chemistry, English and Journalism, Photographic Journalism, Geology and Geography, Landscape Architecture and Planning, Mathematics, Military Science and Tactics, Modern Languages and Latin, Physics, Speech, Zoology, Entomology, and Physiology.

General Studies

TWO-YEAR PROGRAM IN GENERAL EDUCATION

Students may earn the title of "Associate in Arts" or "Associate in Sciences" and a two-year diploma by completion of a program in basic education. It is believed that the prescribed studies will be very helpful to any student, whether he completes only two years of college or whether he continues until he receives a B.S. degree. Although the total number of credit hours required in this program is larger than that required for the completion of the "group requirements" now current, the student may also specialize to some extent in these first two years of college.

The courses, which are drawn from the Schools of Humanities and Sciences, Business and Social Sciences, and Education, are as follows:

Physical Science

Physical Science 31, 32, 33. Central Principles3-3-3 Credits

Biological Science

Biology 1. Principles of Biology5

Physiology 4 or lower division Bacteriology5

Heritage of Civilization

History 4. Ancient World Civilizations5

History 5. Modern World Civilizations5

Citizenship

History 13 or 14. U. S. History5

Pol. Sci. 1. Government and the Individual5

(or)

Pol. Sci. 10. American National Government5

Communication

English 17, 18, 19. Freshman English9

Speech 1. Speech Fundamentals5

Humanities

English 40. World Literature	5
English 60. English Literature	5
English 53. American Literature	5
(or)	
One year of a foreign language	14 or 15 credits
(or)	
Art. 3. Art Understanding and Appreciation	3
Art. 26. History and Appreciation of Architecture	3
Art. 36. Development of Modern Art	3
(or)	
Music 1. The Art of Listening	3
(or)	
Music 90. Music in General Culture	3

Men should also register for Basic Military or Air Science each quarter, and women for a Physical Education activity course each quarter.

Advisers would do well to help students choose classes in health, family living, diet and nutrition, economics and financial planning, and other courses of high functional value in today's living.

INTEGRATED COURSES

The following are broad integrated 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 Department of Bacteriology and Public Health, Botany and Plant Pathology, and Zoology

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 to environments, kinds of living things, reproduction, development, inheritance, and evolution. Five lectures. (5F, W, S, or Su) **Staff**

Physical Science

Administered by the staffs of the Departments of Chemistry, Geology, and Physics

31, 32, 33. **Physical Science.** Principles essential to understanding the physical universe. Elements of astronomy, chemistry, geology, and physics integrated for use in interpreting human experiences. Intended to meet the physical science group requirements upon completion of all three quarters. (3F, 3W, 3S) **Staff**

Humanities (Languages and Arts)

English 40. World Literature. A broad course including study of epic, romance, tragedy, comedy, and satire, as these forms have appeared in Greek, Roman, Hebrew, Italian, French, German, English and American literature. (5F, W or S) **V. Nielsen; Hansen**

(In addition, it is recommended that the student complete at least one of the following: English 45—Philosophical Literature; English 53—American Literature. Also it is recommended that the student complete one of the following: Art 3, 26, 36; Music 1, 90.)

Two years of a foreign language are also recommended as an option for satisfaction of the Language and Arts, or Humanities, group requirement.)

Social Sciences

History 4. Ancient World Civilization. An integrated course in the cultural heritage of the world from earliest times to the sixteenth century. The Near and Far eastern civilizations with emphasis on the European heritage: Greece, Rome, Christianity, the Middle Ages, Renaissance and Reformation. (5F or S) Ellsworth

History 5. Modern World Civilization. The cultural heritage of the world from the sixteenth century to the present. Emphasis on European civilization and its spread in the world—the Americas, the Near and Far East. (5W) Ellsworth

(Political Science 1—Government and the Individual, and History 13, 14—United States History, are also recommended.)

Students are encouraged to broaden their liberal education with other courses in basic sciences and humanities, landscape architecture, political science, economics, and sociology.

Philosophical Literature

Most of the courses listed below have been cross-referenced from other departments. The major part of their content is philosophical. They are assembled here for the convenience of students interested in the interpretations which philosophers 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.

The philosophical content in many other courses in History, Political Science, and Literature 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.

It is recommended that students take advantage of the instruction in religious philosophy offered by the churches of Logan. Of such work, those courses classed as non-secular yield college credit.

45. Readings in Philosophical Literature. Selected readings in works by great philosophers from Plato to the present. (5W) English 45. Hayward

46. The Bible as English Literature. Provides an opportunity for first-hand acquaintance with the great book of books. (5S) English 46. Vickers

47. Readings in Greek Literature. Provides an opportunity to become acquainted with Greek epics and dramas. (5F) English 47. Vickers

107. History of Biology. The more important men and ideas in the historical development of biology. (4F) Zoology 107. Gardner

117, 118, 119. American Political Thought. The development of American ideas concerning the State and political authority from colonial times to the present. The nature and purpose, modes of organizing and controlling political action in terms of historical and social origins; and applicability to modern problems. Students may register for one, two or three quarters. (2F, 2W, 2S) Political Science 117, 118, 119. Staff

131. Organic Evolution. Critical study of the facts of evolution as obtained from consideration of comparative anatomy, embryology, geographical distribution, blood tests, and other fields upon which the doctrine of evolution is based. Factors causing evolution are considered and discussions undertaken on other bodies of related thought. Prerequisite: Zoology 1 or 2, or 3 and 4. 111 and 112 recommended. (3W) **Gardner**

134. Literary Criticism. Masterpieces of criticism from Plato and Aristotle to Croce studied to develop an awareness of critical standards throughout the ages. (4S) English 134. **Edwards**

145, 146. History of Political Thought. No. 145 covers political theories and ideas from the Greek period to Martin Luther. No. 146 continues the study of political theories from Luther to 18th Century. Students may take either or both quarters. (3F, 3W) Political Science 145, 146. **Staff**

150. Recent Political Thought. Political ideas and writers from the close of the 18th Century to the present with emphasis on analysis of the backgrounds of currently changing political concepts. Examination of contemporary political ideologies. (3S) Political Science 150. **Staff**

155. Emerson. Detailed analysis of his poetry and essays; consideration of his relationship to other major writers in this period. (2) English 155. **Smith**

175. History of American Democratic Thought. American democratic thought from the Revolutionary War to the present. (3W) History 175. **Ricks**

PRE-MEDICAL TRAINING

The School of Humanities and Sciences 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				Sophomore			
	F	W	S		F	W	S
Zoology 3, 4	5	5	....	German, French or			
Chem. 3, 4, 5	5	5	5	Latin	5	5	5
Math. 34, 35, 44 or 46	3	5	3	English 10 .....	....	5	....
English 40 or 52 .....	....	....	5	Physics 17, 18, 19	5	5	5
Military Science	1	1	1	Electives	7	2	7
Electives	3	1	3				
Total	15	17	17	Total	17	17	17

Junior			
	F	W	S
Chem. 121, 122 or 125, 126	5	5	....
Zoology 112	5	....	....
Zoology 118 .....	....	5	....
English 110 .....	....	....	4
Chem. 115 .....	....	....	5
Electives	7	7	8
Total	17	17	17

Recommended electives are Scientific Vocabulary (Eng. 5), Psychology, College Grammar, Technical Writing, History, Political Science, Sociology, Economics, Philosophical Literature or other literature classes. Some medical schools require and a number recommend Comparative Anatomy.

Pre-medical students interested in graduation from this College before attending medical school may major in any subject in which they are interested.

Students interested in a pre-osteopathic program should consult the pre-medical adviser.

Students planning to receive a B.S. degree on a combined curriculum (three years here and one year in a medical or a dental school) must fulfill the group and English composition and military requirements of this College and must complete a minimum of 141 credits of pre-professional work.

Medical Technology

The School of Humanities and Sciences offers the courses which satisfy the entrance requirements for Medical Technology internships in the United States, Canada, and Hawaii. A two-year course is required to complete minimal requirements. However, the college provides a three-year course which combined with the internship qualifies a student for the B.S. degree. For this degree program the college has affiliations with the L. D. S. Hospital in Salt Lake City, St. Benedict's Hospital in Ogden, and Thomas Dee Memorial Hospital in Ogden. At the satisfactory completion of the internship, the student is qualified to take the registration examination given by the Registry of Medical Technologist of the American Society of Clinical Pathologists.

For further details contact Garth A. James in the Department of Bacteriology and Public Health.

PRE-DENTAL TRAINING

Students planning to enter the profession of dentistry may take the necessary courses in the school of Humanities and Sciences to satisfy requirements for admission to any school of dentistry in the United States.

Suggested Pre-Dental Schedule

Freshman

	F	W	S
Chemistry 3, 4, 5	5	5	5
Zoology 3, 4	5	5	.....
Mathematics 34, 35, 44	3	5	3
English 40 or 52 .....	.....	.....	5
Military Science 1, 2, 3 or P. E.	1	1	1
Electives (optional)	3	1	3
Total.....	17	17	17

Sophomore

	F	W	S
Physics 17, 18, 19	5	5	5
Military Science 4, 5, 6, or P. E.	1	1	1
Electives (optional)	6	12	12
Total.....	12	18	18

Junior*

	F	W	S
Chemistry 125, 126	5	5	.....
Zoology 118 or 119 .....	.....	5	or 5
English 110	4	.....	.....
Electives	8	7	12
Total.....	17	17	17

*Students with unusually good records may sometimes be 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.

Recommended electives are Psychology, History, Political Science, Sociology, Economics, Scientific Vocabulary, and other English courses.

Students planning to receive a B.S. degree on a combined curriculum (three years here and one year in a medical or a dental school) must fulfill the group and English composition and military requirements of this College and must complete a minimum of 141 credits of pre-professional work.

B. S. IN NURSING

Persons who have Registered Nurse credentials may pursue studies toward their bachelor of science degree. Credits earned toward the R. N. are applied toward the B. S. as evaluated by the Registrar. Such students may be graduated with a major in Nursing or they may elect to complete their college work in some such field as Public Health or Bacteriology.

Bacteriology and Public Health

Administered jointly by the School of Agriculture and School of Humanities and Sciences

W. Whitney Smith, Professor and Head of Department; Kenneth R. Stevens, Professor; Lewis W. Jones, Associate Professor; Garth A. James, Instructor; John H. Carlquist, Special Professor; Homer Clark, Special Associate Professor; Russell S. Fraser, Special Assistant Professor. Special staff members from the Cache Valley Medical Association.

Bachelor of Science Degree

General Bacteriology majors should take: Bact. 70, 71, 101, 104-105 or 120, or 110, 131, 160, 168, 172, 173, 180, 291; Chemistry 3, 4, 5, 115, 125, 126, 191; Mathematics 35, 44; Physics 17, 18, 19 (6 and 7 are accepted in special cases); Public Health 50; Botany 24, 25; Zoology 3, 4; Library Science 106.

Clinical (Medical Laboratory) Technology Majors should take during their first, second and third years: Bact. 70, 71, 172, 173, 101, 131, 160, 161, 168, 291; Chemistry 3, 4, 5, 12, 17, 18, 190, 192; Physiology 4; Physics 6, 7; Public Health 50; Zoology 3, 4, 116, 129; and meet all college requirements except for total credits and upper division. A hospital internship for twelve months shall be completed during the fourth year, which shall include instruction in Bact. 133, 134, 135, 136, 137, 138, 139. Utah State Agricultural College has made provisions for instruction of laboratory technicians in this internship in the W. H. Groves L. D. S. Hospital in Salt Lake City or the Thomas Dee L. D. S. Hospital in Ogden. During this fourth year, students register for three quarters. When this program is satisfactorily completed, students are eligible for the Bachelor of Science degree in Medical Technology. The 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 Garth A. James for further details.)

Health Education Majors should take: Public Health 15, 50, 151, 152, 153, 156; Bacteriology 10; Physical Education 55, 84, 135, 145, 181; Foods and Nutrition 5.

Physical Education—Health Education composite majors should consult Professor H. B. Hunsaker.

Minors in Health Education should take: Public Health 15, 50, 151, 156; Physical Education 135, 145; Social Work 165; plus Electives, Physical Education 55, 84, 181; Foods and Nutrition 6; Psychology 145 or Social Work 162.

Public Health Majors should take: Public Health 50, 151, 152, 153, 155; Bacteriology 10 or 70, 71; Dairy 6, 7; Physiology 4; Zoology 3, 4, 111, 116.

Master of Science Degree

Research and graduate courses are available in various specialized subjects, with strong support from related departments and agencies. Courses numbered 200 and above are designed for graduate students. Courses 110, 120, 131, 151, 153, 161, 168, and 180 may be used for credit by graduate majors in Bacteriology. These courses and the following — 104, 105, 151, 156 and 160 — may be modified and used for credit by graduate students in related departments.

See "Bacteriology and Public Health" in the School of Agriculture for course listings and other degree offerings.

Botany and Plant Pathology

Administered jointly by the School of Agriculture and School of Humanities and Sciences

Ralph W. Ames, Professor and Head of Department; W. S. Boyle, George W. Cochran, Herman H. Wiebe, Associate Professors; Arthur H. Holmgren, Associate Professor and Curator of the Intermountain Herbarium; Richard J. Shaw, Instructor; John L. Chidester, Thomas J. Denman, Research Associates; Orson S. Cannon, Eugene H. Cronin, Leonard L. Jansen, George H. Kaloostian, Bryce N. Wadley, Robert Zundel, Collaborators, U. S. Department of Agriculture. B. L. Richards, Professor Emeritus.

Bachelor of Science Degree in Botany

Study and research in Botany focus upon four major fields of study: cytology, pathology, physiology, and taxonomy. Course requirements for all fields of botany include: Botany 24, 25, 30, 117, 120, 240, 241, 242; Math. 35; Chem. 10, 11, 12; Zool. 112. Required additional courses for the various fields of botany are as follows: Cytology: Botany 116, 118, 130 or 150; Zool. 3, 4, 131; Chem. 124, 125; Physics 6, 7; Pathology: Botany 116, 130, 150; Zool. 2; Ent. 108; Physiology: Botany 130 or 150; Zool. 3, 4; Taxonomy: Botany 116, 118, 130, 150; Zool. 1107, 131, 214; Agronomy 56; Range Management 126; German 1, 2, 3; Latin 1, 2, 3.

Recommended additional courses for specialized fields include: Cytology: Botany 130 or 150; Math. 44, 97, 98, 99; Pathology: Botany 221, 222, 223; Ent. 230; Math. 44, 97, 98, 99; Chem. 124, 125; Physics 6, 7; Ag. Econ. 53; Bact. 70; Agronomy 131, 132, 56; Hort. 131; 1, 4, 6; Physiology: Botany 116, 130 or 150, 224; Math. 44, 97, 98, 99; Chem. 124, 125, 115; Physics 20, 21, 22; Bact. 180; Agronomy 56, 131, 132; Toxonomy: Agronomy 131, 132; Botany 104, 108, 112.

Course requirements for a teaching major: Botany 24, 25, 30, 120, 130.

Master of Science Degree in Botany

The Department of Botany offers opportunity for research and graduate study leading to the Master of Science degree in the following specialized fields: Cytology, Pathology, Physiology, Taxonomy. The research and graduate possibilities in these subjects are greatly augmented through the cooperation of the Utah State Agricultural Experiment Station, United States Department of Agriculture, and the Intermountain Herbarium.

The following courses may be used for graduate credit by students majoring in the Department of Botany: 104, 118, 121, 135. In addition to the courses listed above, students in other departments may receive graduate credit for 117, 120, 130, 150.

See "Botany and Plant Pathology" in School of Agriculture for course listings.

Chemistry

Melvin C. Cannon, Professor and Department Head; Delbert Greenwood, Theodore M. Burton, Professors; Harris O. Van Orden, Norman Bauer, Garth L. Lee, Associate Professors; Sigrid S. Kennington, Instructor.

The degree of Bachelor of Science in Chemistry is a professional degree, and graduates must meet the minimum requirements of the American Chemical Society besides fulfilling the group requirements of the College given in the introduction of this catalog. To aid students in registering, the following suggested schedule is given.

Sherwin Maeser, Professor Emeritus.

Suggested Schedule

Freshmen

- A. For students who have completed 1½ units of high school algebra and ½ unit of geometry:

	F	W	S
Chem. 3, 4, 5	5	5	5
Math. 35, 46, 97	5	5	5
Group requirements in biological and/or social sciences	5	5	5
Physical Education or Military Science and Tactics	1	1	1
Total.....	16	16	16

- B. For students who enter college with credit for only 1 unit of algebra and ½ unit of geometry:

	F	W	S
Chem. 3, 4, 5	5	5	5
Math. 34, 35, 46	3	5	5
Group requirements in biological and/or social sciences....	8	5	.....
Eng. 10 or 11 (special petition must be made to take this course in freshman year).....	—	—	5
Physical Education or Military Science and Tactics	1	1	1
Total.....	17	16	16

Sophomores

- A. For students with mathematics:

	F	W	S
Math. 98, 99	5	5	.....
English 10 .....	.....	.....	5
Physics 20, 21, 22	5	5	5
Chemistry 17, 18	5	5	.....
Lower Division requirements .....	.....	.....	5
Physical Education or Military Science and Tactics	1	1	1
Total.....	16	16	16

NOTE: Five credits lower division group requirements must be completed in junior year.

- B. For students with incomplete mathematics:

	F	W	S
Math. 97, 98, 99	5	5	5
Physics 20, 21, 22	5	5	5
Chemistry 17, 18	5	5	.....
Lower Division group requirements .....	.....	.....	5
Physical Education or Military Science and Tactics	1	1	1
Total.....	16	16	16

Juniors			
	F	W	S
Chemistry 121, 122, 123	5	5	5
German	5	5	5
Electives in geology, biology, social science, English	5	5	5
Total.....	15	15	15

Seniors			
	F	W	S
Chemistry 104, 105, 106	3	3	3
Chemistry 109, 110, 111	1	1	1
Chemistry 135			3
Chemistry 160	1	1	1
Chemistry 191			5
English 111		4	
Physics 120, 121, 130	3	3	3
Electives (must include at least 3 credits adv. Chem.).....	9	4	
Total.....	17	16	16

Master of Science Degree in Chemistry

The Chemistry Department offers the Master of Science degree with research in any one of the following fields: Analytical, Biological, Inorganic, Organic, and Physical. Besides graduate courses (in the 200 series), courses 116, 135, 155, 191 may be used towards the Master's degree in Chemistry. Any course in the 100 or 200 series may be counted towards the Master's degree by other departments if the student's supervisory committee approves.

Before admission to candidacy for the degree, all graduate students are required to pass the National Cooperative Test Examinations of the American Council of Education for undergraduate training in General Chemistry, Qualitative Analysis, Quantitative Analysis, Organic Chemistry and Physical Chemistry.

Courses

3, 4, 5. Chemical Principles and Qualitative Analysis. Introduction to chemical theory and principles of chemistry, including introductory qualitative analysis. Prerequisites: high school chemistry or physics, algebra and geometry. For science majors, pre-medical and pre-dental students, home economics majors in foods and nutrition. Three lectures, two labs. (5F, 5W, 5S)

Maeser

10, 11, 12. General Chemistry. Fundamental principles of inorganic and organic chemistry. A one-year terminal course open to any matriculated student. Students with a grade of B or higher may enter Chemistry 5 in the spring quarter. (5F, 5W, 5S)

Lee, Van Orden, Kennington

17, 18. Quantitative Analysis. Theory and practice of gravimetric and volumetric analysis. A terminal course for majors in agriculture and home economics. Prerequisite: Chem. 5 (5F, 5W)

Cannon

31, 32, 33. Physical Science. Principles essential to understanding the physical universe. Elements of astronomy, chemistry, geology, mathematics and physics integrated for use in interpreting human experience. Intended to meet the physical science group requirements upon completion of all three quarters. (3F, 3W, 3S)

Staff

104, 105, 106. Physical Chemistry. Quantitative methods for solving problems in chemical thermodynamics, electrochemistry, reaction kinetics, phase rule and quantum theory. Prerequisites: Chem. 5; Physics, 20, 21, 22; Math. 99. (3F, 3W, 3S)

Bauer

107, 108. Dairy Chemistry. The chemistry of milk and milk products including tests for adulterants, preservatives, and routine quantitative methods of analysis of dairy products. Taught alternate years. Prerequisites: Chem. 12 or equivalent. (4F, 4W)

Van Orden

109, 110, 111. Physical Chemistry Laboratory. To accompany Chemistry 104, 105, and 106. (1F, 1W, 1S) **Bauer**

115. Quantitative Analysis, A Brief Course. Basic theory and laboratory practice of quantitative analysis. A terminal course designed primarily for pre-medical and pre-dental majors. Prerequisites: Chem. 5 (5S) **Cannon**

116. Inorganic Preparations. A laboratory course in practical laboratory methods of synthetic inorganic chemistry. Prerequisites: Chem. 5. Any quarter. Time and credit arranged. **Lee**

121, 122, 123. Organic Chemistry. Fundamentals of chemistry of carbon compounds. Terminal at the end of the second quarter for non-chemistry majors who do not desire more than ten hours credit. Prerequisites: Chem. 5 or Chem. 11. (5F, 5W, 5S) **Burton**

124. Organic Preparations. An advanced laboratory course in the synthesis of more complex compounds. Prerequisite: Chem. 123. (3F) **Burton**

135. Chemical Literature. Exercises in finding, assembling and using information available in technical publications. (Given alternate years. Not given 1955-56.) (3S) (This course should precede or accompany English 111.) **Burton**

155. Glass Blowing. A laboratory course in the technique of manufacture and repair of laboratory glassware. (2W) **Burton**

160. Seminar. (1F, 1W, 1S) Time arranged. **Staff**

190. Elementary Biochemistry. The chemistry of carbohydrates, fats, proteins, enzymes, vitamins, hormones and minerals and their transformations in plants and animals. Prerequisite: Chem. 12. Terminal course not considered to serve as prerequisite for Advanced Biochemistry. **Van Orden**

191. Fundamentals of Biochemistry. The chemistry of carbohydrates, fats, proteins, enzymes, vitamins, hormones and minerals and their transformations in plants and animals. Prerequisite: Chem. 122. Prerequisite for Advanced Biochemistry. **Van Orden**

198. Undergraduate Research Problems. Any quarter. Time and credit arranged. **Staff**

215. Chemical Thermodynamics. Application of basic thermodynamic principles to selected physical-chemical problems. Prerequisites: Physical Chem. 104, 105, 106; Math. 98, 99. (5W) **Bauer**

225, 226, 227. Advanced Organic Chemistry. Lecture course for graduate students. Includes modern theories and special topics in organic chemistry. Taught alternate years. (Taught 1956-57.) Prerequisites: Chem. 123, 106. (3F, 3W, 3S) **Burton**

232. The Colloidal State and Surface Chemistry. Fundamental properties of colloiddally dispersed systems. Application of physical-chemical principles to surface and membrane phenomena. Examples of colloidal behavior are selected from diverse fields of interest, such as: industrial catalysis, dairy processing, cell physiology and soil mechanics. Prerequisites: Physical Chem. 104, 105, 106; Math. 98, 99. (5F) **Bauer**

234. Qualitative Organic Analysis. The classification, reactions and laboratory work involved in identification of unknown organic compounds. Taught alternate years. (Taught in 1955-56.) Prerequisites: Chem. 19 and 123. (3S) **Burton**

250. Advanced Inorganic Chemistry. Based on the periodic table and atomic structure. Designed for Chemistry seniors and graduates and others having similar training. (Taught alternate years. 1956-57.) (3S) **Lee**

252. Chemical Forces and Molecular Structure. An interpretation of chemical and physical properties of matter in terms of electrostatic and electrodynamic forces between fundamental particles. Structural properties derived from X-ray crystallography are emphasized. Prerequisites: Chem. 104, 105, 106; Math. 98, 99. (5S) **Bauer**

270. Chemical Microscopy. Lecture and laboratory practice in use of the microscope and its accessories as applied to chemistry, with special reference to rapid qualitative methods and analysis of minute amounts of material. Prerequisite: Quantitative Analysis. (2 or more; W) Cannon

272. Optical Methods of Chemical Analysis. Problems in spectroscopy, spectrophotometry, colorimetry, refractometry, and microscopy. Prerequisites: Quantitative Analysis and Physical Chem. or special permission. (3F) Cannon

(Offered 1955-56 and alternate years following).

273. Electro-Chemical Methods of Analysis. Instruction in Potentiometry, Polarography, Electro-analysis, and related methods as applied to analytical chemistry. Prerequisites: Quantitative Analysis and Physical Chem. (3W)

(Offered 1955-56 and alternate years following).

274. Advanced Quantitative Analysis. Special problems in quantitative analysis. Prerequisite: Chem. 19. Time and credit to be arranged. Cannon

289. Animal Metabolism. Feeding experiments involving development of amino acid, vitamin, mineral, and other nutritional deficiencies in animals. Chemical and biological tests made on rations, animal tissues, blood, urine, and other secretions and excretions when indicated. Time and credit arranged. Greenwood

292. Biochemistry. Problems in metabolism—micro-methods of blood and urine analysis with their applications to metabolism and to the diagnosis and treatment of disease. Prerequisite: Chem. 190 or 191 or equivalent. (3F) Greenwood

293. Biochemistry. Preparations of enzymes or amino acids as arranged. Prerequisite: Chem. 109 or 191. Time and credit arranged. Any quarter. Greenwood

294. Biochemistry. Microbiological and colorimetric methods for determination of vitamins and amino acid in plant and animal tissues. Prerequisite: Chem. 190 or 191 and Bact. 70 or 71. (3W) Greenwood

295. Advanced Biochemistry. Enzymes and their functions in plants and animals. Prerequisite: Chem. 191 (3F) or Chem. 190 plus Chem. 122.

(Taught 1955-56 and alternate years following).

296. Advanced Biochemistry. Carbohydrates, fats, proteins and minerals and their metabolism in plants and animals. Prerequisite: Chem. 191 (3W) or Chem. 190 plus Chem. 122. Van Orden

(Taught 1955-56 and alternate years following).

297. Advanced Biochemistry. Vitamins and hormones and their functions in plants and animals. Prerequisite: Chem. 191 or Chem. 190 plus Chem. 122. (3S) (Taught 1955-56 and alternate years following). Van Orden

298. Research. Graduate students majoring in chemistry may elect research in any branch of the subject. Any quarter. Time and credit arranged. Staff

English

King Hendricks, Professor and Department Head; Carlton Culmsee, Hubert W. Smith, Wendell M. Keck, Ira N. Hayward, Professors; Moyle Q. Rice, Associate Professor; Stanley P. Andersen, Thornton Y. Booth, John J. Stewart, Maxwell D. Edwards, Blair Hansen, J. Lynn Mortensen, Assistant Professors; Pearl S. Budge, Veneta Nielsen, John S. Bullen, Instructors.

Wallace J. Vickers, Professor Emeritus.

English Major Requirements

Lower Division: English 1, 53, 60; either English 40, 45, 46, or 47; History 34; one year of a foreign language.

Upper Division: English 105, 117, 162, 163, two period courses (161, 175, 180, 190, 191), 150, or 151, and one additional course in American Literature numbered above 150. English 124 is recommended for English majors and teaching majors in English. Teaching majors in English meet the same requirements as English majors except for foreign language.

English-Speech Composite Major: English 1, 53, 117, 163, 180, 190, 191; Journalism 12 and 112; Speech (see listing under the department of Speech and Drama).

Courses

A. Drill in Essentials of English. To assist students with English deficiencies. Students whose standing in the Freshman Placement Examination show the need of such assistance are assigned to one of the sections as a prerequisite for English 10 or English 17. (3F, W or S) Daily. **Staff**

B. English for Foreign Students. Basic training in the structure of the language with exercises and drills for increasing comprehension and ability to write accurately. It is required of all foreign students failing to make required scores on English proficiency examinations administered at time of entrance into the College. Other foreign students may take the course as an elective. Daily. (3) **Meyer**

C. English Phonetics for Foreign Students. To train foreign students in the sounds of English, and to increase their ability to speak with the rhythm and intonation of American English. May be taken in conjunction with B. Daily. (3) **Meyer**

1. College Grammar. (5 F or W)

Vickers

2. Mechanics of Writing. An elective review course for the student of average ability, providing instruction in fundamentals of sentence structure, usage, punctuation, and spelling, and including a limited amount of writing. Not counted toward fulfilling the composition requirement. (3F, W or S) **Mortensen**

5. Scientific Vocabulary. A study of word formation and derivation as a means of understanding scientific terms and of increasing vocabulary. (3F, W or S) **Keck; Hansen; Andersen**

10. Sophomore Composition. Required of all students not offering its equivalent. May not be taken in the freshman year. Emphasizes correctness and effectiveness in sentence, paragraph and theme; gives practice in organization and outlining of information, and in expository writing; demands clear, forceful expression, and requires a full third of a student's time. (5F, W or S) **Staff**

17, 18, 19. Freshman. For Forestry, Engineering, and Technology students only. Drill in fundamentals of sentence and paragraph structure. Exercises in grammar, vocabulary, and spelling. Composition, with stress on intelligent thinking and clear expression. (3F, 3W, 3S) **Staff**

31. Floating Poetry. Poetry that has lived in oral tradition since medieval times. The course is divided into four parts: the narrative ballad, the non-narrative poem, Negro poetry (including slave songs and spirituals), and children's poetry. (3) **Hendricks**

32. Reading in Poetry. To develop appreciation for poetry. Verse forms, various types of poems, and the idea underlying lasting poetry are considered. (5F, W or S) **V. Nielsen**

33. Contemporary Short Story. The technique of the short story. English, American, and European stories are analyzed. Encouragement is given students who wish to write. (3F, 3W, 3S) **Rice**

35. Nineteenth Century Novel. Reading and analysis of the best novels by major English, American, and Continental novelists. (3W) **Edwards; Booth**

37. Contemporary Novels. Reading and interpretation of the best twentieth century novels. (3F, W or S) **Bullen; Anderson**

38. The Essay. Writers of the present—American and English. (3S) **Rice; Edwards**

40. World Literature. A survey course including a study of epic and romance, tragedy, comedy, and satire, as these forms have appeared in Greek, Roman, Hebrew, Italian, French, German, English and American literature. (5F, W or S) **V. Nielsen; Hansen**

43. Scandinavian Literature (In Translation). Selected readings from recent and traditional writers: short stories, novels, poetry. (3S) **M. L. Nielsen**

45. Readings in Philosophical Literature. Selected readings in works by great philosophers from Plato to the present. (5S) **Hayward**

46. The Bible as English Literature. Provides an opportunity for first-hand acquaintance with the great book of books. (5S) **Vickers**

47. Readings in Greek Literature. Provides an opportunity to become acquainted with Greek epics and dramas. (5) **Vickers**

53. American Literature. Survey of American literature from the beginnings to the present, with emphasis on main literary trends and ideas characteristic of American culture. Open to English majors or minors and to others by permission of the instructor. (5F, W, or S) **Smith; Hayward**

60. English Literature. A survey of the principal masterpieces of English literature. (5W) **Edwards; Mortensen; Hansen**

63. Shakespeare. Offers the opportunity to gain a general knowledge of Shakespeare by reading a liberal number of his plays and participating in class discussions upon them. (3W) **Vickers**

105. History of the English Language. The evolution of the English language from Anglo-Saxon times to present. (3) Taught alternate years. **Hendricks**

110. Advanced Composition. For students who have taken English 10; may be taken in place of English 19 by students who have credit in English 17 and English 18 and who have transferred from Forestry or Engineering; may be taken by transfer students who have six credits in Composition. Emphasizes vocabulary, selection, and clear organization of information. (4F, W or S) **Staff**

111. Technical Writing. Emphasis upon bibliography, research methods and final form of the technical report. Open to juniors and seniors only. (4F, W or S) **Booth; Keck; Edwards**

112. Advanced Writing Problems. A practical course in special problems of writing, such as letters of application, summary abstracts, short reports, and informal articles; mainly for juniors and seniors in forestry or engineering who do not take 111. (4W or S) **Keck**

117. Creative Writing. Short stories, essays, poetry. (3F) **Rice**

118. Writer's Workshop. For students who desire special assistance in imaginative writing. Admission is granted to all who show special talent in writing. Prospective students are required to consult the instructor before registering. (2W) **Culmsee**

119. Poetry Workshop. Direction and criticism for students who wish to write poetry. (2S) **V. Nielsen; Anderson**

122. Children's Literature. Prose and Poetry of childhood. Helpful to teachers and parents. (4F, W or S) **Mortensen**

124. The Teaching of English. (See Secondary Education 124.) **Hayward**

134. Literary Criticism. Masterpieces of criticism from Plato and Aristotle to Croce studied to develop an awareness of critical standards throughout the ages. (4S) Culmsee; Edwards

English 141. Utopian Literature. Reading and discussion of a half-dozen major Utopian works from Plato to the present. A general education course of interest to students in other departments. Booth

147. Comparative Literature. A comparative study of the literature of the 18th century of France and England. (5F) Hendricks

148. Comparative Literature. A comparative study of the Romantic period in England and Germany. (5W) Hendricks

149. Comparative Literature. A study of the 19th Century in England, France and Russia. (5S) Hendricks

150. American Poetry. Development of American poetry as shown through writings of major poets from Philip Freneau to the present. (3) Hayward

151. American Fiction. A brief consideration of the beginning of the American novel and short story, followed by detailed study of important nineteenth and early twentieth century fiction writers. (3 W) Smith

154. Major American Authors. Intensive studies of the chief American novelists, poets, and essayists of the Nineteenth Century: a. Edgar Allen Poe; b. Ralph Waldo Emerson; c. Nathaniel Hawthorne; d. Herman Melville; e. Mark Twain; f. Henry James; g. Walt Whitman. These courses are taught when required. (2) Smith; Hayward

161. Medieval Literature. English literature from Beowulf to the Renaissance, exclusive of Chaucer. Emphasis on the epic and the metrical romance. Some continental literature included. Reading in translation. (5W) Vickers

162. Chaucer. Relation of Chaucer to his time; his influence upon subsequent literature. Emphasis upon oral reading. (5F) Taught alternate years. Hendricks

163. Shakespeare. Six plays: Macbeth, Henry IV, King Lear, Hamlet, Othello, Twelfth Night; collateral readings. (5S) Taught alternate years. Vickers

167. Arthurian Legends. The legends and their relation to English literature. (3) Nielsen

168. Readings in World Drama. A survey of world drama from the beginning to Ibsen. (5) Hayward

169. Reading in World Drama. A survey of world drama from Ibsen to the present. (5) Hayward

170. Milton. Selected prose and poetry with emphasis on "Paradise Lost." (5) Vickers

175. Elizabethan and Stuart Literature. Poetry and prose works, exclusive of those of Shakespeare and Milton, from 1557 to 1660. (5) Rice

180. The Eighteenth Century. A comprehensive study of the literature from 1700 to 1798. (5) Keck

185. Eighteenth Century Novels. Major novels by Defoe, Richardson, Fielding, Smollett, Sterne, and Goldsmith. (3) Keck

English 186. Restoration and 18th Century Drama. A study of representative British plays from Etherege to Sheridan. Booth

190. Romantic Period. A brief study of the predecessors of romanticism; a study of the literature from 1798-1832, with emphasis on poetry. (5W) Smith

191. The Victorian Period. A comprehensive review of the literary influences and personalities of the period with emphasis on the chief poets and prose masters of the age. (5S) Booth; Smith

- 192. Shelley.** His relation to the Romantic movement. (2S) **Rice**
- 196. Victorian Essays.** Reading and discussion of shorter Victorian prose writings on literary, philosophical, social, economic, and other problems important then and now. Of interest to students in other departments who desire an upper-division general education course. (4) **Booth**
- 197. Victorian Novel.** Representative works of each of several English novelists. Analysis is made of construction, characterization, ideas, style and other important characteristics of the novel as it has developed to English. (4) **Booth**
- 199. Readings and Conference.** Time and credit arranged. Any quarter. Limited to English majors. Instructor's approval required. **Staff**
- 200. Thesis.** Time and credit arranged. **Staff**
- 203. Tragedy.** A study of the theory and practice of tragedy from Aeschylus until the present. (5) **Vickers**
- 204. Comedy.** A study of the theory of comedy and of the use of comedy in various literary forms. (5) **Vickers**
- 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 or S) **Keck; Hendricks**
- 247. Seminar in Comparative Literature of the 18th Century.** Research studies in the inter-relations of English and Continental literature between 1700 and 1832. Time and credit arranged. (4) **Hendricks**
- 252. The New England Circle.** Principal New England writers from Bryant to Henry Adams. (5) **Smith; Hayward**
- 261. Readings in Middle English.** Middle English Metrical Romances. (4) **Hendricks**
- 280. Seminar.** Intensive study of special problems in 18th century literature. (5) **Keck**
- 290. Seminar. Nineteenth Century Literature.** Intensive study of special problems and selected writers in the period. (4) **Booth; Smith**
- 291. Victorian Social Critics.** Judgments of Carlyle, Ruskin, Mill, Arnold, Morris and Butler. **Booth**

Journalism

Major students in Journalism should complete Journalism 12, 13, 14, 16, 81, 96, 112, 114, 115, 125, 156, or 164; Photographic Journalism 51, 151; English 5, 10, 53, 110, 117 or 118 or 119.

They are urged to complete as many of the following as possible: Journalism 1, 2, 3, 4, 5, 6, 91, 182; English 40, 46, 60, 63, 105, 134. It is recommended that a minor be selected from the following: Accounting, Art, Business Administration, Economics, English, History, Modern Languages, Political Science, Psychology, Sociology, Speech.

Majors in Agricultural Journalism and Home Economics Journalism, designed to meet needs of individuals, are available.

1, 2, 3. College Journalism. For members of Student Life Staff. Discussions of newspaper and responsibilities of journalists. (1F, 1W, 1S) **Staff**

4, 5, 6. College Journalism. Second year. (1F, 1W, 1S) **Staff**

12. Reporting. Lectures on the historical, social and vocational aspects of the various fields of journalism: newspaper, magazine, book, radio, television, motion picture, public relations, advertising, teaching; also, the psychology of news. (3F) **Stewart**

13. Reporting. A continuation of 12 with emphasis on newspaper style, ethics, social responsibilities, and problems of reporting. Practical experience writing for newspapers. Prerequisite: 12 (3W) **Stewart**

14. Reporting. A continuation of 13. Prerequisites: 12 and 13. (3S) **Stewart**

16. Copyreading. Primarily a laboratory course in handling newspaper copy, headline, page layouts. Prerequisite: Journalism 12, 13. (3S) **Staff**

81. Introduction to Radio and Television. (See Speech Department for description.) (3F) **B. Hansen**

82. Radio Speech. (See Speech Department for description.) (3W) **B. Hansen**

83. Elements of Broadcasting. (See Speech Department for description.) (3S) **B. Hansen**

91. Weekly Paper. Problems of editing and publishing weeklies. Efforts are made to provide laboratory experience in a weekly. (3F) Taught alternate years. **Stewart**

96. Growth of Mass Media and Propaganda. Development of American publications and electronic means of disseminating information and propaganda; also main currents in thought conveyed by these media. (5S) **Culmsee**

112. Writing Feature Articles. Lectures and practice in preparing feature articles for newspapers and magazines. Analysis of periodicals is made to determine available markets and what editors buy. (3W) **Culmsee**

114. Writing for Radio. Study and practice in writing information and continuity for radio programs. (3W) Taught alternate years. **Stewart**

115. Law of the Press. Law of libel, right of privacy, contempt of court, copyright, and postal regulation. (2W) Taught alternate years. **Staff**

120. Journalistic Techniques. For non-journalism majors. Techniques which aid professional people, extension workers and others to use newspapers, magazines and radio for publicity and information purposes. (3F) **Stewart**

125. Editorial Page. A study of editorials and other elements of the modern editorial page, and the writing of editorials. (3F) **Andersen**

156. Principles of Advertising. (See Merchandising Department, School of Commerce, for description.) (5W)

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: 12, 13, 14 or permission of instructor. (3W) **Staff**

166. Journalism Practices. Laboratory work in publications or radio stations. (2) **Staff**

182. Radio Newscasting and Writing. Offered in both Speech and Journalism Departments. Study and application of principles of editing, organizing, writing and presenting news by radio. Three periods a week devoted to discussion and practice in writing and arrangement; two periods a week meetings are held in the studios for analysis and presentation of news over the microphone. (5W) Taught alternate years. **B. Hansen; Stewart**

185, 186, 187. Special Problems in Journalism. (1-2F, 1-2W, 1-2S)

Photographic Journalism

BERT V. ALLEN, Director of Photographic Service

For a major in Photographic Journalism, a student should study the following courses in addition to the Photography listed below: Journalism 12, 13, 14, 112, 115 and 156 or 164.

General service courses are available for students desiring instruction in fundamentals of photography. Some courses are designed especially for students of Agriculture, Engineering and Technology, Forest, Range and Wildlife Management, and other technical or professional subjects in which photography is highly useful.

Description of Courses

51. General Photography. Principles and practices in fundamentals of general photography. Training in selection and use of cameras, lenses, meters, films, filters, lights, developers, and accessories. Two lectures, one 3-hr. lab. (3F, W or S) Allen

61. General Photography Laboratory. Additional lab work to supplement Photography 51 for those desiring more than 3 credits of work. Two 3-hr. labs. (2F, W or S) Allen

151. Photographic Problems. Designed to help students solve advanced photographic problems. May be repeated provided that a different type of photographic work is taken each time the student registers. Repeating students must have approval of major professor and department head. Prerequisite: Photography 51. Two lectures, two 2-hr. labs. (3F, W or S) Allen

163. Commercial and Scenic Photography. Training in all types of outdoor photography including scenic, agricultural, livestock, wild life, and plant life. Suited to students in Forest, Range and Wildlife Management and in all phases of agriculture. Aerial photography is included as it applies. Prerequisite: Photography 51. Two lectures, three 3-hour labs. (5S) Allen

166. Color Photography. Problems in color. Ektachrome and Kodachrome, use of tungsten, daylight and flash technique, printing processes, composition in color arrangement. Prerequisite: Art 32, Photo 51. Three lectures, two labs. (5F) Allen

Geology

J. Stewart Williams, Professor and Head of Department; Clyde T. Hardy, Associate Professor.

Geology Club: The Geology Club, under general supervision of the department, is an organization for all geology students. Meetings are held twice each month and programs consist of talks by guests, faculty, and students. Regular attendance is required of all students. All interested persons are invited to attend.

Bachelor of Science Degree

Minimum Requirements: All majors must satisfactorily complete the following basic courses: Chemistry 3, 4, 5; Civil Engineering 84; Engineering Drawing 61, 63; English 110, 111; Geology 2, 3, 5, 101, 102, 106, 108, 110, 114, 115; Mathematics 35, 46; Physics 20, 21, 22; and Zoology 3. Recommended electives are Mathematics 97, 98, 99; German 1, 2, 3; and Civil Engineering 85, 181.

Upper Division Options: Advanced undergraduates must select one or more upper division options no later than the beginning of the senior year, and must request assignment to a major professor. Approval of the course pro-

gram by the major professor must be obtained in advance of each registration. Minimum requirements in each upper division option are as follows:

Petroleum Geology: Geology 105, 109, 111.

Mining Geology: Geology 103, 105, 113.

Ground-water Geology: Geology 103, 115, 117; C. E. 173.

Stratigraphy—Invertebrate Paleontology: Consult Major Professor.

Field Trips: Field work is an essential part of training in geology. Majors should therefore be prepared to reserve Saturdays during Fall and Spring quarters for field trips.

Master of Science Degree

The Department of Geology offers advanced study and research leading to the Master of Science degree with specialization in areal geology, stratigraphy—vertebrate paleontology, and ground-water geology. Graduate students in geology may take the following courses in the 100 series for credit: Geology 102, 103, 105, 109, 111, 113, 116, and 117. Graduate students in other departments may take any course in the 100 series for graduate credit.

Courses

1. Introductory Physical Geology. For students in nonscience areas. (5F, W or S) Staff

3. Physical Geology. For students in Geology, Forestry, Engineering, Agronomy, etc. Field trip required in Fall and Spring quarters. (5F, W or S) Staff

4. Historical Geology. Physical history of the earth, and the development of life as indicated by the geologic record. Prerequisite: Geol. 1 or 3 (5W) Staff

5. Minerals, Rocks, and Fossils. Identification of common minerals, rocks, and fossils. Prerequisite: Geol. 3. (3S) Staff

101. Mineralogy. Identification of common minerals by physical and chemical tests. Elementary crystallography. Prerequisites: Geol. 3 and Chem. 3, 4, and 5, or equivalents. (5F) Hardy

102. Optical Mineralogy and Petrography. Determination of minerals in grains and thin sections utilizing the petrographic microscope. Classification of igneous rocks. Prerequisites: Geol. 101 and Physics 22. (5W) Taught alternate years. Not taught 1956-57. Hardy

103 Engineering Geology. Application of geology to engineering problems. For seniors in Engineering. (3S) Williams

105. Sedimentary Petrography: Mineralogical Analysis. Determination of mineral grains by means of the polarizing microscope. Heavy mineral separation. Prerequisite: Geol. 102. (3S) Taught alternate years. Not taught 1956-57. Hardy

106. Invertebrate Paleontology. Introduction to the study of invertebrate fossils. Methods of preparation. Prerequisites: Geol. 2 and Zool. 3. (5W) Taught alternate years. Not taught 1956-57. Williams

108. Stratigraphy and Sedimentation. Processes by which sedimentary rocks are formed. Original structures of sediments. Recognition of stratigraphic units by means of index fossils. Prerequisites: Geol. 3 and 106. (5S) Taught alternate years. Not taught 1955-56. Williams

109. Sedimentary Petrography: Mechanical Analysis. Mechanical analysis of sediments. Statistical representation. Prerequisite: Geol. 101. (3F) Taught alternate years. Not taught 1956-57. Hardy

110. Structural Geology. Origin and classification of geologic structures. Deformation of the crust of the earth. Prerequisite: Geol. 3, (5F) Taught alternate years. Not taught 1955-56. **Staff**

111. Petroleum Geology. Origin and accumulation of petroleum. Subsurface methods utilized in exploration including a survey of geophysical techniques. Prerequisites: Geol. 108 and 110. (5W) Taught alternate years. Not taught 1955-56. **Hardy**

113. Economic Geology: Metals. Geologic occurrence and distribution of metallic mineral deposits. Prerequisites: Geol. 101 and 110. (5S) Taught alternate years. Not taught 1956-57. **Hardy**

114. Geologic Field Methods. Preparation of geologic and topographic maps utilizing the plane table. Measurement of stratigraphic sections. Field problems required. Prerequisites: Geol. 3; Civil Engineering 84. (5S) Taught alternate years. Not taught in 1955-56. **Staff**

115. Advanced Physical Geology. Processes of erosion. Action and development of streams. Land forms. Subsurface water. Prerequisites: Geol. 3 and college mathematics, chemistry, and physics. (5F) **Williams**

116. Special Problems. Directed study of selected problems. Written report required. (1-6F, W or 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: Geol. 3. (4W) **Williams**

210. Seminar. Prerequisite: Graduate standing. (2-5F, W or S) **Staff**

220. Thesis. Prerequisite: Graduate standing. (5-15F, W or S) **Staff**

History

Joel E. Ricks, John Duncan Brite, Professors; George Ellsworth, Associate Professor.

Students who major in History should complete History 4, 5, 13, 14, and thirty additional credits of upper division History selected in conference with the head of the department. History majors intending to pursue graduate study should complete two years of French or German.

Students who minor in History should consult with the head of the History Department for specific recommendations before registering in the minor field.

Survey Courses

1. Early European History. A survey of the medieval and early modern European periods from the fall of the Roman Empire through the Renaissance, the Reformation, and the religious wars. (5) **Brite**

2. Modern European History. A survey of modern European history from the seventeenth century to the Second World War. (5) **Brite**

4. Ancient World Civilization. The cultural history of the world from the earliest times to the sixteenth century. The Near and Far Eastern civilizations with emphasis on the European heritage: Greece, Rome, Christianity, the Middle Ages, Renaissance and Reformation. (5F, W or S) **Ellsworth**

5. Modern World Civilizations. The cultural history of the world from the sixteenth century to the present. Emphasis on European civilization and its spread in the world—the Americas, the Near and Far East. (5W or S) **Brite**

8. Recent European History. From the Treaty of Versailles in 1919 to the present, emphasizing the problems following that war and the underlying causes of World War II. (3W or S) **Brite**

9. Current World Affairs. An historical inquiry into the evolution and development of the United Nations organizations, the domestic problems and foreign relations of the major world powers since 1945. (1) Ellsworth

History 10. American Civilization. The American heritage studied through a characterization of major periods and movements, the development of the institutions and social ideas of the United States. (3F) Ellsworth

13. Early United States History. Includes the colonization of the Atlantic seaboard, the Westward Movement, the revolution, the Constitution, the beginnings of American government, the rise of American democracy, social and economic movements, the rise of sections, expansion, nationalism, and the Civil War. (5F, W or S) Ricks

14. Modern United States History. Reconstruction, industrialism, the last frontier, the agrarian revolts, imperialism, the eras of reform, American culture, the new democracy and the two World Wars. (5F, W or S) Ricks

History 21. The Americas to 1763. Geography, pre-Columbian peoples, conquest and colonization by European powers, international rivalries, political, social and economic developments. (3 W) Ellsworth

History 22. The Americas since 1763. The eve of the revolutions, the Anglo-American and Spanish-American revolutions, early development of the United States and Latin American republics, Brazil and Canada, their political, social and economic development, their role in the contemporary world. (3S) Ellsworth

34. English History. English history from the earliest times to the present day. (5F) Brite

History of Europe

105. Greek History. Greek civilization to the Roman conquest, 146 B.C. Emphasizes political, social, intellectual and artistic developments and contributions. (5 W) Ellsworth

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

111. Medieval Europe (500-1500 A.D.). Political, economic, social and cultural developments during the Middle Ages. (3) Brite

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

125. Absolute Monarchies (1589-1789). From the rise of French absolutism to the French Revolution. (3) Brite

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

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

138. The History of Russia. From the earliest times to the present day. (3W) Brite

History of the United States

132. History of the American Frontier. To the Far West. (3F) Ricks

135. History of the Far West. Deals with the region from the Rockies to the Pacific Coast, with special emphasis upon the Intermountain West. (5S) Ricks

History 143. The Jacksonian Era. Political, economical and cultural developments of the United States, 1815-1850. American society, industry and commerce, labor, cultural developments, reform movements, the westward movement, extension of the suffrage and the coming of democracy. (3 W) Ellsworth

144. The Civil War and Reconstruction. (3)**Ricks**

152. The American Revolution. The background, philosophy, nature, campaigns and consequences of the American Revolution. (3) **Ricks**

History 156. Social History of the United States. The development of the patterns of American life, social ideas, education, religion, science, literature and the arts, studied around a framework of major thought forms. The relation of these developments to public policies. (3 F) **Ellsworth**

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. (3) **Ellsworth**

171. Constitutional History of the United States. (5W)**Ricks**

175. History of American Democratic Thought. American democratic thought from the Revolutionary War to the present. (3) **Ricks**

Far Eastern History**176. History of the Far East. (3S)****Brite****Seminar**

193. Bibliography and Writing of History. Undergraduate professional course for those desiring special training in any type of historical research. Required of all seniors majoring in History. (3 F) **Ellsworth**

Graduate Courses**229. Seminar. Problems in the Industrial Revolution. (3)****Brite****239. Seminar in the History of the Mountain West. (3)****Ellsworth**

(3) 276. Selected Problems in the Constitutional History of the United States. **Ricks**

292. Seminar in the Sources and Literature of History. (3)**Brite****293. Seminar in the Method and Writing of History. (3)****Ellsworth****299. Thesis. (F, W or S) Time and credit arranged.****Staff****Landscape Architecture and Planning**

Administered jointly by the School of Agriculture and School of Humanities and Sciences

Laval S. Morris, Professor and Head of Department; **Kenji Shiozawa**,* Assistant Professor.

See "Landscape Architecture" in School of Agriculture for course descriptions.

3. Elements of Landscape Architecture and Planning.**20. Drawing.****30. History and Literature of Landscape Architecture.****35. Theory of Design.****40, 41. Plant Materials.****130. Recreational Planning.****135. Travel Course.**

*On leave.

- 140, 141, 142. Design.
- 150, 151, 152. Planting Design.
- 160, 161, 162. Landscape Construction.
- 165. Construction Methods and Practice.
- 170. Civic Planning.
- 180, 181, 182. Advanced Planning and Design.
- 190. Special Problems.
- 195. Seminar.
- 210. Advanced Problems.

Architecture

- 60, 61, 62. Architectural Design.

Mathematics

V. H. Tingey, Professor and Head of Department; Neville C. Hunsaker, Professor; Mary Nelson, Joe Elich, Associate Professors; Joseph K. Everton, Assistant Professor.

Two types of majors are offered by the Mathematics Department. Students intending to enter graduate study in mathematics take the regular major. Those intending to teach in high schools take the regular major or the teaching major.

Regular majors are required to take mathematics 130, 131, 132 and fifteen additional credit hours of upper division mathematics. Regular majors should have a reading knowledge of either French or German. Physics 20, 21, and 22 and nine credit hours of upper division physics are recommended.

Students expecting to teach mathematics in high school must meet the state requirements for certification in addition to meeting the requirements of a regular major in mathematics.

All students majoring in mathematics must have had plane and solid geometry. Plane geometry is a prerequisite for all college mathematics.

Courses

B. Plane Geometry. (F or W)

3. Solid Geometry. (2F or W) Prerequisite: two years high school algebra, or mathematics 34

34. Introduction to College Algebra. Prerequisite: one year of high school algebra. Students who have had more than one year of high school algebra are not given college credit for mathematics 34. Daily. (3F, W or S)

35. College Algebra. Prerequisite: 34. (5F, W or S)

44. Plane Trigonometry. Prerequisite: 35. (3F, W or S)

46. Plane and Spherical Trigonometry. Prerequisite: 35. (5F, W or S)

50. Descriptive Astronomy. (3S)

60. Mathematics of Finance. Prerequisite: Math. 35.

97. Plane and Solid Analytical Geometry. Prerequisite: 35, and 44 or 46. (5F, W or S)

98. Differential Calculus. Prerequisite: 97. (5F, W or S)

99. Integral Calculus. Prerequisite: 98. (5F, W or S)

100. Calculus. Prerequisite: 99, (3S)

118. Modern Algebra. Prerequisite: 99. (3W)

119. Theory of Equations. Prerequisite: 99. (3W)

120. Modern Geometry. Prerequisite: 97. (3W)

122. Ordinary Differential Equations. Prerequisite: 99. (3F or S)
 123. Number Theory. Prerequisite: 99. (3S)
 124. Foundations of Mathematics. (3S)
 130. Advanced Calculus. Prerequisite: 100. (3F)
 131. Advanced Calculus. Prerequisite: 130. (3W)
 132. Advanced Calculus. Prerequisite: 131. (3S)
 145. Vector Analysis. Prerequisite: 99. (3F)
 150. The Teaching of Mathematics in the Elementary and High School. (3F or S)
 153. Mathematical Readings. Prerequisite: 123. (3S)
 246. Tensor Analysis. Prerequisite: 145. (3W)
 254. Theory of Functions. Prerequisite: 132. (3F)
 255. Theory of Functions. Prerequisite: 254. (3W)
 256. Theory of Functions. Prerequisite: 255. (3S)
 257. Advanced Applied Mathematics for Physicists, Chemists and Engineers. Prerequisite: 132. (3F)
 258. Advanced Applied Mathematics for Physicists, Chemists and Engineers. Prerequisite: 257. (3W)
 259. Advanced Applied Mathematics for Physicists, Chemists and Engineers. Prerequisite: 258. (3S)

DIVISION OF STATISTICS

Degree: 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 in the Division of Statistics.

Students wishing to major or minor in statistics will take the course 160 to 167 inclusive in the Division of Statistics, and Mathematics 122, 130, 131 and 132.

160. Determinant and Matrix Theory. (3F)
 161. The Calculus of Probability. (5F)
 162. Mathematics of Statistics. (5F)
 163. Mathematics of Statistics. (5W)
 166. Sequential Analysis and the Control of Quality of Output in Manufacturing. (3W)
 167. Statistical Reading and Reports. (3S)

Military Science and Tactics and Air Science

A department major in Military Science and Tactics or Air Science is offered in the School of Humanities and Sciences. This major is intended to serve two categories: Those service personnel stationed at near-by military installations who desire to complete a degree while in the service; and college students who are interested in the possibility of making a career of the service. Students electing this major are required to complete a dual major. The purpose of the dual major, as pertains to the regular college student, is to assure the student of adequate preparation for his future in the event he is not selected or cannot qualify for a reserve commission in the Armed Forces. All

majors at this institution are acceptable as a dual major but the following are particularly recommended: Engineering, Physics, Chemistry, Mathematics, English, Political Science, or Psychology. A freshman student electing Military or Air Science as a major is advised to pursue one of the above mentioned majors.

Army ROTC

A freshman contemplating a major in Military Science and Tactics should concentrate on filling lower division group requirements including required basic Military Science courses, and strive for a high grade point average. High scholarship is one of the requisites for selection to the Advanced ROTC course. (Other qualifications are shown in "Military Science and Tactics and Air Science" section in latter part of catalog.)

It is not possible to qualify for a major in Military Science and Tactics if the student is not selected for Advanced ROTC. The first year Advanced Students with highest scholarship and leadership qualities are selected as "Distinguished Military Students." The best qualified of the "Distinguished Military Students" are named "Distinguished Military Graduates" in the last year of the advanced program. These "Distinguished Military Graduates" may apply for a commission in the Regular Army. All of the advanced ROTC students offered commissions are expected to serve on active duty for two years upon graduation, except veterans with prior service.

Air Force ROTC

It is not possible to qualify for a major in Air Science if the student is not selected for advanced AFROTC. Lower division students desiring to major in Air Science must maintain a high grade point average as academic excellence is one of the criteria for selection of the advanced program. A percentage of the first year advanced students with the highest scholarship and leadership qualities are selected as "Distinguished Military Students." The best qualified of the "Distinguished Military Students" are designated "Distinguished Military Graduates" upon completion of the advanced program and graduation from the institution. Students receiving commissions in the United States Air Force Reserve are authorized to apply for commission in the regular component of the Air Force after completing one year of active duty. Students having been designated "Distinguished Military Graduates," receive additional consideration in selection for regular commissions. All of the advanced AFROTC students offered commissions are expected to serve on extended active duty for a minimum of three years upon graduation, except veterans with sufficient prior service.

See the "Military Science and Tactics and Air Science" section in the latter part of the catalog for complete statement of regulations and courses.

Modern Languages and Latin

George A. Meyer, Professor and Head of Department; M. L. Nielsen, Professor; Thelma Fogelberg, Associate Professor; Aldyth Thain, Jesse G. Nelson, *Gordon E. Porter, Assistant Professors.

Intensive elementary language courses are designed for students who wish to acquire a speaking as well as a reading knowledge of the language in shorter time than is required for standard elementary courses. One hour daily is used for lecture and one hour for drill in oral-aural training. The equivalent of the standard first year of modern language is completed in two quarters. Special courses for advanced work are provided for students who have satisfactorily completed the intensive two quarters' course.

*On leave.

Standard 5-credit elementary courses are provided for students whose aim is primarily a reading and some speaking knowledge of a foreign language and the satisfying of language requirements.

No credit in a beginning language may be used towards graduation until at least 14 credits have been accumulated.

Major in a modern language: (Prospective majors are advised to enroll in the intensive courses.)

French: The following courses are required: 1, 2, 3, 101, 102, 105, 110, and twelve credits in courses numbered above 110.

German: Forty-five credits including courses 1, 2, 3, 101, 102, and fifteen credits from courses numbered above 103.

Language credit by special examination—Students who have acquired a working knowledge of a foreign language by residence abroad may obtain a maximum of 15 hours of credit in that language by taking a special examination. Such an examination is given only in those languages in which the department has an instructor competent to examine the student. At present, examinations may be taken in French, German, Spanish, Portuguese, Norwegian, Swedish, and Danish.

In addition to the elementary courses regularly listed below, permissible special examination credit is listed as Norwegian 1, 2, 3; Swedish 1, 2, 3; Danish 1, 2, 3.

FRENCH

- 1A, 2A. Elementary French. Intensive Course. Two hours daily. (7F, 7W) Meyer
 1, 2, 3. Elementary French. (5F, 5W, 5S) Staff
 101A. Intermediate French. Intensive course. (5S) Meyer
 102A. Intermediate French. (3F) Meyer
 101, 102, 103. Intermediate French. (3F, 3W, 3S) Thain
 105. Advanced Composition and Conversation. (3W) Fogelberg
 106, 107, 108. Selective Reading. Open to students who have completed French 102 or its equivalent. Readings and reports in various subjects, scientific or literary. (1-2F, 1-2W, 1-2S) Staff
 109. French Short Story. Students of the French Conte as a literary form serves as an introduction to literary movements in France. Special emphasis on the 19th century. (3S) Meyer
 110. French Phonetics. Principles of French pronunciation and their practical application. (3F) Meyer
 112. 19th Century French Poetry. (3W) Thain
 115, 116, 117. French for Graduate Students. Short, basic course designed to give graduate students a reading knowledge of French as a help towards passing advanced degree language requirements. (3F, 3W, 3S) Staff
 120. Comedies of Moliere. Moliere's plays as social criticism. (3F) Meyer
 121. French Classic Drama. Plays of Corneille and Racine. (3W) Staff
 122. Nineteenth Century French Drama. Romantic and Realistic Schools. (3S) Fogelberg
 125. Survey of French Literature. (3S) Thain
 129, 130. French Literature of the 18th Century. Special emphasis on the Philosophy of the period—Voltaire, Rousseau, Ruffon, Diderot. (3F, 3W) Meyer
 131. Comedies of Beaumarchais and Marivaux. (3S) Staff
 135, 136, 137. Nineteenth Century French Novel. (3F, 3W, 3S) Fogelberg

GERMAN

- 1A, 2A. Elementary German. Intensive Course. Two hours daily. (7F, 7W)
 1, 2, 3. Elementary German. (5F, 5W, 5S) Staff
 101A. Intermediate German. Intensive. (5S) Staff

- 101, 102, 103. Intermediate German. (3F, 3W, 3S) Staff
105. Advanced Composition and Conversation. (3W) Staff
- 106, 107, 108. Selective Readings. Open to students who have completed German 102 or its equivalent. Readings and reports in various subjects, scientific or literary. (1-2F, 1-2W, 1-2S) Staff
- 110, 111, 112. Scientific German. Reading of scientific texts. Reports. (2F, 2W, 2S) Open to students after completion of 101 or equivalent. Nelson
120. Die deutsche Novelle im 19. Jahrhundert. Reading and discussion of representative stories by Hauff, Storm, Meyer, Keller and others. (3F) Nielsen
121. Lessing—Plays and Biography. (3) Nielsen
122. Schiller—Poetry, Plays and Biography. (3S) Nielsen
123. Die deutsche Novelle im 20. Jahrhundert. Representative stories by Thomas Mann, Heinrich Mann, Herman Hesse, Arthur Schnitzler and others. (3) Staff
125. Survey of German Literature. (3S) Staff
130. Goethe's Faust. Prerequisite: Two years of College German or equivalent. (3W) Staff
131. Goethe' Prose. Werther, Dichtung und Wahrheit, and selections from Wilhelm Meister. Reading of a biography of Goethe. (3S) Staff
133. German Drama of the Nineteenth Century. Rapid reading and discussion of representative plays from Kleist to Hauptmann. (3) Staff
150. Phonetics and conversation. Especially for returned missionaries and others who have had experience with the language abroad. (3) Nielsen
153. Thomas Mann—Novels, Novellen and Essays. His life and philosophy. The course is conducted in English and readings are in translation. Either German or English credit is given. (3) Nielsen

SPANISH

- 1A, 2A. Elementary Spanish. Intensive Course. Two hours daily. (7F, 7W) Staff
- 1, 2, 3. Elementary Spanish. (5F, 5W, 5S) Fogelberg, Porter
- 101, 102, 103 Intermediate Spanish. (3F, 3W, 3S) Porter
- 101A. Intermediate Spanish. Intensive Course. (5S) Fogelberg
105. Advanced Composition and Conversation. (3W) Fogelberg
- 106, 107, 108. Selective Readings. Open to students who have completed Spanish 102 or its equivalent. Readings and reports in various subjects, scientific or literary. (1-2F, 1-2W, 1-2S) Porter
125. Survey of Spanish Literature. (3S) Fogelberg

GREEK

- 1, 2, 3. Elementary Greek. (5F, 5W, 5S) Meyer

LATIN

- 1, 2, 3. Latin. Emphasis on 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 reading from Caesar. (5F, 5W, 5S) Thain
- 101, 102, 103. Vergil and Cicero. Readings from the orations of Cicero and Vergil'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) Nielsen
- 104, 105, 106. Selective Readings in Latin. (2F, 2W, 2S) Nielsen

PORTUGUESE

1, 2, 3. Portuguese. Grammar, dictation, conversation and reading. Study of the history and culture of Brazil and Portugal. (5F, 5W, 5S) **Meyer**

101, 102, 103. Second Year of Portuguese. Grammar, reading, conversation and composition. Credit arranged. (F, W, S) **Meyer**

106, 107, 108. Selective Readings. One or two credits. (1-2F, 1-2W, 1-2S) **Meyer, Porter**

RUSSIAN

1, 2, 3. Russian. (5F, 5W, 5S)

Staff

Courses for Foreign Students Taught by the Modern Language Department

M. L. A. English Phonetics for Foreign Students (2 Cr).

To train foreign students in the sounds of English, and to increase their ability to speak with the rhythm and intonation of American English. May be taken in conjunction with M. L. B.

M. L. B. English for Foreign Students (3 Cr).

Basic training in the structure of the language, with exercises and drills for increasing comprehension and ability to write accurately. It is 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.

Physics

Rolland Perry, Professor and Head of Department; **Philip J. Hart**, Associate Professor; **Jay O. Jensen**, Assistant Professor.

Willard Gardner, Professor Emeritus.

Requirements for Physics Majors: 45 credits, of which 30 credits must be upper division courses. Certain approved courses in upper division Engineering, not to exceed 10 credits, may be counted.

Suggested courses: The following sequence of courses is recommended for students who wish to continue in graduate study in physics. Students desiring to complete a teaching major in physics in preparation for secondary school teaching, or those desiring to take courses in physics as part of a composite teaching major should consult with the head of the department for specific recommendations. Required professional education courses for the teaching certificate are listed by the School of Education.

Freshman Year: Mathematics 35, 46, 97; Chemistry 3, 4, 5; Botany 1 or Zoology 1; Economics 51; 5 credits Social Science.

Sophomore Year: Physics 20, 21, 22; Math. 98, 99, 100; English 10; German or French.

Junior Year: Physics 120, 121, 130, Physics 175, 176, 177; (or Physics 153, 154) Math. 119, 122, 145, 160; English 110; 5 credits Biological Science; German or French.

Senior Year: Physics 153, 154 (or Physics 175, 176, 177) 185, 186, 187, 193, 194, 195; one other year course in Physics; Math. 120, 130, 131, 132; Chem. 104, 105, 106. Language group electives.

A Teaching Minor in Physics is approved only for students majoring in closely related subjects. Such students must complete Physics 20, 21, 22, and at least 9 credits of upper division work.

Master of Science Degree in Physics

Candidates for the degree of Master of Science in Physics must 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. If the candidate has fewer than six credits in certain of these five fields, he may be requested to take additional work in those areas as part of the work for the Master's degree.

Courses

3. Introductory Physics. A non-technical course for students who do not expect to major in sciences but who want understanding of fundamental physical principles and their applications. (5F, W or S) Jensen

6, 7. General Physics. Physics 6 covers mechanics, constitution of matter, heat, and meteorology. Physics 7 emphasizes electricity and magnetism, with a survey of light and sound. Primarily designed for students in forestry and Agriculture. (Physics 6, 5 credits F or W; Physics 7, 5 credits S) Jensen

16. Introductory Meteorology. A non-mathematical treatment of physical laws governing the atmosphere and its phenomena. Brief study of the polar-front theory, air-mass analysis, weather map reading, forecasting, and information required by the Civil Aeronautics Administration for flying. (3F) Jensen

17, 18, 19. Mechanics and Molecular Physics. Electricity and Magnetism. Heat, Sound and Light. For Pre-Medical, Pre-Dental, Agriculture and Technology Majors. Prerequisite: Math. 44 or 46. Should be taken in sophomore year, and in the sequence indicated, except with permission of instructor. Three lectures, two labs and two quiz periods per week. (5F, 5W, 5S) Jensen

20, 21, 22. Mechanics. Electricity and Magnetism. Heat, Sound and Light. For Science majors and Engineers. Prerequisite: Math. 44 or 46. Concurrent or previous registration for calculus desirable. To be taken in sequence except with permission of instructor. Should be taken in the sophomore year. Three lectures, two labs and two quiz sections per week. (5F, 5W, 5S) Perry; Hart

31, 32, 33. Physical Science. Principles essential to understanding the physical universe. Elements of astronomy, chemistry, geology, mathematics, and physics integrated for use in interpreting human experience. Intended to meet the physical science group requirements upon completion of three quarters' work. (3F, 3W, 3S) Staff

UPPER DIVISION

Calculus and Physics 20, 21, 22 are prerequisite for all courses numbered above 100. Math. 122 should be taken in Junior year.

Physical Chemistry. See Chemistry 104, 105, 106 and Chemistry 109, 110, 111.

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. Prerequisite: Physics 6 or 22 and Calculus. Four lectures, one lab. (5S) Jensen

120, 121. Modern Physics. (Recommended for juniors.) A study of electrons, ions, atomic structure and radiation. (3F, 3W) Perry

130. Nuclear Physics. (To follow Physics 121.) A survey of methods and results of recent investigations of nuclear processes. (3S) Perry

140. Biophysics. Principles of electricity, light, X-rays and radioactivity as related to studies in biology. (5F) Hart

146. Sound. An intermediate course in sound and vibration. Taught alternate years. (3S) **Hart**

153, 154. Analytical Mechanics. Prerequisite: Differential Equations. (3F, 3W) Taught 1956-57. **Hart**

160, 161, 162. Heat; Thermodynamics; Kinetic Theory. (3F, 3W, 3S) **Hart**

166, 167. Geometrical and Physical Optics. (3F, 3W) Taught 1956-57. **Hart**

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) Taught 1955-56. **Perry**

182. Electronics. Emphasis on design and construction of electronic measuring equipment for the modern research laboratory, for communication, and for the numerous controls in the modern factory. Three lectures, one lab. (4 Arr.) Taught 1956-57. **Hart**

185, 186, 187. Physical Measurements. A laboratory course to give the advanced student experience with precision measuring instruments and their use in physics. Measurements in electricity and magnetism, heat, optics and spectroscopy, atomic and nuclear physics. Recommended for seniors. (2F, 2W, 2S) **Perry**

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. All upper division physics majors are expected to attend whether registered for this course or not. (1F, 1W, 1S) **Staff**

196, 197, 198. Selected Readings on Physics. (1F, 1W, 1S) **Staff**

GRADUATE COURSES

Courses numbered above 200 may be taken by undergraduates only with the approval of the instructor and the head of the department.

210, 211. X-Ray Diffraction; X-Ray Crystallography (3W, 3S) Taught 1956-57. **Hart**

220, 221, 222. Atomic Spectra, Molecular Spectra, and Spectroscopic Measurements. (5F, 5W, 5S) Taught 1956-57. **Perry**

230, 231, 232. Nuclear Physics. (3F, 3W, 3S) Taught 1955-56. **Perry**

250. Research in Physics. Credit to be arranged before registration. (F, W, S) **Staff**

285, 286, 287. Introductory Quantum Mechanics. Prerequisite: Advanced Calculus. (3F, 3W, 3S) Taught 1956-57. **Perry**

290, 291, 292. Theoretical Physics. (3F, 3W, 3S) Taught 1955-56. **Hart**

293, 294, 295. Seminar in Physics. (1F, 1W, 1S) **Staff**

Upon sufficient demand other courses may be offered.

Speech

Chester J. Myers, Professor and Head of Department; Rex E. Robinson, Floyd T. Morgan, Associate Professors; Burrell F. Hansen, Gwendella Thornley, Parley W. Newman, Assistant Professors; George Tanner, Instructor.

The Department of Speech offers training in interpretation, public address, broadcasting, and speech pathology. Drama has been transferred to the Department of Fine Arts, School of Education, and dramatic art courses will be listed there subsequently.

The requirements of forty-five credit hours for a departmental major or a teaching major in Speech are as follows: Public Speaking, 8 credits (Speech 125 required of all majors); Interpretation, 8 credits (Speech 124 required of all majors); Drama 8 credits (4 credits in Speech 150 required of all majors; Speech Correction, 5 credits (Speech 167 required of all majors); Radio, 6 credits (Radio Production required of all majors); elective courses in Speech, 10 credits. In addition, courses in Dramatic Literature, 5 credits and Teaching of Speech, 2 credits, are to be recommended by the Department Head according to student needs.

English courses 163, 168 may be used for credit toward the department requirement in dramatic literature.

Students placing emphasis in speech correction and desiring to comply with the minimum standards for certification by the American Speech and Hearing Association, in addition to departmental requirements, must satisfactorily complete the following speech courses: 7, 111, 167, 169, 171, 173, 175, 177, 179. An additional 14 quarter hours in psychology is required including Child Psychology (or Child Development) and Mental Hygiene.

For the Composite English-Speech Major, students are required to have the following speech courses: Public Speaking, 8 credits; Interpretation, 8 credits; Drama, 8 credits; Speech Correction, 5 credits; Radio, 3 credits; Teaching of Speech, 2 credits. For a distribution of these courses see second paragraph above. For English courses needed for the English-Speech composite major see writeup for English Department.

Students whose understanding of spoken English shows the need of special assistance may be requested to register for Speech 11 as a prerequisite for Speech 1 or Speech 5.

Master of Science Degree

The Department of Speech offers opportunity for research and graduate study leading to a Master of Science degree in the following specialized fields: Speech Pathology, interpretation, theatre, public address and radio.

The following courses may be used for graduate credit by students majoring in the Speech Department or by students in other departments: 107, 110, 111, 123, 124, 125, 150, 152, 154, 171, 173, 181, 182, 184, 185, 186, 190, 192.

Courses

1. Public Speaking A. (Formerly Fundamentals of Speech) Elementary training in Public Speaking. Includes training in daily speaking situations, voice improvement. Clinic assistance available to students who need it. Time for clinical assistance to be arranged. Credit is not given to students who have taken Speech 5. (5F, W or S) **Staff**

4. Principles of Reading. Effective oral and silent reading of literary selections. A preparatory course for understanding and appreciation of the printed page. Practice material includes both standard literature and everyday reading matter. (5F, W or S) **Thornley**

5. Public Speaking B. Meets specific needs of professional people in the practice of their profession. Basic principles of effective speaking, with emphasis on preparation and delivery of forms and address of greatest interest to those for whom the course is provided. Credit is not given to students who have taken Speech 1. (3F, W or S) **Staff**

7. Voice and Phonetics. This course is designed to analyze speech with regard to the acoustical, anatomical and phonetic components of which it is composed. (3F) **Newman**

12. Individual Problems. Individual attention given in private to particular needs of the student in an effort to eliminate personal defects, develop skill,

and solve individual speech problems. Recommended for everyone needing individual speech instruction and to speech majors. Special fee. Any quarter. May be taken more than one quarter. Credit arranged. **Staff**

16. Dialect. The most prominent dialect forms, their principles and uses. The dialect work of such writers as Burns, Kipling, Drummond, Riley, Dunbar, Harris, and Kirk is studied, discussed and learned. Taught alternate years. (3S) **Myers**

21. Intermediate Public Speaking. (Formerly Advanced Public Speaking) Students work with types of speaking most interesting and useful to them, and determine lengths of speeches and times to speak, within the framework of certain minimum requirements. Emphasis on developing skill in speech presentation. Prerequisite: Speech 1 or 5. (3F, W, or S) **Robinson**

24. Oral Interpretation: Lecture and Recital. Various literary forms are studied for platform presentation. Reading from manuscript and from memory. Preparation and presentation of public recital in reading. (3F) **Myers**

26. Make-up. Practice and theory of straight and character make-ups for the stage. Recommended for prospective directors of school, church and community theatricals. (1F) **Morgan**

44. Fundamentals of Acting. Practice and theory of basic principles and concepts of the art of acting. (3F) **Morgan**

50. Theatre Workshop. Limited credit is given for participation in Utah State Theatre plays. One lecture period per week, laboratory and rehearsal times arranged. Consult instructors for permission to register. (1 to 6, F, W, S) **Morgan, Tanner**

60. Drama Appreciation. To develop greater appreciation of drama and theatre through a better understanding of the contributions made to the production of a play by playwriting, acting, directing and staging. Selected plays and materials on theatre and drama are studied. (3 F) **Morgan**

75. Remedial Speech. For persons who have a noticeable difficulty with speech, in articulation, quality, pitch intensity, or rhythm. Time and credit arranged. Consult instructor before registering. May be taken more than one quarter. **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 Speech. Analysis and development of speech skills and speech forms used in radio and TV. Development of acceptable standards of voice and articulation for broadcasting. Includes exercises in presentation of announcements, talks, program continuities, interviews and roundtables. (3S) **B. Hansen**

83. Elements of Broadcasting. The various aspects of broadcast programs with practice in each. Writing and production of commercial continuity, news, musical programs, and dramas are carried out. (3W) **B. Hansen**

84. Studio and Control Room Operations. Basic studio and control room operations carried out by the announcer in radio stations. Information is basic for radio producers, announcers, and educators who use radio. 1 hour lecture and 2 hours of lab. per week. (2F) **B. Hansen**

109. Public Discussion. Application of various group discussions techniques to current problems. Efforts are made to have some discussions presented to various civic and religious organizations, or to release them over a commercial radio station. (3S) **Robinson**

110. Public Programs. Scene and play reading. Taught alternate years. (3W) **Myers**

111. The Psychology and Semantics of Speech. Principles of psychology which underlie speech. An insight into the processes of symbol use is attempted to bring about a more effective communication function. (3S).

Newman

112. Private Instruction. Individual attention given in private to particular needs of the student in an effort to eliminate personal defects, develop skill, and solve individual speech instruction and to speech majors. Special fee. Any quarter. May be taken more than one quarter. Credit arranged.

Staff

113. Argumentation. For the student desiring a background of information and practice in techniques of analysis, investigation, evidence, reasoning, brief making, refutation, and the construction and delivery of the argumentative speech. (3F)

Robinson

114. Writing for Radio. (3S) (See Journalism Division)

115. Intercollegiate Debating. Members of debating squads may receive not more than three credits in any one year. (3F, W or 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, or S)

Myers

120. Playground Dramatics and Pageantry. Principles involved in playground dramatics, make-up, pageantry, story-telling, and related activities. Taught alternate years. Not taught 1955-56. (3S)

Myers

123. Teaching of Speech. (Education 123)—Methods and problems peculiar to the teaching of speech; organization of courses and lesson plans is included. Students may register only with the permission of the instructor. (2S)

Myers

124. Advanced Interpretation. The mastering of significant selections from great writers. Reading from manuscript and from memory. (5S)

Myers

125. Speech Composition. Advanced theory and practice of public speaking. Students build and deliver several short speeches and read selected masterpieces from the world's public speaking literature. Prerequisite: Sophomore standing, and Speech 1 or 5 (5W)

Robinson

144. Advanced Acting. Emphasis on the creative approach to acting. Study and development of the actor's physical, mental and emotional resources. Analysis and creation of the role. (3W)

Morgan

146. Directing. Theory and practice of the principles of stage directing. Students select, cast, direct and present one act plays. (3W)

Morgan

150. Drama Production. Principles, procedures, and materials of play production. Scene design and construction, scene painting, lighting, costuming, and management are studied, and principles learned are applied to presentation of plays. Students are assigned to work crews in Utah State Theatre productions. (2, 3F)

Tanner

152. Drama Production Laboratory. Four hours per week of crew and staff work on Utah State Theatre productions. (2W)

Tanner

54. Continuation of Speech 152. (2S)

Tanner

158. Children's Theatre. Creative dramatics, and selection, preparation and presentation of children's plays. Recommended for prospective elementary school teachers. Consult instructor before registering. (3 or 5S)

Morgan

167. Introduction to Speech Correction. Factors conducive to normal and abnormal speech development in the child. Special attention to problems of articulation disorders and stuttering. Students receive supervised experience in actual case work. Recommended for prospective elementary school teachers. (5F)

Newman

169. Speech Pathology I. Functional and organic voice defects are studied. Cleft palate speech problems are considered. Some attention is given to the acquisition of substitute voice such as esophageal speech. Supervised experience in actual case work. Prerequisite: Speech 167. (5W) Newman

171. Speech Pathology II. Lectures and practicum in speech problems due to lesions of the nervous system such as Cerebral Palsy, Aphasia and dysarthrias. Prerequisite: Sp. 167. (5S) Newman

173. Advanced Clinical Practice. Case histories, supervised diagnostic and remedial case work in speech pathology. Consult instructor for permission to register. Any quarter. Credit arranged. Newman

174. History of the Theatre. An historical survey of the theatre from ancient to modern times. (5W) Morgan

175. Measurement of Hearing. Attention is given the function of the ear. Audiometric techniques of surveying. Types of hearing loss and methods of hearing-aid fitting. Some laboratory work. (3F) Newman

176. Problems of the High School Drama Director. Play selection, organization of the production, drama club activities, contests and festivals, simplification of settings, lighting and costumes, financing, auditorium and stage facilities, central staging, audio-visual aids, bibliography are studied. Also recommended to directors and prospective directors of church and community theatres. (3S) Morgan

177. Communication Problems of the Hard of Hearing. Covers speech problems associated with hearing deficiencies. An introduction into the problems of lip reading is given. (2W) Newman

179. Speech Science. Lectures and readings in pertinent research studies that have contributed to the field of speech. (3W) Newman

181. Radio Production. Study and studio practice in problems in directing and producing various kinds of broadcasts. Planning programs, casting and rehearsal procedures, co-ordination of technical aspects of production, and problems in special studio effects are considered. Registration limited to Juniors and Seniors. (3S) B. Hansen

182. Radio Newscasting and Writing. Gives credit in both Speech and Journalism departments. Principles of editing, organizing, writing and presenting news by radio. Three periods a week devoted to discussion and practice in writing and arrangement; two periods a week meetings are held in the studios for analysis and presentation of news over the microphone. Not taught 1955-56. (5W) Stewart; B. Hansen

184. Educational Broadcasting. Study and practice in the preparation and broadcasting of educational programs for children and adults. Designed to acquaint teachers, extension agents, civic workers, and others engaged in public informational activities with the broadcast services. Taught alternate years. (3W) B. Hansen

185. Advanced Radio-TV Production. Follows 181 and deals with more specialized production problems such as remote pick-ups, integration of recorded with live material, network and local studio co-ordination, documentary production, dramatic problems and special events. Prerequisite: Speech 181. B. Hansen

186. Radio and Television Training. Enrollment limited to students qualified by training and ability for actual broadcasting experience in a station. Students so qualified are allowed to register for from 3 to 5 credits. Students serve an apprenticeship under direction of the station staff in executing duties expected of a regular staff employee. Students render three hours service per week broadcasting for each registered hour of credit. (Time and Credit arranged.) (F, W, S) B. Hansen

190. Problems in Speech and Drama. Especially selected work, individually assigned, handled and directed in consultation with the student. Special Speech problems of merit and of mutual interest to students and instructors are investigated and reported upon in this course. Consult instructor for permission to register. Any quarter. Credit and time arranged. **Staff**

192. Projects in Theatre. Advanced work in acting, directing, scene design, costume design, costume construction, stage lighting, technical practice, advanced make-up 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. By permission of instructors. (2-5, F, W, S) **Morgan; Tanner**

GRADUATE COURSES

200. Seminar in Speech or Drama. Emphasis on the various fields of Speech. Research problems. (2F or W) **Staff**

201. Thesis. Prerequisite: Graduate standing. (2-5F, W or S)

207. Experimental Methods in Audiology. Lecture and laboratory periods in basic concepts of psychophysics and psychophysiology of the ear. Prerequisites: graduate standing and some background in elementary statistics. (3S) **Myers and Staff
Newman**

208. Experimental Phonetics. Principles and techniques in scientific analysis of speech and voice. (3W) **Newman**

210. Problems of the Producing Director. Problems of Educational Theatre and Community Theatre management. The following problems are investigated and discussed: Community Theatre organization and publicity; Community Festivals; Programming; Budgets and Finances. (3S) **Morgan**

290. Research Studies. Advanced research in Speech and Drama. By permission of instructors. Any quarter. Credit arranged. **Staff**

292. Projects in Theatre Advanced work in scene design, costume design and construction, technical practice, stage lighting, directing, theatre management, make-up. Projects may be part of major productions of the Utah State Theatre or they may be independent endeavors. By permission of instructors. Any quarter. Time and credit arranged. **Morgan**

Zoology

ZOOLOGY, ENTOMOLOGY, PHYSIOLOGY

Administered jointly by the School of Agriculture and School of Humanities and Sciences

D. M. Hammond, Professor and Head of Department; **G. F. Knowlton**, **Clyde Biddulph**, **Eldon J. Gardner**, **William F. Sigler**, Professors; **J. Sedley Stanford**, **T. L. Bahler**, **Donald W. Davis**, Associate Professors; **Merrill Gunnell**, **Gene H. Linford**, Assistant Professors; **Howard E. Dorst**, **F. V. Lieberman**, **G. E. Bohart**, **H. F. Thornley**, **William H. Chinn**, **George H. Kaloostian**, **William P. Nye**, **M. D. Levin**, **Paul R. Fitzgerald**, **Albert Earl Johnson**, Collaborators in Research, U. S. D. A.

For a major in Zoology the following courses must be taken: Zoology 3, 4, 107, 112, 116 or Entomology 115, 118 or 119; 127 or 128, 131; Entomology 13 and Physiology 121, 122. Also the following courses are recommended: Mathematics 34, 35, 44; Agronomy 131, 132; Chemistry 3, 4, 5, 125, 126; Physics 17,

18, 19; Botany 24, 25; Bacteriology 70, 71; Wildlife 160; Geology 3, 4. For students planning graduate work leading toward the Ph.D. degree, study of foreign languages is recommended.

For a pre-medical major in Zoology, the pre-medical requirements listed in the introduction, School of Humanities and Sciences, must be completed, and in addition the following courses must be taken: Zoology 107, 119, 127 or 128, 129, 131, 116 or Entomology 115.

Master of Science Degree

The Zoology, Entomology, and Physiology Department offers courses leading toward the Master of Science degree in various phases of agricultural entomology, genetics, medical entomology, physiology, taxonomy, parasitology, mammalogy, and ornithology.

ZOOLOGY

1. Principles of Biology. See Biology I under General Studies.

2. General Zoology. A brief survey of the more important groups of animals and the basic principles of greatest importance in Zoology. This course is especially designed to meet the needs of students in Agriculture and Forestry for a basic course in Zoology. Three lectures, two labs. (5F or S) **Staff**

3. Invertebrate Zoology. An introduction to invertebrate animals, emphasizing basic principles, organization of the major groups, and evolutionary relationships. Three lectures, two labs. (5F or W) **Staff**

4. Vertebrate Zoology. A study of the vertebrate, with emphasis on structure, function, evolutionary relationships and some consideration of natural history. (5W or S) Prerequisite: Zool. 3 or equivalent. **Staff**

107. History and Literature of Biology. The more important men and ideas in the historical development of biology and the methods of finding references. (4F) **Gardner**

111. Heredity. Facts and principles of inheritance, with emphasis on application to human beings. It is desirable but not essential that an introductory course in biology, physiology, or botany precede this course. (4S) **Linford**

112. Principles of Genetics. A technical course in basic principles of heredity and variation. Prerequisite: Zool. 2 or 3 and 4, or Bot. 24, 25. Four lectures, one lab. (5F, W, or S) **Gardner**

113. Human Genetics. Inheritance of human, physical and mental characteristics and associated problems. Prerequisite: a course in zoology or physiology. **Gardner**

116. Parasitology. Protozoa and worms parasitic in man, domestic animals and wild animals, and relationships between parasites and their hosts are studied. Prerequisite: Zool. 3. Three lectures, two labs. (5S) **Bahler**

118. Vertebrate Embryology. An introduction to the principles of development of the vertebrates. Prerequisite: Zool. 4 or equivalent. Three lectures, two labs. (5W) **Hammond**

119. Comparative Anatomy. Fundamentals of structure of the main types of vertebrates are studied comparatively. Prerequisite: Zool. 4 or equivalent. Three lectures, two labs. (5S) **Hammond**

121. Ornithology. Bird study planned to acquaint students with native birds and the class Aves (birds) in general. Identification, relationships, structure, habits, and distribution are studied in classroom, laboratory, and field. Two lectures, two labs. (4S) **Stanford**

122. Mammalogy. Introduces students to Mammalia, with particular reference to Utah and North American species. Identification, distribution, structure, habits, and economic importance are stressed. Two lectures, two labs. (4W) Stanford

123. Natural History of Animals. Identification, habits, food, distribution and other features of common Utah animals. Also, methods of collection and preparation of specimens for study, display and storage. Laboratory time is spent in making observations and collections in the field. Prerequisite: One or more courses in Zoology. Two lectures, two labs. (4F) Stanford

127. Cytology. Study of cells, with emphasis on chromosomes and their behavior. Two lectures, two labs. (4W) Gardner

128. Elements of Histology. Study of tissues, including characteristics of different kinds of tissues and the main organs. Three lectures, two labs. (5F) Bahler

129. Histological Technique. Techniques employed in making preparations of animal tissues for microscopic study. Three labs. (3S) Bahler

131. Organic Evolution. Critical study of the facts and theories pertaining to evolution. Prerequisite: One basic course, in biological science. Zool. 111 or 112 recommended. (3W) Gardner

135. Protozoology. A study of local free-living and parasite protozoa and methods of studying them. Prerequisite: Zool. 3. Two labs. (2F) Hammond

155. Ichthyology. Ecology, classification, and life histories of native and introduced fishes. Two lectures, two labs. (4W) Sigler

201. Special Problems. Individual study of a problem under the guidance of a staff member. Credit arranged. (F, W or S) Staff

214. Advanced Genetics. Intensive study of problems of inheritance, with special consideration given to recent and current research. Prerequisite: Zool. 112. (3S) Gardner

240. Research and Thesis. Research connected with problem undertaken for partial fulfillment of requirement for Master of Science degree. Credit arranged. (F, W or S) Staff

221, 222, 223 Seminar. Attendance required of all graduate students in department during each quarter in residence. Problems relating to research in general or to current researches in zoological science are discussed by faculty, graduate students, and advanced undergraduates. (1F, 1W, 1S) Staff

ENTOMOLOGY

For a major in Entomology, the following courses are required: Zoology 3, 4, 107, 111 or 112, 131; Entomology 13, 103, 104, 108, 111, 115; Botany 24, 25, 130; Chemistry 3, 4, 5, 125, 126 (or 10, 11, 12); Mathematics 35; Physics 6, 7; Wildlife Management 160. The following courses are recommended: Entomology 120, 138, 230; Agricultural Economics 53; Botany 30; Agronomy 131, 132 and one other course; Horticulture 131 and one other course; Foreign language, two or more courses. For a major in Agricultural Entomology see Department of Zoology in School of Agriculture.

13. General Entomology. The structure, classification, distribution, interrelationships, and life histories of insects. Three lectures, two labs. (5W) Davis

21. Beekeeping. Introduction to principles and practices of beekeeping, how to establish a colony, seasonal management of colonies for honey production and pollination purposes; swarm control, honey harvest, and wintering practices. Two lectures, one lab. (3S) Levin

102. Systematic Entomology. Study of the classification of insects to orders. Collection of 400 specimens, 125 species and 15 orders required. Majors in entomology take Entomology 103 instead of this course. Prerequisite: Entomology 13 or 108. Three labs. (3S) Davis

103. Morphology and Taxonomy of Insects. A study of the external structures of insects and how they are used in classification. Collection of at least 600 specimens, 200 species, 90 families and 18 orders required. Prerequisite: Entomology 13. Two lectures, two labs and field collecting. (5F) Stanford; Davis

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) Davis

105. Forest Entomology. Principal insects attacking forests and forest products. Some attention is also given principles of biological control. A brief study is made of forest vertebrates with emphasis on insect-eating birds. One lecture, two labs. (3F) Stanford

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 or S) Davis

111. Anatomy and Physiology of Insects. Comparative study of internal structure with considerable attention given to function. Prerequisite: Ent. 101. Two lectures, 2 labs. (4W) Stanford

115. Medical and Veterinary Entomology. Arthropods are studied that annoy and transmit disease to man and domesticated and wild animals. Vectors of plague, spotted fever, tularemia, malaria and other Arthropods carrying disease receive major attention. Prerequisite: Ent. 13 or equivalent. Two lectures, two labs. (4W) Stanford

120. Insect Pollination in Relation to Agriculture. The role of 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. Taught alternate years. (2W) Bohart

138. Aquatic Entomology. Identification, distribution, life histories and adaptations of aquatic insects are studied with particular reference to local streams and lakes. Two lectures, one lab. (3S) Stanford

210. Special Problems. Individual study of a problem under guidance of a staff member. Prerequisite: Ent. 13, 103 and 108. Credit arranged. (F, W or S) Staff

230. Insects in Relation to Plant Diseases. A study of 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. Taught alternate years. Two lectures, one lab. (3W) Davis

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 are studied. Prerequisite: Ent. 103. (2W) Taught alternate years. Staff

250. Research and Thesis. For research connected with problem undertaken for partial fulfillment of requirements for Master of Science degree. Credit arranged. (F, W, S) Staff

PHYSIOLOGY

For a major in Physiology the following courses must be taken: Physiology 4, 115, 116, 117, 121, 122, 123; Biology 1, Zoology 107, 112, 118, 119, 128, 129 and 131; Bio-chemistry 191. Also Mathematics 34, 35 and 44; Physics 17, 18, 19; Chemistry 3, 4, 5, 17, 18 or 115, 125, 126; Bacteriology 70, 71; and at least one year of a foreign language are recommended.

4. General 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. (5F, W or S) Staff

20. Human Anatomy. Structure of the main human body systems with emphasis on the muscular, skeletal and nervous systems. For students desiring a more thorough study of human anatomy than is given in Physiology 4. Prerequisite: Physiology 4. Two lectures, one lab. (3F) Linford

121, 122. Mammalian Physiology. An intensive and detailed two-quarter course in physiology in which the function of each of the organ systems of man and animals is studied. Students may not register for 122 without having had 121. As preparation, Physiol. 4, Zool. 2, 3, or 4, or Vet. Sci. 20, and courses in physics and chemistry are recommended. Three lectures, two labs. (5F, 5W) Bidulph

123. Endocrinology. The glands of internal secretion, with emphasis on the hormones in reproduction. As preparation, Physiol. 4 or Biol. 1 or Zool. 2, 3, or 4, or Vet. Sc. 20 are recommended. (3S) Bidulph

131. Comparative Physiology. A comparative study of the physiological functions, primarily of the vertebrates. Prerequisite: Physiology 4. Two lectures, one lab. (3S) Bidulph

200. Special Problems. Special investigations in physiology are carried out in this laboratory course. Open to students who have taken Physiol 121, 122 or who have been granted special permission. (2-5F, W or S) Staff

241. Methods of Endocrine Research. Methods used in studying the endocrine glands. Prerequisite: Physiol. 123. (3F) Bidulph

260. Research and Thesis. Research connected with problem undertaken for partial fulfillment of requirement for Master of Science degree. Credit arranged. Staff

MILITARY SCIENCE AND TACTICS AND AIR SCIENCE

Army and Air Force

COLONEL CALVIN L. PARTIN,
Professor of Military Science and Tactics

COLONEL HOWARD A. MOODY,
Professor of Air Science and Tactics

DEAN CARLTON CULMSEE,
Civilian Coordinator

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General Information

Both Army and Air Force ROTC units are established at this institution. Department of Defense policies govern the Army-Air Force ratio for new student entrance into the two programs. All those with a sincere desire to fly and who meet the requirements for flight training are encouraged to enroll in the Air Force ROTC, but the desire of the new student is normally first consideration. Both programs provide many opportunities for leadership development and possibility of a regular commission. Details of each program follow.

Army ROTC

Calvin L. Partin, Colonel, Professor of Military Science and Tactics. Assistant Professors of Military Science and Tactics Peter J. Lacey Jr., Lt. Col., Arty.; Donald G. Leeper, Major Ordnance Corps; Charles F. McCormick Jr., Capt., QMC; Jasper P. Jaques, Capt., QMC; Narion G. Larsen, Capt., QMC. Assistant Instructors: Karl L. Cooper, M/Sgt.; Donald K. Bartholonew, M/Sgt.; Richard C. Gunn.

Since 1893 military training has been offered as a prescribed part of the college curricula. The Morrill Act of 1862 prescribed two years of military training for all physically qualified male students attending Land Grant colleges. Exempt from this requirement are transferring junior or senior students from a college which has no ROTC unit.

The general objective of the course of ROTC instruction is to produce junior officers who by their education, training and inherent qualities are suitable for continued development as officers in the United States Army. Training in military leadership is emphasized. Instruction is given in subjects common to all branches of the army and is known as a Branch General ROTC Program. As the name implies Reserve Officer Training Corps is an instrument of training and instruction—not conscription. Present regulations provide that students enrolled in the program may be deferred from selective service provided they meet prescribed standards and execute a deferment agreement.

Veterans who have been honorably discharged or transferred to the Enlisted Reserve Corps and relieved from active duty, may be given credit under the provisions of Public Law 81—79th Congress, in lieu of completion of all or part of the basic ROTC courses. Such military service also permits a veteran to apply for advanced ROTC upon completion of lower division requirements.

The four year course in the Reserve Officers Training Corps is divided into the Basic Course and the Advanced Course.

The basic course is normally pursued during the freshman and sophomore years. The completion of the basic course is a prerequisite for graduation unless relieved from this obligation by proper authority. Lower division transfer students must enroll and continue the basic course while in a lower division status.

The advanced course consists of the third and fourth years of the Military Science course and is now co-aligned with the student's junior and senior years. The course is elective, but once entered upon, it becomes a prerequisite for graduation unless released by proper authority.

Enrollment Conditions

All students formally enrolled in the basic and advanced course must be:

1. Citizens of the United States.
2. Physically qualified. Due allowance is made for defects which are correctable, before the student, who is otherwise qualified, becomes eligible for commissioning.

3. Accepted by the institution as a regularly enrolled student.
4. Not less than 14 years of age and not have reached 23rd birthday at the time of initial enrollment in basic course.
5. Willing to sign a loyalty certificate.

In addition to the above, all formally enrolled Advanced ROTC students must comply with the conditions listed below:

1. Be under 27 years of age at the time of initial enrollment in the Advanced Course.
2. Successfully complete ROTC qualifying examination and appear before a board of officers and college representatives.
3. Have completed the basic ROTC course or its equivalent.
4. Be in good academic standing (1.000 GPA or above)
5. Be selected by the PMST and the President of the College.

Military Science Regulations

The student, by registration at the institution, obligates himself to fulfill certain requirements prescribed by the college under current regulations of the Reserve Officer's Training Corps. These requirements are as follows: Two years of Military Training (six credits) for all qualified male students. A student claiming exemption from Military Science must present proof of his reasons for such exemption at the time of registration. Pending final decision on his request, the student registers for the course prescribed and enters the work of that course. It is the duty of every student of whom Military Training is required to see that he is properly registered for the proper course and to report for all periods of instruction. Students required to take Military Training who fail to register or appear for classes are, with the approval of the President, excluded from all college classes. To satisfy the Military Training requirements a passing grade is required for six quarters. Any portion of the course for which a failing grade is rendered must be repeated until a passing grade is earned. The responsibility of compliance with the above rests entirely with the student.

The periods, Tuesday 3 p.m. through 5 p.m. and Thursday 11 a.m. through 1 p.m. are set aside for Military Drills during the Fall and Spring Quarters. All Military Science students must attend one or the other of these drills.

Every student is required to pay a combination uniform deposit and laboratory fee of \$5.00 upon registration. This deposit, less laboratory fees and the price of any property lost or damaged, will be refunded upon completion of or withdrawal from the course. The normal refund is \$3.00.

Credit for Junior Division ROTC is allowed only upon presentation of a Military Training Certificate from the high school unit where training was accomplished. This credit is allowed on the basis of one year high school training being the equivalent of one quarter of college training. However, the waiving of one or more quarters of Military Science on the above basis does not obviate the college requirement of six quarters of Military or Air Science or Physical Education. New students, on the basis of High School ROTC, may enroll in second year basic. Enrollment is usually authorized only at the start of the Sophomore year. Students are not considered for enrollment in Advanced ROTC until all lower division work is completed.

Air Force ROTC

Howard A. Moody, Colonel, Professor of Air Science. Assistant Professors of Air Science: **Harry W. Plummer**, Major; **Chester G. Krieger**, Captain; **David K. Merrill**, Captain; **Kenneth L. Sterne**, **Eldon B. Hooper**, 1st Lt.; **Robert G. Publicover**, CWO.

The Air Force ROTC curriculum was designed to produce commissioned officers in quantities and of qualities sufficient to meet the needs of the United States Air Force in these times of international tensions. Although the need exists for officers in many fields and technical specialties, the greatest need is for pilots and other flying personnel.

The Air Science curriculum is divided into the basic course, covering freshmen and sophomores; and the advanced course, consisting of juniors and seniors. During the advanced phase students will receive \$0.90 per day.

Entering freshmen desiring enrollment in the Air Force will be admitted. It is the desire of the Air Force that the majority of students will eventually apply for flying duty either pilot training or observer training.

Enrollment

All students enrolled in the basic course must meet the following conditions:

1. Be a citizen of the United States.
2. Be physically qualified.
3. Be a regularly enrolled student at the institution.
4. Student must be between 14 and 23 years of age at time of initial enrollment.
5. No credit will be allowed by the Air Force for High School ROTC.
6. Depending upon the amount of time served, veterans may be given credit for the basic program but cannot enter the advanced program until they are academic juniors.

Equipment

1. Students will be provided with textbooks and uniforms at no expense to themselves.
2. Each Air Science student will make a \$5.00 deposit with the Registrar to cover damaged or lost equipment. One dollar will be deducted for maintenance costs and one dollar will be deducted for the Military Ball.
3. Students who are registered in Air Science will be issued a booklet covering AFROTC regulations, customs and procedures. A copy of this booklet is on file with the deans for ready reference by advisors.

Army

Basic Courses (MS I and MS II)

11. Military Science I. Organization of the Army and ROTC; Individual Weapons and Marksmanship; School of the Soldier and Exercise of Command. (1F) Jacques

12. Military Science I. Individual Weapons and Marksmanship; American Military History. (1W) Jacques

13. Military Science I. American Military History; School of the Soldier and Exercise of Command. (1S) Jacques

21. Military Science II. Map Reading; School of the Soldier and Exercise of Command. (1F) Larsen

22. Military Science II. Aerial Photograph Reading; Crew Served Weapons and Gunnery. (1W) Larsen

23. Military Science II. Crew Served Weapons and Gunnery; School of the Soldier and Exercise of Command. (1S) Larsen

Advanced Courses (MS III and MS IV)

131. Military Science III. Leadership; Military Teaching Methods; Organization, Function, and Mission of the Arms and Services; School of the Soldier and Exercise of Command. (3F) **Lacey**

132. Military Science III. Organization, Function, and Mission of the Arms and Services; Small Unit Tactics. (3W) **Lacey**

133. Military Science III. Small Unit Tactics; School of the Soldier and Exercise of Command. (3S) **Lacey**

141. Military Science IV. Operations; School of the Soldier and Exercise of Command. (3F) **Leeper**

142. Military Science IV. Operations, Logistics, Military Administration and Personnel Management. (3W) **Leeper**

143. Military Science IV. Military Administration, Service Orientation, School of the Soldier and Exercise of Command. (3S) **Leeper**

150. Military Science Summer Camp. Six weeks practical training at a regular army post. Attendance at summer camp is required of all advanced military science students. Students normally attend during the summer following completion of Military Science III.

174. Advanced Military Science Seminar Problems. Prerequisite: Enrollment in or completion of Advanced Military Science. Credits arranged. **Staff**

201. Advanced Military Science Seminar Problems. Prerequisite: Graduate standing. Credits arranged. **Staff**

AIR SCIENCE COURSES

Two hours drill are required each week during the fall and spring course.

AIR SCIENCE I—FIRST YEAR BASIC—AIR FORCE

11. Air Science. Introduces student to Air Force ROTC course, to USAC cadet program and to regulations which govern cadet. Reason for ROTC program and obligations of service are explained. Major part of quarter is devoted to history of flight beginning with man's earliest attempts to fly. Theory of flight is taught in latter part of quarter. (Drill required) (1F)

12. Air Science. Fundamentals of Global Geography. The major geographical regions of the earth, map projections, geography of the world as influenced by the airplane, are first studied. The power of a nation to defend itself and to support a war effort, based on its geographical position and resource strength. Then attention is given to the reasons for war, the solutions mankind has tried, their successes and failures, in attempting to eliminate war. The tensions which build up between nations, their causes and results. The basic structure of the United Nations and various other security organizations is taught in this quarter. (1W)

13. Air Science. Historical development, mission, weapons and joint operations of Armed Forces; the place of air power in modern war, the functions and use of aircraft in modern war, and in combination with other branches of the service. The future of military aviation in the United States. (Drill required) (1S)

AIR SCIENCE II—SECOND YEAR BASIC—AIR FORCE

21. Air Science. Introduction to Elements of Aerial Warfare. Study of targets including definition and types and related intelligence procedures. Study of weapons, including conventional high explosives, atomic, rocket-propulsion, chemical, biological and psychological. (1F)

22. Air Science. Study of delivery aircraft dealing with factors governing design and type of delivery aircraft and purpose for which designed. Study of the air base as a platform for the delivery of weapons. (1W)

23. Air Science. Study of operations including types of combat air operations such as strategic, theater, air transport, and air defense. This study preceded by background material on United States Air policy. (1S)

AIR SCIENCE III—FIRST YEAR ADVANCED—AIR FORCE

131. Air Science. Introduction to advanced AFROTC, the functioning of the Air Force during the first 15 hours. The remaining 25 hours of the quarter are (writing, speaking, reading, listening) techniques, and Air Force instructional methods are the content of this course. (3F)

132. Air Science. Legal procedures and the military justice system in the Air Force during the first 15 hours. The remaining 25 hours of the quarter are used in study of problem solving techniques. (3W)

133. Air Science. Aerial navigation (including map reading and use of navigational computers), weather prediction and weather map interpretation, and the actual functions of a typical Air Force Base and the functions of the key officers on a base are presented. (3S)

150. Air Science, Summer Camp. The Air Force ROTC summer camp consists of four weeks of practical training at an established AF Base. It is conducted by regular Air Force officers and offers the cadet training with latest equipment used by the Air Force. Flight orientation phase is emphasized.

Unless exempt, the cadet attends the camp the next summer following the signing of his contract. Exemptions are authorized only for students who are required to attend other summer schools or camps, such as Forestry or otherwise. In this case, the student is required to attend Air Force camp the following summer.

AIR SCIENCE IV—SECOND YEAR ADVANCED—AIR FORCE

141. Air Science. Summer camp critique, principles of leadership and management, authority of command, responsibilities of leadership and problems of leadership and career guidance are taught during this quarter. (3F)

142. Air Science. This course covers military aspects of world political geography and geopolitical concept, international politics, structure of politics, structure of political power, world powers and strategic areas, changing patterns of power in world politics, and problems in world security in relation to international power clashes. (3W)

143. Air Science. This course covers military aviation, evolution of warfare to include principles of war, modern warfare as carried out by land, naval and air arms. The students are briefed for commissioned service to include active duty assignments and the long range reserve plan. (3S)

AIR SCIENCE ADVANCED—SEMINAR

171, 172, 173. Air Science Seminar. (Prerequisite: Enrollment in Advanced AFROTC or a graduate of AFROTC.) This course is devoted to study of the duties of an Air Force officer at squadron level, special problems, and advanced study of subjects pertaining to air force activities. (Credits arranged up to 3)

JOINT ARMY-AIR FORCE COURSES OR ACTIVITIES

Sponsor Corps: A semi-military organization composed of 75 coeds elected to the Corps by popular vote of the Army and Air Force Advanced Cadets. Only freshmen and transfer students who are freshman or first quarter sophomores may apply to fill annual vacancies.

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 only 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 Department and to maintain a highly efficient drill company." Company "D," 6th Regiment and 6th Regimental Headquarters are both located at USAC. Pershing Rifles has an Army Platoon and an Air Force Flight and is open to any basic or advanced cadet as long as the number does not exceed 60 basics and 7 advanced students.

Rifle Team: Established to promote marksmanship among Army and Air Force Cadets. Team competes in several regional and national invitational tournaments.

ROTC Band Courses

1B, 2B, 3B. ROTC. First Year (1F, 1W, 1S)	Staff
4B, 5B, 6B. ROTC Band. Second Year (1F, 1W, 1S)	Staff

Sponsor Corps Courses

51, 52, 53. Military Science Sponsor Drill. A Drill course for girls elected to Corps of Sponsors. (1F, 1W, 1S)	Capt. C. F. McCormick
54, 55, 56. Military Science Sponsors Drill. (Sophomore) (1F, 1W, 1S)	Capt. C. F. McCormick
151, 152, 153. Military Science Sponsor Drill. (Junior) (1F, 1W, 1S)	Capt. C. F. McCormick
154, 155, 156. Military Science Sponsor Drill. (Senior) (1F, 1W, 1S)	Capt. C. F. McCormick

Pershing Rifles

37, 38, 39. Pershing Rifle Drill—Freshmen.	Staff
40, 41, 42. Pershing Rifle Drill—Sophomores.	Staff
137, 138, 139. Pershing Rifle Drill—Regimental Staff	Staff

RESEARCH AND EXTENSION

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Agricultural Experiment Station

D. WYNNE THORNE, Director

The Agricultural Experiment Station, established in 1889, is a major division of the College. It is responsible for conducting research in Utah under provisions of the Hatch, Adams, Purnell, Bankhead-Jones and Agricultural Research and Marketing Acts of Congress, and of various acts of the Utah State Legislature. Its primary objective is to conduct experiments and scientific researches that have for their purpose the establishment and maintenance of a permanent and efficient agricultural industry and the development and improvement of the rural home and rural life. Results of this research are published in bulletins and scientific articles. They form the basis for much of the work of the Agricultural Extension Service.

The Agricultural Experiment Station staff numbers approximately 125. Many of them are also members of the teaching faculty of the College. Some of them also divide their time with the Agricultural Extension Service of the College. In addition, several employees of the U. S. Department of Agriculture are assigned to collaborate in the agricultural research program of the station.

Main offices of the Agricultural Experiment Station, including the office of the Director and the Division of Publications, are on the College campus in the new agricultural science building. Most of the research laboratories used by the Experiment Station are also on the campus, distributed among the various College 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 College campus, at the College of Southern Utah, at Ephraim, at the U. S. Forest Service Desert Range Station, at the Benmore Experimental Range in Tooele County, and on the ranges in different parts of the state.

The Station also maintains the following experimental farms:

Dairy Experimental Farm, including 183 acres of land, barns and a house. The Station maintains an experimental Holstein-Friesian dairy herd of about 60 pure-bred animals. Pasture investigations are conducted here.

Greenville Farm, a 36-acre tract, is used for experimental work in plant breeding and other phases of crop production.

Farmington Field Station at North Farmington is a 61-acre tract used for experimental work in horticulture and vegetable crops.

Nephi Farm is used for experimental work in dry farming and range seedling. This farm has 103 acres.

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.

Howell Field Station for Horticulture Research, located in Weber County north of Ogden, is a 71-acre tract used for investigation in fruit production.

Poultry Experimental Farm, a new farm in North Logan, is used for research on the breeding, feeding, and control of disease in chickens.

Turkey Experimental Farm is a new 33-acre farm east of the Campus used for studies in turkey breeding, nutrition, and disease control.

Animal Husbandry Farm north of the campus contains 287 acres of land used for barns and pasture and production of crops for feed.

A summer range area of 2820 acres in the mountains east of Cedar City is used to graze the experimental sheep.

Benmore area of 3500 acres of reseeded range pasture is used in cooperation with the U. S. Department of Agriculture for studies in management of range cattle and for research in range management.

The Station also owns farm plots near the College and rents land for experimental purposes in various parts of Utah.

Other investigations not involving land use are conducted throughout the state. Among these are soil surveys; plant disease surveys; problems of injurious insect control; problems connected with land use, agricultural marketing and farm management; studies of social problems connected with rural living; gathering of snow survey data; problems connected with irrigation and the surveying of range resources.

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. Between 50 and 100 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.

Major research now in progress includes projects in the departments of Agricultural Economics, Agronomy, Animal Husbandry, Dairy Industry, Poultry Husbandry, Veterinary Science, Botany and Plant Pathology, Bacteriology and Public Health, Chemistry, Forestry, Home Economics, Horticulture, Irrigation and Drainage, Landscape Architecture and Planning, Physics, Range Management, Rural Sociology, Wildlife Management, and Zoology, Entomology, and Physiology.

Engineering Experiment Station

J. E. CHRISTIANSEN, Director

See "Engineering Experiment Station" under School of Engineering.

Extension Service

CARL FRISCHKNECHT, Director

Farm income is expressed in terms of cash, good food, comfortable homes, and pleasant surroundings. Farm ownership and close contact with nature develop virtues in farm families that result in the highest type of citizens.

The main objective of the Extension Service is to aid rural people in improving farm income and in developing useful, satisfactory lives. Its educational programs are designed to help people to help themselves. Rural leadership is developed by encouraging groups of people to analyze their own problems. A plan to solve these problems becomes the Extension program of work, jointly determined by Extension Workers and local people.

Extension programs conducted with and for the people usually result in increased production per acre and per animal unit, more efficient marketing, conservation of soil and other natural resources, improvement of homes, improvement of health by better balanced diets, 4-H Club work which gives boys and girls more appreciation for the farm and home and better understanding of national and world affairs.

The Extension Service is one of the three main divisions of the College and the educational arm of the U. S. Department of Agriculture. Its agricultural and home demonstration agents serve in every county. Cooperating with the agents is a state staff of specialists in agricultural economics, agricultural engineering, agricultural forestry, agronomy, animal husbandry, cattle marketing, 4-H Club work, clothing consumer education, education, dairy manufacturing, entomology, home furnishings, home management, horticulture, irrigation, marketing, nutrition, poultry, recreation, rural sociology, and soil conservation. These specialists work out from the College in all portions of the state.

To help train rural leaders, the Extension Service conducts free, non-credit short courses in various agricultural and home economics subjects at the College and at other locations throughout the state.

The Smith-Lever Act of 1914, which established the Extension Service as a unit of each Land-Grant college, specified that the job of Extension was "to give instruction and practical demonstrations to rural people and to the industrial classes to the end that rural life and welfare would be improved."

The ultimate objective towards which Extension work is directed is more fruitful lives and better living for all people in the state.

Extension is a two-way organization. It takes (1) the findings of research to the people of the state and, (2) it brings the problems affecting the welfare of the people back to the research agencies for solution.

DIVISION OF OFF-CAMPUS CLASSES AND HOME STUDY

L. G. NOBLE, Supervisor

"The State is Our Campus"

The Division of Off Campus Classes and Home Study is fully accredited by the National University Extension Association.

Off-Campus Classes. Off-Campus Classes are offered in many subjects throughout the State. In-service helps to teachers are available in every department, including classes for the renewal of teaching certificates. Classes are available in vocational subjects and for special-study groups.

Home Study. Home study furnishes an excellent opportunity for systematic instruction to students of high school or college grade and to all adults who desire to obtain information in selected fields.

Students should be at least 19 years of age, or must submit 15 units of high school work, or must be graduates of a high school for admission to Home study courses of college grade. One-fourth of the credits necessary for a degree (45) may be earned through this department.

In the College division a wide variety of subjects is offered in the following departments: Agricultural Economics and Marketing, Agronomy, Animal Husbandry, including Poultry and Dairying, Art, Bacteriology, Business Administration and Accounting, Economics, Education, English, Entomology, Forestry, Geology, Home Economics, History, Horticulture, Irrigation and Drainage, Mathematics, Political Science, Psychology, Public Health and Zoology.

Preparatory or high school courses are offered for those who have been unable to complete their high school courses and who wish to satisfy the entrance requirements of the College and also for those who wish to fit themselves for careers in which the equivalent of a high school education is necessary.

REGULATIONS FOR OFF-CAMPUS CLASS WORK FOR CREDIT

I. GENERAL

All instructors in off-campus courses are either members of the regular teaching faculty officially assigned to the teaching project concerned, or non-resident members appointed under the procedure customary for faculty appointment in the Institution.

Off-campus credit courses given by direct class instruction shall:

- (a) be equivalent in content, hours of class instruction and preparation, to similar courses offered in residence work.
- (b) be subject to the same prerequisites as comparable campus courses, or as the departments may prescribe, including a comprehensive final examination.

II. RESIDENCE COURSES SUPERVISED BY DIVISION OF CLASS WORK

All credit obtained through the Division of Off-Campus Classwork is classified as off-campus credit and meets all requirements for graduation except the "15 hours of on-campus" rule.

Courses carrying off-campus credits should not exceed 50 minute periods.

Off-Campus classes for graduate students are given with special permission of the Graduate School.

Credit for Travel. Credit will be allowed for travel where previous arrangements have been made with the department of off-campus class work. The maximum to be allowed shall not exceed one quarter hour of credit per week for the duration of the course. For further information, contact the department of off-campus classes.

III. HOME STUDY COURSES FOR CREDIT

All home study courses must include a final examination.

Students registered for home study must count this study as part of their total load in case of registration for residence work at the College. If the home study or the residence registration exceeds the maximum amount permitted by the Institution, then the student must obtain the permission of the Attendance and Scholarship Committee to carry this excess load.

Each school of the College, subject to faculty approval, shall determine the nature and the amount of home study credit accepted for admission and toward graduation. In no case shall more than 25 percent of the total number of credit hours accepted for graduation be home study credit.

(For other regulations concerning off-campus credits, see section on "Graduation" in introduction of this catalog.)

Evening School Program

C. D. McBRIDE, Supervisor

The Evening School program is a varied program of both general education and practical training for adults in all walks of life.

Objectives

1. To provide evening classes for busy people who cannot attend regular day school.
2. To provide practical training in the various occupational fields for people who need to prepare for jobs, or who need further training in their present field of work.
3. To provide classes in general and cultural education for general self-improvement.
4. To provide classes in related instruction for apprentices and other learners.
5. To provide opportunity for people seeking a college degree to take evening classes for college credit without having to discontinue their regular work to go to school.
6. To provide classes in special-interest fields for people interested in a special field of work.
7. To enable regular college students to take evening classes when desirable.

The Program

Classes in the Evening School are offered by most of the many departments in the various schools of the college. They are taught by the regular college professors and by specialists in the field.

Many of the classes carry college credit which can be earned by meeting the standard requirements for credit.

Other classes are for training purposes and not academic credit. These carry "T" credit, or training credit, which prepares for a job but does not lead toward a degree.

Evening School is held on four evenings a week, Monday, Tuesday, Wednesday and Thursday from 7 to 10 p.m.

Specific classes are scheduled for two evenings a week, some on Monday and Wednesday, and others on Tuesday and Thursday. This makes it possible for a person to attend Evening School two or four evenings a week as he may choose.

Classes are held on a clock hour schedule. Classroom classes are an hour and a half, and laboratory or shop classes are three hours in length.

Special courses are provided for those who desire to specialize quickly in certain occupational fields.

Admission

Evening School is open to all adults who can profit by it, regardless of previous education.

Students who intend to work for college credit toward a degree are required to meet the college entrance requirements and maintain acceptable scholastic standards in their work.

Veterans may enter the Evening School under the G. I. Bill.

The School Year

Evening School is held during all the four quarters of the school year. Each quarter covers from ten to twelve weeks.

Registration

Registration for Evening School is done through the Evening School office located in the Mechanic Arts building.

Students may register during the two weeks prior to the opening of each quarter, or on the special registration day and evening set at the beginning of each quarter.

Fees

There are two fee schedules. One is for students who desire college credit. The other is for people who do not desire college credit but are interested in taking a class or two for "T" credit, or training for a job.

1. The College Credit fee.

The registration fee for college credit is \$10.00 for the school year or for the summer quarter which is separate from the rest of the school year.

After paying the registration fee a student may register for classes by paying a class fee for each class. The minimum class fee is \$7.50 per quarter and the maximum is \$10.00. The class fee is based on the length of the class period, and not on the credit.

2. The "T" credit, or training credit fee ranges from \$10.00 to \$20.00 per class, including laboratory fee.

A person may register for a class for "T" credit by paying only the class fee, without having to pay the registration fee of \$10.00.

Summer School

E. A. JACOBSEN, Dean

For more than 30 years the College has conducted Summer School. Since 1924, the offering has been materially enlarged and enriched. Among the purposes of this large educational undertaking is to bring to Logan a number of the leading educators of the nation, and build, in the Intermountain West, a summer school of wide influence.

A full quarter of work is offered, divided into two sessions, the first of six weeks and the second, five weeks.

During the Summer School, all departments of the College offer courses; the program is arranged to meet the special needs of summer students. Courses offered in Education, Psychology, and related departments make it possible for students to meet all requirements for Utah certification. This curriculum also meets requirements for certification in most of the surrounding states.

In past years the majority of summer students have been teachers and administrators in secondary and elementary schools. At present an increasing number of regular students is continuing through the summer. High school graduates are also entering the college immediately rather than postponing entrance until Fall Quarter. Former military personnel who are receiving government aid are especially interested in a regular summer program inasmuch as nearly all of them wish to complete their education as quickly as possible. The summer curriculum is arranged to meet this trend. Consequently, practically all departments are offering much of their regular program in the Summer Quarter.

Numerous lectures, lyceum numbers in music and drama, and other recreational opportunities are regularly scheduled as part of the summer school offering.

GRADUATE CREDIT

Summer School students are allowed seven years in which to satisfy requirements for the Master of Science or the Master of Education degree, but they may complete the requirement for this degree by attendance at three Summer Schools. This makes it possible to obtain this degree without giving up present teaching employment. Those who expect to register for work leading to this degree should submit their credits to the dean of the Graduate School several weeks in advance of registration and indicate the subject in which they wish to major. This will make it possible to have the course of study approved by the time of registration.

The Summer School catalog containing detailed announcements of courses is issued annually in March and is available upon request.

COLLEGE OF SOUTHERN UTAH

ROYDEN BRAITHWAITE, Director

College of Southern Utah, founded in 1897, was first called the Branch Normal School of the University of Utah. With the growing need in southern Utah for agricultural development, a change of administration at the parent institution was effected in 1913 and the school then became a branch of Utah State Agricultural College. The branch was authorized under supervision of the Board of Trustees to offer such courses as are "permitted by law to be given in the Utah State Agricultural College." Through new offerings in Economics, Vocational Industrial Education, Basic Arts and Sciences, Business, Social Sciences and Education, young men and women now find increased opportunity to become better home and community builders. Significantly of value is the fact that all CSU courses parallel those of the parent institution.

Eleven men have served as heads of the branch since its founding. The first four were known as principals and held office as follows while the school was a part of the University of Utah: Milton Bennion 1897-1900; J. Reuben Clark 1900-1901; Nathan T. Porter 1901-1904; George W. Decker 1904-1913. The remaining six men have been titled Directors since the institution became a branch of Utah State Agricultural College. They are Roy F. Homer 1913-1921; P. V. Cardon 1921-1922; J. Howard Maughan 1922-1929; Henry Oberhansley 1929-1945; H. Wayne Driggs 1945-1951; Daryl Chase 1951-1954. Dr. Royden Braithwaite was named Director in January, 1955.

Beginning with 1936-37 school year, the Board of Trustees authorized the addition of Upper Division courses in Agronomy, Animal Husbandry, and Agricultural Economics and related work. This enables students in Agriculture to obtain a B.S. degree in these departments with one year of additional work at Utah State Agricultural College, Logan.

In 1948-49 courses for the training of elementary teachers to the Bachelor's Degree were authorized by the Board of Trustees.

The first regular summer school of the College was held in 1949.

In 1953 the Board of Trustees authorized that the name of the branch be changed from Branch Agricultural College to College of Southern Utah.

The Extension Service and the Agricultural Experiment Station are closely connected with CSU. Certain members of the resident staff at Cedar City are also members of the staffs of these two divisions. Deans of the parent institution supervise closely the work of the corresponding divisions at the branch, and course offerings closely parallel those offered on the Logan campus.

SNOW COLLEGE

LESTER B. WHETTEN, Director

Sanpete Stake Academy, founded in 1888 at Ephraim by the Church of Jesus Christ of Latter-day Saints was first a preparatory and intermediate school. High School work was added in 1895. After normal studies were added as a fifth year in 1912, the institution became known as Snow Normal College.

It became a junior college in 1922 and since then has been called Snow College.

It was made a state junior college in 1932, and became a four-year junior college in 1937. The college became a branch of Utah State Agricultural College July 1, 1951. It initiated a Vocational Agricultural Program in 1943.

The College Plant includes: (1) The main campus, on which are the Administration Building, the Science Building, the Mechanic Arts Building, Gymnasium, Cafeteria, Auditorium, and outdoor recreational facilities.

(2) The athletic field is an eight-acre tract, contributed by faculty and student body, and is equipped for football, track, and other field events.

(3) The college farm, consisting of 60 acres of improved land has ample housing for farm stock, machinery, and storage facilities for feeding supplies and farm crops. Buildings and equipment for dairy, poultry, sheep, swine and other livestock provide adequate facilities for training in agriculture. Animals on the farm are registered and are of the highest quality.

(4) The dormitory and housing units, convenient to the campus, provide for both married and unmarried students.

Administrators of the school have been: Alma Greenwood, 1888 to 1891; George C. Christensen, 1891 to 1892; Newton E. Noyes, 1892 to 1921; Wayne B. Hales, 1921 to 1924; Milton H. Knudsen, 1924 to 1933; I. Owen Horsfall, 1933 to 1936; James A. Nuttall, 1936 to 1952; Lester B. Whetten, 1953.

List of Graduates 1954

TWO-YEAR CERTIFICATES

Diesel Technology

Alger, Glenn Price

Automotive Repair

Ellis, Richard Owen

Welding

Mickelson, James Thomas

SCHOOL OF AGRICULTURE

BACHELOR OF SCIENCE DEGREE IN AGRICULTURE

Ahmed, Kadim Salman
Al-Safi, Jafar Al
Ames, Charles W.
Andrews, Dean Carlton
Bankhead, W. Wayne
Barry, Addison K., Jr.
Bates, Steven LaGrand
Beckstead, Ferrell N., Jr.
Behunin, Cecil Dale
Bell, George Marcus
Brown, Darwin R.
Brown Keith Coleman
Buchanan, Ronald LaVere
Bybee, Don L.
Callister, Sheldon L.
Campbell, Lawrence A.
Carlsen, Miles
Caroll, Albert Rulon
Carter, Val H.
Casper, William V.
Christensen, Garth R.
Christensen, L. Clair
Christensen, Rondo A.
Christiansen, Odell C.
Clark, Melvin Vernell
Clement, Lloyd A.
Clements, Ross Kay
Conkle, Leslie Clyde
Cottle, Albert Jay
Coulson, Virgil
Creech, Orville Lynn
Creer, William Nielsen
Critchfield, Daren F.
Dalley, Dale Z.
Darrington, Leslie
Dobson, Donald C.
Doolittle, Emery
Dunford, Robert Moroni

Evaldson, Donald K.
Edwards, Donald Taylor
Empey, Alfred D.
Esplin, Lynn James
Fairbourn, Marlin A.
Ferry, Miles Y.
Foote, Warren C.
Furniss, John C.
Gardner, Ivan Bennion
Garrett, Windsor Keith
George, Elmer, Jr.
Gibbons, Claude Johnson
Gillies, Phil Marlow
Glover, David V.
Haderlie, Van K.
Hansen, Lawrence P.
Harr, James Royce
Hatch, Alton L.
Heiner, Robert Earl
Hopson, Gordon James
Howell, Ronald O.
Huber, Douglas S.
Hughes, John A.
Hull, Leonard Mann
Hunsaker, Don C.
Hurt, Raymond C.
Hyer, William Budge
Israelsen, Dee B.
Jensen, Gail Boyde
Jensen, Morgan Snow
Jensen, Ronald Selin
Jensen, Warren Edgar
Jolley, Ted W.
Keller, H. Ralph
Kirby, Rex B.
Lamb, Lamont
Larsen, Don Ray
Larsen, Jack D.

Larson, Glen Raymond
 Lazenby, Ray Don
 Leatham, Ben A.
 Lewengrub, Bert Harold
 Longhurst, Robert Max
 McDaniel, Jay D.
 McLaughlin, Richard Lee
 McMullin, E. Grant
 Montgomery, Richard W.
 Napombejara, Charnchai
 Neuenswander, Lavor A.
 Olsen, Blaine Lee
 Olsen, Farrel John
 Orme, Leon Edwin
 Palmer, Orval
 Patterson, Lloyd L.
 Perkes, Leo Lamon
 Peterson, Jay Allen
 Phillips, Max LeRoy
 Pincock, Don Samuel
 Pixton, Robert A.
 Porter, Kenneth
 Prestwich, Sheldon G.
 Quinn, Richard Joseph
 Rasmussen, Arlo Marvin
 Reeder, Martin Glen

Richardson, Duane G.
 Robinson, Charles W.
 Rudd, Ross Cornell
 Schank, Stanley Cox
 Schwartz, Richard Kay
 Schwartz, Stanley
 Shawcroft, John Lynn
 Sorensen, Clifford C.
 Sorensen, Glade V.
 Spencer, Louis D.
 Stewart, Denzil S.
 Svedin, Walter Joseph
 Swan, George Whitlock
 Swenson, Russell Neil
 Tanner, Doyle Boyd
 Tingey, Paul Heber
 Tueller, Mack William
 Waldron, Robert Ware
 Warburton, Dwight C.
 Wightman, Dale Flander
 Wilcox, Verl G.
 Williams, James E.
 Williams, Max W.
 Winkel, Cleve R.
 Zundel, Robert M.

SCHOOL OF ARTS AND SCIENCES

BACHELOR OF SCIENCE DEGREE IN ARTS AND SCIENCES

Abrams, Olive Veloy
 Alexander, Mary Louise Thorndike
 Alleman, Roma
 Allen, James B.
 Allen, Richard C.
 Baugh, Joseph S., Jr.
 Bernhisel, Jay M.
 Boothe, Jon R.
 Burgener, Robert Ernest
 Burgoyne, Rodney W.
 Casaleggio, Carl Albert
 Clayson, Reed Lamar
 Coleman, Vern Lester
 Critchfield, Frederick
 Daines, Paul Hatch
 Datwyler, Reed
 Dunn, Donald D.
 Dunn, Emile Hyde
 Ellis, LeGrande Clark
 Evans, Ailene Broby
 Evans, Paul William
 Ewing, Gordon J.
 Faddis, Bonnie
 Fritz, Paul
 Gaddie, Barbara Gayle
 Gardner, Thurman William
 Gittins, David Arthur
 Greaves, Margaret
 Green, Herman Lee
 Green, Ruth
 Grubic, Danny

Haglock, Elmer I.
 Heckmann, Richard A.
 Hendricks, Grace
 Herrick, Clyde N.
 Heslop, Weldon A.
 Ingram, Sherman G.
 Jensen, Jay David
 Jensen, Robert LeRoy
 Jeppsen, Ray O.
 Johnson, Whitney Larsen
 Jones, Barbara Mae
 Jones, Boyd Thorpe
 Jones, Norman Frederick
 Kimble, Norman Auer
 Knowles, Eleanor C.
 Langford, Wilbur Reed
 Larsen, Edris
 Leishman, Janice R.
 Lewis, Mamie Rae
 Lichfield, Walter C.
 Livingston, June
 Mason, Roscoe LeRoy
 Mathias, Oral Boyd
 Maughan, Shirley J.
 Mitchell, Richard P.
 Morgan, Marcia B.
 Mortimer, William J.
 Mutlag, Daood Salman
 Nakamura, Tak J.
 Nash, William James
 Nellis, Bob Don
 Noble, Joseph William

Olsen, Ruth
 Olson, Earl Parkinson
 Oveson, Shirley Ann
 Plant, John Bernard
 Prudence, Norman Ronald
 Rallison, Marvin L.
 Reber, Donald S.
 Reeves, Merilyn Bronson
 Rider, David
 Rigby, Vaughan Dale
 Rogers, Dick Ray

Scott, Jack Grover
 Sjostrom, Clair Reed
 Smith, Richard Thomas
 Spainhower, Donald E.
 Stock, Reed Clark
 Tate, Charles Delmer, Jr.
 Thompson, Owen LaMoine
 Venable, Robert L.
 Waite, Joseph Richard
 Weeks, Wendell Lawrence
 Whitby, Paul Alma

SCHOOL OF COMMERCE

BACHELOR OF SCIENCE DEGREE IN COMMERCE

Allen, LeGrande
 Ashdown, Rex Richard
 Austin, Ronald Eugene
 Bamdad, Nasrin
 Beck, Roland Jay
 Bledsoe, Lloyd G.
 Brown, Kenneth H.
 Cahoon, Winston Arthur
 Chingas, George Lee Von
 Christensen, Glen A.
 Claridge, Rex Charles
 Cloward, Dix W.
 Condie, Gordon Orlando
 Croft, John B.
 Dance, Arnold Julius
 Davis, Julian I.
 Deem, Darrell L.
 El Hag, Ayad Adbullah
 Eliason, Jay T.
 Everton, Robert Edgar
 Farnsworth, Eugene C.
 Finch, David Garth
 Foster, James I.
 Fox, Floyd Ruby
 Glenn, Stewart William
 Godfrey, Iris S.
 Hale, Wilford M.
 Hamilton, Jim Vernon
 Hansen, Emma Lou
 Hatch, Dorothy Dawn
 Hawkes, J. Milton
 Haws, Arlington D.
 Henrie, Usher Junior
 Holt, William B.
 Hostman, Karl E.
 Hugie, Eldon R.
 Jensen, Gilbert Willard
 John, Alban Richard
 Jones, Sidney L.
 Jorgensen, Donna R.
 Jorgensen, Milton V.
 Keller, Alan Evans
 King, James E.
 Korth, Don Robert
 Larsen, Darwin W.
 Larsen, Larry James
 Larson, Ballard M.

Larson, Conrad Walter
 Lee, Dwendon Maxfield
 Lunt, David Allen
 MacLeod, David Alan
 Mantlo, Glendon Richard
 Martin, Charles Lee
 Martin, Charles Willis
 McLea, Jack Young
 Mecham, Lloyd A.
 Monson, Garth P.
 Moss, Robert Eldredge
 Nixon, Floyd George
 Nordman, Diana L.
 Nye, Wenden Morgan
 Obropta, Robert James
 Okerland, Edward Carl
 Olson, Melvin Ronald
 Olson, Norman Joseph
 O'Malley, Thomas Joseph
 Omland, Gerald Michael
 Passey, Lawrence Keith
 Patterson, David C.
 Petersen, Jerry Bruce
 Peterson, E. Lavee
 Peterson, Glenn H.
 Pett, Burton Royal
 Phillips, John Lee
 Pilkington, Walter F.
 Polson, Lois Avis
 Pond, Martin Taggart
 Poulsen, Larry Neil
 Preston, George Welling
 Rich, Marilyn
 Robinson, Richard O.
 Schneider, Lyle D.
 Sears, Max Fred
 Shreeve, Caleb A., Jr.
 Slack, James Preston
 Smith, Lloyd David
 Smith, Thiel W.
 Sorensen, Philip Edward
 Stock, Gloria Jeanne
 Taylor, John LeRoy
 Thomas, Hyrum Preston
 Thomas, Ralph S.
 Thorstensen, Carl W.

Todd, Howard G.
 Vaterlaus, Dean Rich
 Welch, Lionel C.
 Whipple, Dale E.

Williams, Hal Nathan
 Winterrose, R. Gayle
 Wiser, Fern Hansen
 Yeates, Sidney Chance

SCHOOL OF EDUCATION

BACHELOR OF SCIENCE DEGREE IN EDUCATION

Allred, Ivan Walker
 Anderson, Ivy M.
 Arnoldson, Elliot J.
 Atkins, Harold Wilford
 Ayarbe, Joseph P.
 Bagley, Larue T.
 Baird, June Griffiths
 Batt, Hazel Lee
 Bennett, Charles Everett, Sr.
 Blackburn, Deward E.
 Blakeslee, Richard J.
 Bone, Sherman L.
 Boothe, Leila A.
 Brady, Perry Blair
 Bridges, Frederick R.
 Brough, Rebecca
 Bullen, Bobby Winston
 Bunderson, Sylvia Jones
 Burnett, Barbara
 Bush, George D.
 Campbell, Del Ray
 Cannom, Amelia C.
 Cavallucci, Ralph J.
 Chamberlin, Irene S.
 Charlesworth, Donna J.
 Cipolla, Joseph Paul
 Clark, Edna B.
 Clark, Fannie Leona
 Clawson, Marlene
 Condie, Angus
 Cook, Rulon Hancey
 Cordon, Edgar N.
 Coulson, Joan Johnson
 Cracas, Thomas
 Crane, James Heber
 Crawford, Helen P.
 Criddle, Erma S.
 Crook, Kay M.
 Crookston, Lurna
 Cummings, Duane A.
 Cunningham, Stanley S.
 Davis, Mary E.
 Dawson, John Ray
 Dickson, Donald Jasper
 Drews, Henry Walter
 Edwards, Lewis Marsh
 Erickson, Joanne
 Farnes, LaRue
 Firth, Ileen
 Ford, John Wallace
 Forsyth, W. Lee
 George, Steve Louis
 Goulding, Rosetta H.
 Graham, Ollie Myrle

Graham, Ollie Petersen
 Griffith, Chloeteal H.
 Hall, Verona Wood
 Handy, Samuel Darrell
 Hansen, Bonnie Beth
 Hansen, Geraldine
 Hansen, Lois Arlene
 Hansen, Louise J.
 Harbertson, Robert B.
 Hawkes, Dean W.
 Hawkes, Nena R.
 Hess, Wendell
 Hilton, Mavis Roundy
 Hipa, Gertrude Harriet
 Hlavaty, Raymond Dean
 Holmes, Louise
 Hull, William Robert
 Hunter, Geraldine T.
 Hyer, Weldon Merle
 Jenkins, John Boyd
 Jenkins, LuJean Hogan
 Jensen, Barbara
 Jensen, Georgia C.
 Jensen, Gordon D.
 Johnson, Deon
 Johnson, Elma C.
 Johnson, Gloria May
 Johnson, L. Gail
 Johnson, Sheldon Artie
 Jones, Ann
 Jones, Marlene Stewart
 Judge, Janice Grace
 Kearl, Laura Ann
 Kerr, Bonita Rae
 Lacey, Patricia June
 Lambert, Clarence DeVoe
 Larsen, Gareth Lee
 Larsen, Mathilda M.
 Larsen, Shirley
 Last, Charles Boyce
 Lee, Thelma Maxfield
 Lindley, Earl L.
 Lloyd, Lureta
 Lundahl, Palma Diane
 Lundgreen, Joyce
 Madsen, Jeannine
 Maughan, Merlin B.
 McCann, Gem Van Orden
 McKenna, John Thomas
 McMurdie, Maughan W.
 McNeeley, Francis F.
 Meikle, Peggy Daines
 Meyer, Arlene
 Milovich, Ray Ted

Mitchell, LaVon Dairs
 Murdock, Allen Dale
 Murray, Beatrice E.
 Naylor, Ross Kaye
 Nebeker, Etta
 Nelson, Betty Renee
 Nelson, Dorothe Ione
 Newcomb, Ora
 Nielsen, Lloyd Evan
 Nielson, Nedra Ruth
 Olsen, J. Clyde
 Olsen, Rita Mae
 Olson, Beth Olsen
 Parker, Edna Wyatt
 Patterson, Mildred Mary
 Petersen, Harold Dean
 Petersen, Wanda H.
 Petty, Carmen LaRue
 Pierce, Robert C.
 Porter, Patricia L.
 Pulley, Jeanette
 Purcell, Farrell L.
 Raleigh, Robert F.
 Reese, Mona Gene
 Reiersen, Donald Frank
 Rigby, Dawn Rae
 Ripplinger, Cecil
 Ritchie, Thomas Jed
 Rogers, James Fredrick

Rose, Margaret Burnett
 Ruesch, Edna
 Seamons, Rendell Mack
 Sedgwick, Anna
 See, Donald Harlan
 Skankey, Barbara Jean
 Slaugh, Joelle Johnson
 Stevens, Phyllis L. A.
 Strate, Ireta H.
 Swenson, Janet Ruth
 Thompson, Virginia Beth
 Thompson, Jenna Lou
 Thompson, Ruby W.
 Timmerman, Elaine
 Tomlinson, Bernadean
 Tueller, Frank Eugene
 Turner, Ray Eyre
 Wallace, Lulu
 Welch, Jonathan C.
 Wendel, Robert H.
 West, Doyle Thomas
 West, John Hunt, Jr.
 Westerberg, Betty Ruth
 Whatcott, Merlin Wayne
 White, Hilda Clark
 Wilcox, Paul Hawkes
 Wilkey, Mack LeMore
 Williams, Margaret
 Wilson, Jeanette R.

GRADUATES FROM COLLEGE OF SOUTHERN UTAH

Arns, Marilyn
 Bettridge, Delton J.
 Fluckiger, Calpurna B.
 Kenney, Joan Hunter
 Kirtley, Edith H.
 Knight, Don Alma
 Larsen, Ruth Sorenson
 Lay, Howard Kay
 Lindstrom, Marilyn Ronnow

Maughan, Edna L.
 Morris, J. Clair
 Nash, Norma E.
 Paice, Shirley Sophia
 Paxman, Raeburn
 Phelps, Hardy Lee
 Roberts, Eleanor Robinson
 Rose, David Q.
 Twitchell, Niel C.

SCHOOL OF ENGINEERING AND TECHNOLOGY

BACHELOR OF SCIENCE DEGREE IN AGRICULTURAL ENGINEERING

Sidhu, Mohinderjit S.

Humphreys, Allan S.

BACHELOR OF SCIENCE DEGREE IN CIVIL ENGINEERING

Adamson, Arnold George
 Akramuzzaman, Mohammed
 Alexander, Warren Gerrard
 Baker, Lester D.
 Barrus, Neil Hunter
 Christensen, Albert L.
 Christiansen, E. Leon
 Davis, Delmer Stevens
 Dunkley, Donald K.

Glauser, Kenneth A.
 Gray, Robert Glenn
 Gurel, Ali Suat
 Hansen, Myron Dale
 Huntsman, John W.
 Israelsen, E. Arvel
 Jacobsen, Donald R.
 Jorgensen, George

Khaffaf, Mahmood Fakhri
 Krusi, Philip Jacob
 Lind, Gerald N.
 Nielsen, Weldon H.

Noble, Harl M.
 Smith, Arthur Flint
 Thompson, Collins L.
 Willis, Wayne Storey

BACHELOR OF SCIENCE DEGREE IN ELECTRICAL ENGINEERING

Asadi, Ridha Murtadha
 Braithwaite, Garth Francis
 Brownell, Fred P., Jr.
 Fawcett, Clifford Don
 Fullmer, Laurel J.
 Gardner, Thurman William

Griffin, Eldon Royal
 Kimose, Jay J.
 Mayeda, Wataru
 Pett, Bayd Gayle
 Redford, Dean Franklin
 Snow, Elliott Sterling

BACHELOR OF SCIENCE DEGREE IN TOOL ENGINEERING

Allen, Dell K.
 Beazer, Jay
 Dallan, Frank William
 Darley, David Kerr
 Daugherty, Onos Helm

Eppich, Sheldon M.
 Naegle, Keith
 Porter, Glenn S.
 Watson, Albert B.

BACHELOR OF SCIENCE DEGREE IN INDUSTRIAL EDUCATION

Bailey, Thurlow Lee
 Calder, Glade H.
 Carlson, Dorius Doyle
 Fawcett, Eugene G.
 Hancey, Garford Gene
 Hendrickson, James Lewis
 Higbee, Edward Miller
 Jackson, John Reed
 Klein, Louis, Jr.

Mickelson, James Thomas
 Nyman, Ross A.
 Perkins, Carlo Milton
 Roberts, Clair Lyman
 Ross, Merrill Rigby
 Van Drimmelen, LeRoy
 Whitaker, John Orson
 Wood, Grant Ree

BACHELOR OF SCIENCE DEGREE IN INDUSTRIAL TECHNOLOGY

Baird, Thomas Oscar
 Blau, Gerald Keith
 Bunderson, Ernest D.
 Bunting, Shirl H.
 Child, Ray Earl
 Curtis, Glenn R., Jr.
 Downey, James C.
 Eves, Donald John
 Gundersen, John Edward
 Hames, W. Gary
 Hawes, Dale James
 Hume, Donald E.
 Ismail, Taha Said
 Jamison, Delmar Reed
 Johnson, James Robert
 Khazeni, Javad Tay
 Lewis, Blaine

Librizzi, Frank J.
 Longhurst, M. Ray
 McHardy, Earl Arthur
 Nejat, Amir
 Nimr, Isam S.
 Slaugh, Ray Golden
 Smith, Joseph Dale
 Snow, Wilford Woodruff
 Sommercorn, Fred Louis
 Stanley Robert Hinkle
 Titensor, R. Dean
 Tueller, Joseph Ross
 Wardleigh, H. Larry
 Whipple, Eugene
 Whiting, Ned Allison
 Williams, Philip H.
 Worthen, Kay Forrest

SCHOOL OF FOREST, RANGE AND WILDLIFE MANAGEMENT
BACHELOR OF SCIENCE DEGREE IN FOREST MANAGEMENT

Alfano, Sam Steve
Christensen, Reed C.
Fenton, Benjamin W., Jr.
Haines, Walter H.
Hayter, Donald Kieth
Hoffmann, James Allen

Hudson, Russell Hugh
Johnson, John Henry
Nebeker, Howard D.
Niebergall, John F.
Niskala, George R.
Sawyer, Ralph Henry

BACHELOR OF SCIENCE DEGREE IN RANGE MANAGEMENT

Bolander, Donald Hugh
Burt, Donald F.
Crezee, Darwin
Ellis, Andrew Pascoe
Ford, Glen Edwin
Granfelt, Carl Eric
Harrison, Ronald Deane

Julander, Rollo Penney
Kunz, Thiel Allen
Murray, Russell Harold
Schultz, Robert Lewis
Sims, John DeLisle
West, Lewis Paul, Jr.
Winkel, Philo Gardner

BACHELOR OF SCIENCE DEGREE IN WILDLIFE MANAGEMENT

Abate, James John
Butterfield, Neil A.
Call, Mayo White
Conder, John Robert
Courtright, Alan M.
Edwards, Harold Lester

Nelson, James Leslie
Sparks, Earl Arthur
Vail, Robert S.
Webb, Edward Lloyd
Williamson, Mahlon Jean

BACHELOR OF SCIENCE DEGREE IN HOME ECONOMICS

Adams, Margaret S.
Baugh, Maurine L.
Bishop, Dorothy Ruth
Brown, Marva Fitzgerald
Burgin, Audrey J.
Buttars, Angela Marlene
Carlson, Ruth C.
Cox, Pearl
Darrington, Lila Cook
Esplin, Gwenavere
Farnsworth, Rhonda Fuhrman
Fisher, Gwen
Gardner, Mary Ada
Glauser, Sally Taylor
Goff, Marie
Hacking, Marjory May
Hamilton, Imogene
Kent, Luanne Mendenhall

Larsen, LaDawn
Le Floree, Margaret E.
Lloyd, Maxine Bowler
Mehas, Goldy
Payne, Rilla Dee
Petersen, Marcia F.
Purser, Marilyn
Stevens, Vera
Taylor, Jean M. C.
Thornton, Lorraine
Vickers, Merle Herman
Viswilingam, Parimala
Wann, Merci Ann
Warburton, Carol C.
Ward, Barbara
Ward, Irleen
Woodward, Marietta
Zollinger, Elma Ann

MASTER OF EDUCATION DEGREE

DON A. BLAKELEY
JOHN W. DUNN
MAX GILBERT GOLLAHER
PERRY EDMUND GOOCH
WAYNE WILLIAM JAMES

JARVIS PAGE PALMER
ANTHONY RUSSELL
BARTEL VAN OOSTENDORP III
ALMA E. WATTERSON

MASTER OF SCIENCE DEGREE

- ABDUL RAZZAQ ABDUL RAHMAN, The Effect of Stage of Maturity on the Quality of Lima Beans for Processing; Horticulture Department; Dr. L. H. Pollard, major professor.
- THAIR G. ALLEN, Opinions of Secondary School Principals in Regard to the Intramural Activities Program in High Schools of Utah; Physical Education Department; Prof. H. B. Hunsaker, major professor.
- GRANT F. ANDERSEN, An Evaluation of the College Football Show Band with Particular Reference to the Institutions of Higher Learning in the Rocky Mountain Area; Education Department; Prof. John C. Carlisle, major professor.
- BRUCE H. ANDERSON, A Study of Irrigation Methods in the Province of Fars, Iran; Irrigation and Drainage Department; Prof. C. H. Milligan, major professor; Dr. O. W. Israelsen, thesis director.
- MAX L. ARCHIBALD, A Study of Facilities for Boys' Physical Education in Secondary Schools of the Idaho Fifth District; Physical Education Department; Prof. H. B. Hunsaker, major professor; Prof. I. C. Heaton, thesis director.
- HEYDAR ALI ARFAA, "B" Plan Seminar Reports; Entomology Department.
- IBRAHIM SULEIMAN ATTOUR, Determination of Consumptive Use of Water at Various Times of the Crop Growing Season; Irrigation and Drainage Department; Dr. D. K. Fuhrman, major professor.
- WIGGO F. AXELGARD, The Use of Corn Syrup Solids of Different Dextrose Equivalents in the Manufacture of Frozen Desserts; Dairy Industry Department; Prof. A. J. Morris, major professor.
- JOSEPH ASTLE BAILEY, Merchandising of Turkeys in the Principal Cities of Utah, 1951-52; Agricultural Economics Department; Dr. R. H. Anderson, major professor.
- JAMES WELLINGTON BIGGAR, Moisture Infiltration and Stability of Structure of Salted Soils as affected by Synthetic Amendments; Agronomy Department; Dr. Sterling A. Taylor, major professor.
- CRAIG BERNELL BLACKHAM, An analysis of Interscholastic Competition for Elementary and Junior High School Students; Physical Education Department; Prof. H. B. Hunsaker, major professor; Miss Lois Downs, thesis director.
- JOSEPH FRANKLIN BOOTH, A Study of the Throwing Techniques of Pottery Making; Art Department; Prof. Floyd V. Cornaby, major professor.
- MAX KAY BUCHMILLER, The Economics of Rural Residential Zoning in Utah County; Agricultural Economics Department; Dr. George T. Blanch, major professor.
- NEWELL R. BUDGE, A Study of Mass Errors in Arithmetic; Education Department; Dr. E. A. Jacobsen, major professor.
- LYNN RANSOM BURTON, "B" Plan Seminar Reports; English Department.
- RALPH EDMUND CAMPBELL, The Effects of Limited Moisture Supply at Various Stages of Growth on the Development and production of Hybrid Corn; Agronomy Department; Dr. H. B. Peterson, major professor.
- JAMES MILES CARLSON, Use of the Pause-Analysis Technique in Determining How Stutters Account for Their Pauses in Speech; Speech and Drama Department; Dr. Richard A. Parry, major professor.

- KAY BAIRD CARVER, The Construction and Testing of a Permanent Magnet Type Beta Ray Spectograph; Physics Department; Dr. R. Perry, major professor.
- PRANI CHANGGHENKIT, The Influence of Various Row and Plant Spacings on the Yield of Certain Field and Vegetable Crops with Special Reference to Lima Beans; Horticulture Department; Dr. L. H. Pollard, major professor.
- CLAYTON B. CHENEY, An Original Three Act Play Entitled "Ah, Moon of My Delight"; Speech and Drama Department; Dr. Chester J. Meyers, major professor.
- RATANA CHOLLUMPE, Strain Comparisons Among Thirteen Strains of Single Comb White Leghorn Fowl; Poultry Department; Dr. J. David Carson, Jr., major professor.
- MOHAMMAD BASHIR CHOUDHRI, Growth and Nutrition of Plants as Affected by Various Levels of Exchangeable Sodium; Agronomy Department; Dr. H. B. Peterson, major professor.
- TREVOR L. CHRISTENSEN, A Proposed Program for the Use of Visual Aids in the Latter-day Saint Seminaries; Visual Education Department; Dr. L. G. Noble, major professor.
- MELBERN J. CLARK, Analysis of the Motives for Entering the Physical Education Profession; Physical Education Department; Prof. H. B. Hunsaker, major professor.
- GEORGE RAY CLAWSON, Survey of Personnel Practices in Selected Industrial Organizations of Utah; Industrial Education Department; Prof. William E. Mortimer, major professor.
- FRANK A. CONDIE, A Study of Athletic Scholarships in the Mountain States Athletic Conference; Economics Department; Prof. E. B. Murray, major professor; Dr. King Hendricks, thesis director.
- HELEN NORMA CROWTHER CONDIE, A Suggested Procedure for Teaching Home Living in the Twelfth Grade; Home Economics Education Department; Miss Helen L. Cawley, major professor; Dr. Bruce Gardner, thesis director.
- FRANCIS PATRICK COYLE, The Effect of Perceptual Training upon Minnesota Clerical Speed Test Performance; Psychology Department; Dr. A. N. Frandsen, major professor.
- EILEEN LOUISE DEAN, "B" Plan Seminar Reports; Clothing, Textiles, and Related Arts Department.
- DOUGLAS R. DEWEY, Inheritance Studies of a Wheat Cross to Six Races of Covered Smut; Agronomy Department; Prof. D. C. Tingey, major professor.
- HENRY WALTER DREWES, An Experimental Study on "Visual-Imagery" and the "Levelling" and "Sharpening" Dimension; Psychology Department; Prof. H. C. Sharp, major professor.
- LESLIE S. DUNN, The Municipal Recreation Program in Fort Bragg, California; Physical Education Department; Prof. Israel C. Heaton, major professor.
- LESTER CLAY ESSIG, JR., The Flannelboard in Education; Education Department; Dr. E. A. Jacobsen, major professor; Dr. Eldon Drake, thesis director.
- WILLIAM FRANKLIN FARNSWORTH, "B" Plan Seminar Reports; General Agriculture Department.
- ROBERT L. FULTON, Marketing Aspects of Cattle Finishing Operations, Major Cattle Finishing Areas of Utah, 1951-52; Agricultural Economics Department; Prof. Lynn H. Davis, major professor.
- GEORGE GALLOWAY, The Effect of the Industrial Arts Curriculum on the Leisure Time Activities of the Retired Teacher in Utah; Industrial Education Department; Prof. William E. Mortimer, major professor.

- LEORA S. GALLOWAY, The Relationship of the School Lunch and Other Meals to the Total Adolescent's Nutrient Intake in Logan and Wellsville, Utah; Foods and Nutrition Department; Dr. Ethelwyn B. Wilcox, major professor.
- JOHN MAXWELL GARR, A Study of the Effects of Systematic and Meaningful Instruction on the Learning of a Complex Motor Skill; Psychology Department; Dr. A. N. Frandsen, major professor.
- ABBAS GHEZELBASH, "B" Plan Seminar Reports; Agricultural Economics Department.
- WILLIAM GERALD GIEL, Requiem in Sand, an Original Novel. English Department; Dr. M. Q. Rice, major professor.
- L. LARUE GODFREY, The Stanford-Binet Intelligence Scale in Appraising Reading Readiness; Education Department; Dr. Arden Frandsen, thesis director; Dr. Caseel Burke, major professor.
- ALICE I. GOLDSBY, Phases in the Life history of *Strongyloides Papillosus*; Zoology Department; Dr. Thomas Bahler, major professor.
- ROBERT GUSTAVESON, The History of South Cache High School; Education Department; Dr. Keith R. Oakes, major professor.
- LE ROY M. HARRIS, Observations on the Occurrence of Estrus in Ewes; Animal Husbandry Department; Prof. J. A. Bennett, major professor; Prof. M. A. Madsen, thesis director.
- CHARLES MORGAN HAWKES, A Study to Determine the Content of an Industrial Arts Program in the Elementary Schools of Box Elder County; Education Department; Dr. E. A. Jacobsen, major professor; Prof. W. E. Mortimer, thesis director.
- WILLIAM K. HERD, A Study of the Effects of Reorganization Upon the Senior High School Educational Program of Jefferson County, Idaho; Education Department; Dr. J. C. Carlisle, major professor.
- SATOSHI HIBI, "This" and "That" as Verbal Expressions of Ego-Involvement; Psychology Department; Dr. D. R. Stone, major professor.
- D. DEE HORTIN, Comparative Value of Dehydrated and Suncured Alfalfa as Supplements for Range Ewes; Animal Husbandry Department; Dr. Lorin E. Harris, major professor.
- DEON W. HUBBARD, A Write-it-once Punched Card System of Farm Cost Accounting for Tax Reporting and Enterprise Analysis; Agricultural Economics Department; Prof. E. M. Morrison, major professor.
- ANGUS HILLYARD HYER, Intraseasonal Behavior of Pasture Mixtures and their Components under Irrigated Conditions; Agronomy Department; Prof. W. T. Bennett, major professor.
- BARBARA PERKINS JACOBSEN, A History of the Latter-day Saint Church Academies with Emphasis on Curriculum, Student Expenses, Facilities, Education Methods, and Activities; Education Department; Dr. E. A. Jacobsen, major professor.
- GENE S. JACOBSEN, A Compilation of the Opinions of the Attorney General of the State of Idaho with Commentary; Education Department; Dr. Keith Oakes, major professor.
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- MOHAMMED AMIN JADDOA, "B" Plan Seminar Reports; Agriculture Department.
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- MARCUS MARTIN JENSEN, The Preparation and Application of a Bacteriophage Typing Method for Staphylococci Associated with Turkey Synovitis; Bacteriology Department; Prof. G. A. James, major professor.

- MAX N. JENSEN, Effect of Time of Freezing on Strength of Concrete; Civil Engineering Department; Prof. J. E. Christiansen, major professor.
- JEROME J. JURINAK, The Available Forms of Zinc in Alkaline Soils; Agronomy Department; Dr. D. W. Thorne, major professor.
- DARRELL M. KELLY, A Study of the In-Service Growth Program for Ogden City Teachers; Education Department; Dr. E. A. Jacobsen, major professor.
- BUNJIRD KHATIKARN, The Inheritance of Certain Seed-Coat Colors in Lima Beans (*Phaseolus lunatus*); Horticulture Department; Dr. L. H. Pollard, major professor.
- SAWAENG KULTHONGKHAM, A Proposed Program of Economic Research to Aid the Rice Producers of Thailand; Agricultural Economics Department; Dr. George T. Blanch, major professor.
- ADRIANNA LANTING KUNKEL, The Content of Essential Amino Acids in 1950 Alfalfa Hay Grown in Utah Soil Treated with Different Fertilizers; Chemistry Department; Dr. D. A. Greenwood, major professor.
- ANNA LEE LAMB, A Study of Administrative Policies and Procedures for Girls' Physical Education in Selected Secondary Schools of Southern Utah; Physical Education Department; Prof. H. B. Hunsaker, major professor.
- GOLDEN L. LARSEN, Recent Trends in the Criticism of Shelley; English Department; Dr. Hubert Smith, major professor.
- WILLIAM ORVID LEE, Control of Dodder in Alfalfa Seed Crops; Agronomy Department; Prof. D. C. Tingey, major professor; Dr. F. L. Timmons, thesis director.
- ABBAS ALI MANII, A Study of the Influence of Some Plant Growth Regulating Chemicals on Delaying the Blossoming of Elberta Peach Trees to Reduce Damage from Spring Frosts; Horticulture Department; Dr. R. M. Bullock, major professor.
- STANLEY PETER MARSH, Comparison of the Methods for Determination of a Neutron Energy Spectrum by Means of a Neutron Camera and Nuclear Emulsions; Physics Department; Dr. R. Perry, major professor.
- ABUL MAJD ZAHIRUL HAQUE MAZUMDER, A Study of Low-Cost Roads; Civil Engineering Department; Prof. Eldon M. Stock, major professor.
- MAX E. MCKINNON, The Place of the General Shop in the Industrial Arts Curriculum in the Secondary Schools of Utah. Industrial Education Department; Prof. W. E. Mortimer, major professor.
- STERLING L. MELDRUM, "B" Plan Seminar Reports; English Department.
- GENE W. MILLER, The Effect of the Bicarbonate Iron on the Respiration of Exercised Roots; Agronomy Department; Dr. H. B. Peterson, major professor.
- CHARLES CHAMP MOORE, The Relationship Between Identification with the Family and Personality Adjustment; Sociology Department; Prof. Don C. Carter, major professor.
- LEO LA DEAN MOWER, Guidance Responsibilities of the Industrial Arts Teacher; Industrial Education Department; Prof. William E. Mortimer, major professor.
- NAJAH HASEEB NABULSI, "B" Plan Seminar Reports; Irrigation and Drainage Engineering.
- JOHN M. NEUHOLD, Age and Growth of the Utah Chub, *Gila atraria* (Girard), in Panguitch Lake and Navajo Lake, from Scales and Opercular Bones; Wildlife Management Department; Dr. Wm. F. Sigler, major professor.
- ERNEST NYMAN, "B" Plan Seminar Reports; Educational Department.
- NUKRUK PAHOLYOTIN, An Investigation of Friction Losses in Valves for Probable Sprinkler Irrigation Equipment; Agricultural Engineering Department; Prof. A. Alvin Bishop, major professor.
- CLARENCE P. PARKER, A Survey and Evaluation of the Student Activity Program in the Twin Falls Junior High School; Education Department; Dr. J. C. Carlisle, major professor.

- BERKLEY H. PARKINSON, 1951 Administrative Procedures and Policies for Boys' Physical Education in Secondary Schools of the Idaho Sixth District; Physical Education Department; Prof. H. B. Hunsaker, major professor.
- UTTAMRAO, ANANTRAO PATIL, A Study of the Relationship Between Consumptive Use of Water and Evaporation; Department of Irrigation and Drainage Engineering; Dr. Vaughn E. Hansen, major professor.
- LYNN KEITH PORTER, The Influence of Root and Soil Aeration and the Bicarbonate Iron on Lime-Induced Chlorosis; Agronomy Department; Dr. Sterling A. Taylor, major professor.
- RICHARD F. PREATOR, A Comparison of the Effects of Injected Radio-active Phosphorus and Gonadectomy on the Anterior Pituitary Gland of the Albino Rat with Observations on the Thyroids, Adrenals, and Male Sex Accessories; Physiology Department; Dr. Clyde Biddulph and Dr. Thomas L. Bahler, major professors.
- PHYLLIS R. PUBLICOVER, Listening Efficiency of College Students with High-Frequency Hearing Loss; Speech and Drama Department; Dr. Richard A. Parry, major professor.
- DELBERT COOPER PURNELL, Salt Movement and Forage Crop Establishment in a Saline-Alkali Soil as Influenced by Ridges and Furrows, Sprinkler Irrigation, and Soil Amendments; Agronomy Department; Dr. H. B. Petersen, major professor.
- CALVIN KING QUAYLE, The Wingless Victory; A Design Thesis; Speech and Drama Department; Prof. Floyd T. Morgan, major professor.
- ROBERT JOSEPH RALEIGH, A Study of Mineral Nutrition of Range Cattle in Southeastern Utah; Animal Husbandry Department; Dr. L. E. Harris, major professor.
- ANOUSHIRAVAN RAZZAGHMANESH, The United Nations Declaration of Human Rights; Political Science Department; Prof. Wendell B. Andreson, major professor.
- HENRY M. REEVES, Muskrat and Waterfowl Production and Harvest on the Dingle Swamp, Bear Lake County, Idaho; Wildlife Management Department; Dr. Jessop B. Low, major professor.
- SYED SAGHIR AHMAD RIZVI, An Analytical Study of Determination of Seepage Line in Earth Dams; Civil Engineering Department; Prof. Melvin J. Greaves, major professor.
- F. DALE ROBBINS, Evaluation of Male Physical Education Programs in Selected Secondary Schools of Utah as Determined by the Standards of the Utah State Course of Study; Physical Education Department; Prof. H. B. Hunsaker, major professor.
- MERLE J. ROGNRUD, The Population, Range, and Productivity of the North Nebo Elk Herd; Wildlife Management Department; Dr. Jessop B. Low, major professor.
- FRED K. ROWLAND, A National Survey of Industrial Arts in the Elementary Schools; Industrial Education Department; Prof. W. E. Mortimer, major professor.
- SHAIKH ABAS ALI INAYATULLAH, Conformal Mapping of the Complex-Potential of Flow; Civil Engineering Department; Prof. M. J. Greaves, major professor.
- GERALD R. SHERRATT, A History of the College of Southern Utah, 1897 to 1947; Education Department; Dr. J. N. Eastmond, major professor.
- THADDIUS NICHOLAS SKOLMOSKI, A Study of High School Students' Projective Responses to Auditory Stimuli; Psychology Department; Dr. D. R. Stone, major professor.
- EVAN J. SORENSON, A Study of the Academic Achievements of Selected Athletics and Non-Athletes of Preston High School for the Years from 1950 to 1953; Physical Education Department; Prof. H. B. Hunsaker, major professor; Dr. L. G. Noble, thesis director.

- JOHANNES STEINVOORT, Practical Applications of Thin-Shell Design Theories; Civil Engineering Department; Prof. H. R. Kepner, major professor.
- JACK RUSSELL TITTENSOR, Personnel Practices Governing the Selection and Appointment of Elementary Teachers in Utah; Education Department; Dr. E. A. Jacobsen, major professor.
- RICHARD WAYNE TRUEBLOOD, The Effect of Grass Reseeding in Sagebrush Lands of Sage Grouse Populations; Wildlife Department; Dr. Jessop B. Low, major professor.
- ROBERT L. UHLER, The Adaptions of the Neutron Scattering Technique of Soil Moisture Determination to Field Application; Agronomy Department; Dr. Sterling A. Taylor, major professor.
- CHLOE E. VICKERS, A Survey of Coeducational Physical Education in Selected Western Colleges; Physical Education Department; Miss Lois Downs, major professor.
- JUNE BUTLER WILLHITE, A Determination of Variability of Teaching Assignments in the Secondary Schools of Utah Together with Implications for Teacher Education Curricula; Education Department; Dr. John C. Carlisle, major professor.
- JAMES JARDINE WILLIAMS, The Financing and Budgeting of Athletics in the Intermountain Collegiate Athletic Conference for School year 1951-1952; Physical Education Department; Prof. H. B. Hunsaker, major professor.
- DONALD BENJAMIN WILSON, Seasonal Yield and Nitrogen Content of Three Grasses Grown Alone and in Association With Each Other and With White Dutch Clover; Agronomy Department; Prof. W. H. Bennett, major professor; R. W. Peake, thesis director.
- CLAIR D. WOODWARD, A Study of the Mechanical Condition of Woodwind Instruments as Related to Playability in Sixteen School Bands; Education Department; Dr. John C. Carlisle, major professor; Dr. N. W. Christiansen, thesis director.
- SPENCER B. WYATT, A Study of School Plant Planning Procedures Together with an Evaluation of the Extent to which they are Being Utilized in Selected Utah School Districts; Dr. Keith R. Oakes, major professor.
- VAL DEAN WYNN, Effectiveness to Evaporation from Ground and Foliage in Reducing Soil Moisture Depletion; Civil Engineering Department; Dr. V. E. Hansen, major professor.

DOCTOR OF EDUCATION DEGREE

- WENDELL O'NEAL RICH, Certain Basic Concepts in the Educational Philosophy of the Church of Jesus Christ of Latter-day Saints, 1830-1930; Education Department; Dr. E. A. Jacobsen, major professor.

HONORARY DOCTOR OF LAWS DEGREE

Edgar B. Brossard

Herschel Bullen, Jr.

Frederick P. Champ

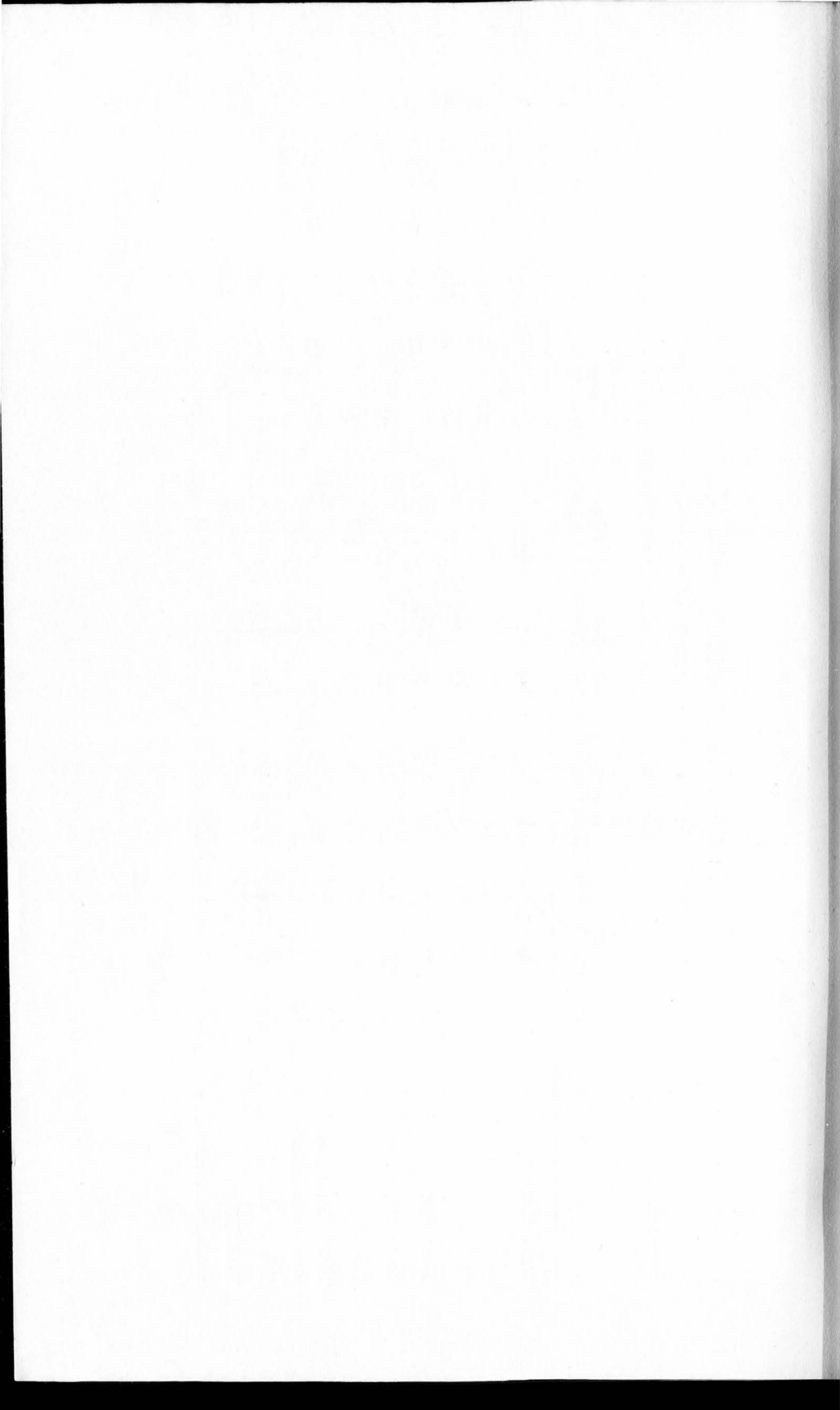
HONORARY DOCTOR OF HUMANITIES DEGREE

Emma Ray Riggs McKay

Summary of Attendance—1953-54

Regular School Year 1953-54 (September to June)

	Sub Coll.		Freshmen		Sophomores		Juniors		Seniors		Graduates		Sub-Total		Total
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	
Agriculture			151	1	108	1	79		133		107		578	2	580
Arts and Science			164	104	102	45	88	19	67	25	37	7	458	200	658
Commerce			84	85	81	43	75	34	101	13	28	4	369	179	548
Education		1	67	75	59	70	48	76	70	69	66	33	310	324	634
Engineering			229	1	187	1	122		128		36		702	2	704
Forestry			66		36		29		39		42		212		212
Home Economics			2	77		45		31	1	37		13	3	203	206
Sub Totals		1	763	343	573	205	441	160	539	144	316	57	2632	910	
TOTALS		1	1106		778		601		683		373		3542		



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UTAH STATE AGRICULTURAL COLLEGE

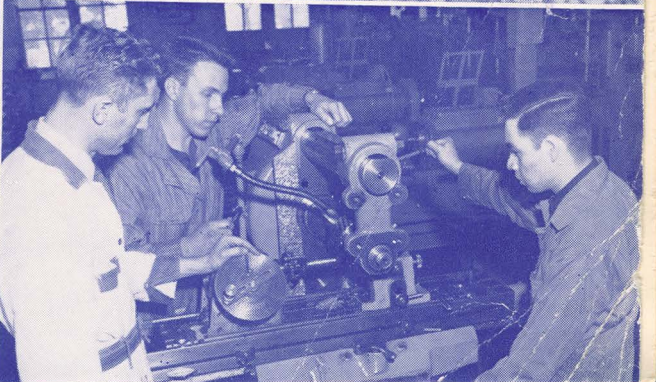
For A Well-Rounded Education

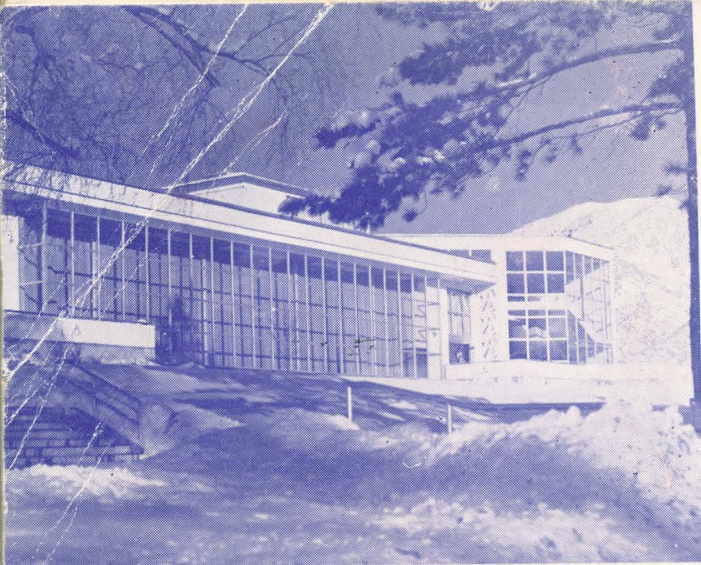
Utah State's variety of educational offerings is indicated by its eight schools: Agriculture; Humanities and Science; Business and Social Sciences; Education; Engineering and Technology; Forest, Range and Wildlife Management; Home and Family Living and Graduate.

The photographs on the opposite page show typical aspects of training at Utah's land-grant college:

Representative of Humanities and Sciences is the chemistry laboratory; in Home and Family Living, foods and nutrition, and other subjects are studied; a popular department in Education is music; if you like the great outdoors you'll envy those four men in range management, one of three departments in Forestry; mastery of typing is essential in the world of Business today; study of crops is one of many specialties in Agriculture; automotive work is an important phase of Engineering and Technology.

With sixty departments from which to choose, you are certain to find the field of your choice at Utah State.





Utah State has a most picturesque campus. It is situated on a terrace of old Lake Bonneville, near the mouth of beautiful Logan canyon, at the foot of the Wasatch mountains, overlooking pastoral Cache Valley. Center of student activities is the ultra-modern Union Building.

Religion has a vital place in education at Utah State. Adjacent to the campus is the Logan Institute of Religion, the largest in the L.D.S. Church's educational system. Students may study credit or non-credit courses provided by L.D.S., Protestant, and Catholic churches.

When Utah State men enter the armed forces, they lead. Training is available in both Air Force and Army units of ROTC.

