Accountancy

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Degrees offered: Bachelor of Science (BS), Bachelor of Arts (BA) in Accounting; Master of Accounting (MAcc); participates in Master of Business Administration (MBA)

Undergraduate options: The *BS or BA in Accounting* requires selection of one of the following options: Accounting, Business Information Systems, Economics, Finance, Management *or* Human Resource Management, Marketing, Personal Financial Planning, or Operations Management. Many of these options qualify for a minor. A dual major in Accounting and Economics is available.

Graduate specializations: *MAcc*—Professional Accountancy, Taxation, Personal Financial Planning, Information Systems, and Finance. MBAs with specializations in Accounting and Personal Financial Planning are offered in the College of Business (see MBA—Accounting and MBA—Personal Financial Planning programs).

Undergraduate minors offered: Accounting and Personal Financial Planning

Undergraduate Programs

Mission

The mission of the School of Accountancy at Utah State University is excellence in accounting education through teaching, research, and service. The school endeavors to provide high-quality accounting preparation for professional careers, to intellectually contribute to the field of accounting through the dissemination of meaningful research, and to render service. The school is dedicated to fostering economic and social progress, and to developing students into responsible and ethical citizens committed to active roles in their profession and service to society with a quest for lifelong learning.

Objectives

The objective of the School of Accountancy is to provide high quality accounting preparation for professional careers in industry, public accounting, and other organizations. The undergraduate programs are devoted to providing basic conceptual accounting, information systems, and business knowledge, along with general education, as a well-rounded foundation for career development. The fostering of high-quality student organizations is fundamental to the career-development process for on-campus programs.

The accounting curriculum is designed to help students prepare to meet changes in social, economic, and technological development. Academic course requirements for the bachelor's degrees include general education coursework, as well as supporting courses in mathematics, economics, business information systems, business communications, business administration, accountancy, and information technology. The programs provide an opportunity to choose from a number of elective courses to broaden educational backgrounds and enhance employment opportunities.

Career Opportunities

Practice in the profession of accounting has become more complex, with computerized information and accounting systems becoming an integral part of the various accounting and business functions. University training is essential to prepare for high-level accounting careers in business, government, and public accounting.

Graduates of the accounting program find employment in a variety of industrial companies, nonbusiness and government agencies, and both large and small public accounting and business advisor firms. Graduates hold all levels of positions within organizations, including supervisors, managers, partners, controllers, financial vice presidents, and chief executive officers. Nonbusiness units and government agencies, such as the Utah State Auditors Office, the Federal Bureau of Investigation, and the Internal Revenue Service, provide jobs in many varied accounting functions.

Requirements

College of Business Requirements. All students majoring in accounting must satisfy the College of Business requirements, provided on pages 101-102. Academic advising about these requirements is available in the College of Business Career and Education Opportunities Center, Business 310A.

Accounting Admission Requirements. In addition to meeting the College of Business requirements, students must have achieved a cumulative overall GPA of 3.0 or higher and have earned a grade of *B* or better in ACCT 2010 before they will be allowed to enroll in ACCT 3110 or 3310.

General Instructions for all Accounting Majors. Since some accounting courses are not offered every semester and many have prerequisites, students should plan their program at least a year ahead.

Accounting Major Requirements. For a bachelor's degree in accounting, students must complete at least 120 credits, including at least 24 credits in accounting and at least 90 credits in nonaccounting courses. To qualify for graduation as an accounting major, a student must maintain an accounting and an overall

GPA of at least 2.5. All accounting majors are required to complete the University Studies requirements (see pages 42-49), the Pre-Business course requirements (see page 102), and BA 3400, 3500, 3700; BUS 3250; ECON 3400; MHR 3110, 4880 or 4890, ACCT 3110, 3120, 3310, 3410, 4500, 4510. In addition, accounting majors select one of the option areas below.

Option Areas for Accounting Majors

(Those marked with an "*" qualify for a minor.)

Accounting. Select 6 additional accounting credits from the following: ACCT 5210, 5220, and 5400. ACCT 5210, 5220, and 5400 (or their equivalents) must be completed either prior to or as part of an MAcc or MBA-Accounting degree.

***Business Information Systems.** Select 12 additional credits in business information systems and computer science from the following: BIS 2300, 3100, and 3330; plus one course selected from CS 1700, 3410, or 3510.

***Economics.** Select 12 additional credits in economics and/or accounting from the following: ECON 4010 or 5010 *and* ECON 4020 or 5000, plus two additional courses from economics or accounting. If the two additional courses are selected from economics, requirements for a dual major in accounting and economics may be met (see *Dual Major* below).

***Finance.** Select 12 additional credits in business administration and/or accounting from the following: BA 4450, 4460, and two courses from: BA 4300, 4410, 4420, 4430 (one additional accounting course may be substituted for one of the two BA courses listed in this group).

Management *or* Human Resource Management. Complete 12 additional credits as approved by the Department of Management and Human Resources.

***Marketing.** Complete 12 additional credits in business administration and accounting as follows: BA 4510, 4530, 4540, 4550. (One additional accounting course may be substituted for BA 4530 or 4540.)

Personal Financial Planning. This option will *not* appear on student transcripts, and will *not* qualify as a minor for students majoring in accounting. Complete 12 additional credits in personal financial planning and business administration as follows: PFP 5060, 5070, 5080; BA 3460 or 4460.

***Operations Management.** Select 12 additional credits in business administration and accounting from the following: BA 4720, and three courses from BA 3080, 4750, 4790, 5730 (one additional accounting course may be substituted for one of the BA courses listed in this group).

Dual Major

Accounting and Economics Dual Major. Select 12 credits in economics in addition to the courses required for an accounting major from the following: ECON 4010 or 5010; ECON 4020 or 5000; and 6 credits of upper-division Economics electives.

Accounting Minor

Students with a major in an area other than accounting may qualify for an accounting minor by completing the following 6 courses (18 credits): ACCT 2010, 2020, 3110, 3120, 3310, and 3410 or 4500. A 2.5 grade point average must be achieved for accounting courses taken.

Personal Financial Planning Minor

Students with a major in an area other than accounting may qualify for a personal financial planning minor by completing, with at least a 2.5 grade point average, the following 5 courses (15 credits): ACCT 3410, PFP 5060, 5070, 5080, and BA 3460 or 4460. These courses are registered with the Certified Financial Planner (CFP) © Board of Standards. Students completing these courses will qualify to sit for the comprehensive CFP © Examination.

Second Bachelor's Degree in Accounting

Students seeking a second bachelor's degree in accounting must be approved by the School of Accountancy, must achieve an accounting and overall grade point average of 2.5, and must complete the course of study listed above for an accounting major.

Honors Degree Option

Academically able students who would like to experience the major in greater depth are encouraged to pursue Department Honors. Honors students will have the opportunity of working one-on-one with professors in selected classes. They will do original, independent work, taking them beyond the basics and allowing them to enjoy the benefits of close supervision and mentorship. Their senior project will provide an opportunity to collaborate with a faculty member on a problem which is significant personally and in accounting. Participating in Department Honors may enhance students' chances of obtaining fellowships and admission to graduate school, and gains them membership in the USU Honors Program. For further information about Department Honors, contact the College of Business Honors Advisor, Professor Dwight Israelsen, Business 608, tel. (435) 797-2298; contact the Honors Office, Merrill Library 374; or visit the Honors website at **http://www.usu.edu/honors**.

Beta Alpha Psi

The Delta Omega Chapter of Beta Alpha Psi, the national honorary and professional accounting fraternity, provides many professional accounting experiences for qualifying accounting students throughout their academic program.

Institute of Management Accountants

The student chapter of the Institute of Management Accountants (IMA) provides professional experiences in the area of management accounting. This organization is especially for students interested in careers in industry, not-for-profit organizations, governmental organizations, and accounting and business entrepreneurship.

Financial Planning Student Association

The Financial Planning Student Association (FPSA) provides students with opportunities to supplement classroom instruction with speakers from the financial planning industry, office visits, and internships at state and national meetings of professional associations in the financial services industry.

Graduate Programs

The graduate programs provide greater breadth and depth in accounting, taxation, information systems, and management to develop a high level of understanding, skill, and leadership capability to enter professional accountancy and related business careers. The Master of Accounting (MAcc) and the Master of Business Administration-Accounting Specialization (MBA-Accounting), offered by the College of Business, qualify graduates to sit for the Certified Public Accountant examination.

Admission Requirements

See general admission requirements, pages 90-91. In addition, candidates are selected based on the combined consideration of their score on the Graduate Management Admissions Test (GMAT) and their grade point average from the previous 60 semester credits (90 quarter credits) completed. Generally, 200 times the GPA plus the GMAT score must total 1,150 or more. Additionally, for MAcc Programs, the minimum acceptable GMAT score is at the 40th percentile and the minimum GPA is 3.0. In addition, scores for each section of the GMAT must be at least at the 40th percentile. For information about admission to the MBA—Accounting Specialization Program, see Admission Requirements for the MBA Program, page 153. Letters of recommendation, professional experience, professional certification, and leadership are also considered in admission decisions for all accounting graduate programs. Students may apply for admission to the graduate programs during their senior year of baccalaureate study. USU accounting students may take graduate courses during their last semester of undergraduate study, provided prerequisite courses have been completed, they have been admitted into a graduate program, and a split registration form is approved by the dean of the School of Graduate Studies. (See *Split Form Policy*, page 92.)

Students with an undergraduate degree in accounting which meets the USU undergraduate accounting program requirements have completed all of the preparatory work for graduate study. Students with less than the equivalent of the undergraduate program are expected to make up the deficiencies. The director of Accounting Graduate Programs will assist in necessary program scheduling. Students are encouraged to satisfy undergraduate deficiencies by taking equivalent graduate business administration, management and human resources, and economics core courses when possible.

Graduate students are expected to maintain an overall GPA of 3.0 to remain in the program.

Complete information relative to the details of the program and course scheduling is available from the School of Accountancy.

Graduate Degree Programs

MAcc requirements for students who have an undergraduate accounting major or equivalent (33 credits)

Program of Study. Students matriculated in the Master of Accounting degree must complete an approved program of study consisting of at least 33 credits. This program must include completion of the Foundation Requirements, the MAcc Core Requirements, and one of the Areas of Specialization Requirements. At least 15 credits must be earned in approved Accounting courses numbered 6000 or above. Details for each requirement type are provided in the following paragraphs.

Foundation Requirements. Students who have not completed undergraduate coursework in Corporate Income Taxation (ACCT 5400 or equivalent) must include ACCT 6400 in their MAcc program of study. Students who have not completed undergraduate coursework in both Accounting for Business Combinations (ACCT 5210 or equivalent) and Accounting for Government and Nonprofit Entities (ACCT 5220 or equivalent) must include the 6000-level offering of the omitted course in their MAcc program of study.

MAcc Core Requirements. The core courses required for this degree include: ACCT 6410, 6510, 6550, 6610; PFP 6560; and BIS 6150.

Master of Accounting Specializations

In addition to meeting the Foundation Requirements and MAcc Core Requirements, students complete requirements for one of the following specializations:

Professional Accountancy Specialization. Required courses for this specialization are: ACCT 6350, 6500, 6540, and 6600.

Taxation Specialization. Required courses for this specialization are: ACCT 6420, 6440, 6460, and one course chosen from PFP 6060, 6070, or 6080.

Personal Financial Planning Specialization. Students must complete PFP 6060, 6070, 6080, and one course chosen from ACCT 6420, 6440, or 6460. In addition, students must complete, or have previously completed, the equivalent of BA 3460 or 4460 (neither of these courses count as part of the 33-credit MAcc degree requirement). This specialization satisfies the requirements to sit for the national Certified Financial Planner (CFP) examination.

Information Systems Specialization. Students must complete ACCT 6500, 6600, and an additional 6 credits of approved systems-related courses.

Finance Specialization. Complete ACCT 6350, plus 9 credits selected from approved finance-related courses.

Accelerated Program for Nonaccounting Undergraduate Majors

MAcc for nonaccounting undergraduate majors (51 to 69 credits). Candidates for this program must score at or above the 50th percentile on all sections of the GMAT and have a 3.3 minimum GPA for the last 60 semester credits. This program requires

the successful completion of the Integrative Pre-MBA Core (BUS 6160, 18 credits), which is offered summer semester only, plus an additional 51 credits. Students with undergraduate degrees in business subjects (other than accounting) need not take the Integrative Pre-MBA Core and therefore may earn the MAcc in 51 credits. The 51 credits include: ACCT 3110, 3120, 3310, 3410, 4510, the Foundation Requirements, the MAcc Core Requirements, and one of the MAcc areas of specialization.

MBA—Accounting Specialization

Students admitted to the MBA Program may earn an Accounting Specialization by completing the MBA Advanced Required Courses, 18 credits (see MBA program description, page 153), and by completing at least 12 approved 6000-level accounting credits as part of their MBA program of study. To qualify for this specialization, students must complete, or have previously completed, the equivalent of ACCT 3110, 3120, 3310, 3410, 4510, 5210 (or 6210), 5220 (or 6220), 5400 (or 6400), 6510, and 6610.

MBA—Personal Financial Planning Specialization

Students admitted to the MBA Program may earn a Personal Financial Planning Specialization by completing the MBA Advanced Required Courses, 18 credits (see MBA program description, page 153), and the following: PFP 6060, 6070, 6080; ACCT 3410 or 6400; and BA 3460 or 4460. This specialization satisfies requirements to sit for the national Certified Financial Planner (CFP) examination.

Financial Assistance

Financial assistance is available in the form of President's Fellowships, Graduate School Fellowships, graduate assistantships, and special School of Accountancy scholarships. Applications for assistance should be made after the application for admission to the School of Graduate Studies is filed, but before March 1 of each year. Application forms are available from the School of Accountancy, and the awards are normally announced by April 15.

Professional Organizations and Activities

Graduate students are encouraged to participate in professional organizations, such as the USU chapters of Beta Alpha Psi (National Honors Fraternity for Financial Information Professionals), the Institute of Management Accountants, and the Financial Planning Student Association. The Federation of Schools of Accountancy, the American Institute of Certified Public Accountants, the Utah Association of Certified Public Accountants, and other professional organizations sponsor professional activities for accounting graduate students.

Accountancy Faculty

ATK Thiokol Professor
Richard L. Jenson, systems

Larzette G. Hale Professor
I. Richard Johnson, financial, business combinations

Richard C. and Vera C. Stratford Professor
David H. Luthy, systems

Arthur Andersen Alumni Professor
Richard L. Ratliff, auditing, financial, internal audit

Ernst & Young Professor
Clifford R. Skousen, international, managerial, financial

Arthur Andersen Executive Professor
Jay H. Price, Jr., financial, governmental, business combinations

Adjunct Professor
M. Kay Jeppesen, government contract accounting and administration

Professors Emeritus
James W. Brackner
Frank A. Condie
Larzette G. Hale

Associate Professor
Irvin T. Nelson, accounting education, financial, managerial

Assistant Professors
Cindy Durtschi, financial, forensic
Rosemary R. Fullerton, financial, managerial
E. Vance Grange, financial planning and tax
Garth F. Novack, tax

Lecturers
Cassy J. H. Budd, tax and financial
Jack W. Peterson, financial
Franklin D. Shuman, financial, managerial, governmental, business combinations
Dale G. Siler, business law and tax

Course Descriptions

Accounting (ACCT), pages 329-330
Personal Financial Planning (PFP), pages 456-457

Aerospace Studies

Department Head: Lt. Colonel Jeffery S. Bateman
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Undergraduate Programs

Objectives

Air Force ROTC provides educational experiences that develop skills and attitudes vital to the career of an Air Force officer. The purpose of the course is to give an understanding of the mission and the global responsibilities of the United States Air Force. The academic phase develops background in national and international affairs to help understand and evaluate world events.

In addition, the curriculum includes experiences designed to stimulate and develop an interest in the Air Force (e.g., orientation flights and visits to Air Force bases); opportunities to apply the principles of leadership, human relations, management, and staff work in practical situations; and other related experiences.

Requirements

Physical Fitness and Medical. All students must meet the physical fitness and medical standards for general military service.

Age Limitations. To qualify as a pilot or navigator, students must be able to finish the aerospace studies program and graduate from the University before age 29 years. Other students must complete the military program and graduate from the University prior to reaching the age of 30. Age waivers are available up to age 35.

Academic Requirements. Successful completion of the four-, three-, two-, or one-year Air Force ROTC program is required to be commissioned as a Second Lieutenant in the U.S. Air Force. Aerospace Studies classes are taken in addition to the classes required for a bachelor's degree. In some cases, ROTC classes may be taken in conjunction with a master's degree program. The program taken is based on the number of years remaining until graduation (e.g., a transfer student with two years remaining until graduation would enroll in the two-year program). The courses, along with the normal schedule for taking them for each of the programs, are listed below:

Four-Year Program. *First year:* AS 1010, 1110, 1020, 1120. *Second year:* AS 2010, 2110, 2020, 2120. *Third year:* AS 3400, 3010, 3110, 3020, 3120. *Fourth year:* AS 4010, 4110, 4020, 4120.

Three-Year Program. *First year:* AS 1010, 1110, 2010, 2110, 1020, 1120, 2020, 2120. *Second year:* AS 3400, 3010, 3110, 3020, 3120. *Third year:* AS 4010, 4110, 4020, 4120.

Two-Year Program. *First year:* AS 3500, 3010, 3110, 3020, 3120. *Second year:* AS 4010, 4110, 4020, 4120.

One-Year Program. AS 3500, 4010, 4110, 4020, 4120.

Summer Training. AS 3500 is a prerequisite for cadets entering the Air Force ROTC two-year program. Training will be given at an Air Force base and will last five weeks. Up to 5 university credits may be granted for this training.

All cadets in the three- and four-year programs will attend a four-week summer training camp. Attendance at this camp is usually between the sophomore and junior year at a selected Air Force base. Up to 4 credits may be granted for this training.

Leadership Laboratory. A Leadership Laboratory period is required each week during the fall and spring semesters for each year of aerospace studies. Interested students should check the current *Schedule of Classes* for the Leadership Laboratory schedule.

Minor. A minor in Aerospace Studies may be awarded upon completion of commissioning requirements.

Veterans. A veteran may apply for the Air Force ROTC program if he or she can complete the program prior to reaching age 30, with a year for year waiver up to age 35 for each year of active duty service. (The waiver does not apply to the maximum age at graduation to enter flight training of 29.) The general military course (first two years) may be waived for prior military service. However, veterans must successfully complete AS 3400 prior to entering the two-year program.

Scholarships and Financial Aid

Scholarships. Air Force ROTC scholarships are available on a competitive basis. These scholarships pay all or part of tuition and fees, a textbook allowance, and a monthly nontaxable stipend during the school year. High school seniors must apply for four-year scholarships prior to December of their senior year. In-college scholarships can be applied for while enrolled in Air Force ROTC.

Uniforms and Texts. All Air Force ROTC texts and uniforms are furnished at no expense to the student.

Miscellaneous Information

Career Opportunities. To meet the challenges, keep up with technological advancements, and explore the opportunities of the ever-broadening horizons in the aerospace age, officers possessing a variety of skills are required by the Air Force. Interested students should contact the Aerospace Studies Department for information on the Air Force career opportunities related to their academic major.

Aerospace Studies Faculty

Professor

Lt. Colonel Jeffery S. Bateman

Assistant Professors

Captain James Lovewell, Commandant of Cadets

Major Walter D. Martin, Unit Admissions Officer

Information Manager

Staff Sergeant Holly A. Huff

Director of Personnel

Senior Airman Jessica L. Bruckner

Course Descriptions

Aerospace Studies (AS), page 340

Agricultural Systems Technology and Education

Department Head: Gary S. Straquadine
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WWW: http://www.aste.usu.edu

Agricultural Systems Technology *and* Agricultural Education Advisor: Eric B. Worthen, ASTE 117, (435) 797-7091, eric.worthen@usu.edu

Agricultural Machinery Technology Advisor: Evan P. Parker, ASTE 137, (435) 797-1928, epparker@cc.usu.edu

Family and Consumer Sciences Education Advisor: Betty J. Murri, Family Life 303A, (435) 797-1565, betty.murri@usu.edu

Degrees offered: Bachelor of Science (BS) in Agricultural Education; BS, Master of Science (MS) in Agricultural Systems Technology; BS in Family and Consumer Sciences Education

Undergraduate emphases: *BS—Agricultural Systems Technology*: Agribusiness and Agricultural Mechanization

Graduate specializations: *MS*—Agricultural Extension Education, Agricultural Mechanization, Family and Consumer Sciences Education and Extension, International Agricultural Extension, and Secondary/Postsecondary Agricultural Education

One-year Certificate and Associate of Applied Science (AAS): Agricultural Machinery Technology

Undergraduate Programs

Objectives

The programs offered in the Agricultural Systems Technology and Education Department are for students who are preparing for positions as family and consumer sciences *or* agricultural education teachers, as well as for positions in family and consumer sciences education *or* agricultural extension, agricultural mechanization, agribusiness, and agricultural production and management.

The facilities for these programs include laboratories with specially designed equipment for practical instruction in agricultural systems and mechanization, including computer applications, agribusiness, agricultural buildings, engines, electricity, hydraulics, machinery, and repair welding. Family and Consumer Sciences Education students use laboratories equipped for instruction in secondary education, clothing production, textile science, early childhood, nutrition, and interior design.

Requirements

Departmental Admission Requirements. Admission requirements for the Department of Agricultural Systems Technology and Education are the same as those described for the University on pages 15-18. Students in good standing may apply for admission to the department.

Bachelor of Science in Agricultural Education. Preparation in Agricultural Education includes technical agriculture, economics, and business. Students selecting the teaching option will also enroll in principles and techniques of teaching courses.

Students interested in teaching agricultural production and processing, agricultural mechanics, horticulture, or natural resources will be guided into areas of their major interest. Agricultural backgrounds or summer agricultural experiences are necessary for teacher certification.

An application for admission to teacher education should ordinarily be completed before the junior year (see College of Education and Human Services requirements, page 104). Approval for admission to teacher education is a prerequisite to enrollment in education and psychology courses. A 2.75 GPA is required for admission to the teacher education program.

Requirements for the **Bachelor of Science in Agricultural Education** are listed briefly. For more detailed information on courses and the recommended sequence for taking them, see the major requirement sheet available from the Agricultural Systems Technology and Education Department.

The Agricultural Education major involves four teaching areas, which correspond with the Utah agricultural education program model design. Students must complete the University Studies requirements (see pages 42-49). In addition, students must complete the following courses in preparation for teacher licensure: SCED 3100, 3210, 4200, 4210; SPED 4000; and ASTE 2710, 3240, 3300, 3620, 4150, 4300, 5500, 5630. An Instructional Technology course must also be taken (contact departmental advisor to determine which course to take).

All students in the Agricultural Education major will complete a core of technical agricultural courses to include ASTE 1010, 3050, 3080; ADVS 1110; BIOL 1110, 1210; CHEM 1110; and SOIL 3000. Students are required to designate a program emphasis for the following areas: Production and Processing; Agricultural Systems; Horticulture; and Natural Resources. Approximately 50 credits in a technical agriculture specialization are required in each of the four program area choices. All students who seek an agricultural education teaching position in Utah are encouraged to complete the biological science teaching endorsement, which includes an additional 19 credits.

Bachelor of Science in Agricultural Systems Technology (AST). This major has two emphases: *Agribusiness* and *Agricultural Mechanization*. Preparation in either emphasis includes technical agriculture, economics, and business. The agricultural mechanization emphasis requires additional courses in technical electives and communication skills development.

The Bachelor of Science in Agricultural Systems Technology, **Agribusiness Emphasis**, includes the following courses: ASTE 1010, 2200, 2830, 3030, 3050, 3080, 3090, 3100, 4100, 4900, 5260; ACCT 2010; CHEM 1110; ECON 1500, 3030, 3050; MATH 1050; SOIL 3000; STAT 2300; and 24 credits of departmental electives. Students will complete a minor in Business or Agribusiness. Additional requirements in Animal Science; Plant and Soil Sciences; and Forest, Range, and Wildlife Sciences must also be met. In addition, students must complete the University Studies Requirements.

Bachelor of Science in Agricultural Systems Technology, **Agricultural Mechanization Emphasis**, includes the following courses: ASTE 1010, 2200, 2830, 3030, 3050, 3080, 3090, 3100, 4100, 4900, 5260; ACCT 2010; CHEM 1110; ECON 1500, 3030; MATH 1050; and SOIL 3000. Students must also fulfill University Studies requirements and complete designated electives.

Bachelor of Science (Dual Major) in Agricultural Systems Technology **and** Agribusiness includes the following courses: ASTE 1010, 2200, 3030 (or 4100), 3050, 3090, 3200 (or 3080), 3600, 5260; ECON 1500, 1550, 3030, 3050, 4010, 4030, 5030, 5050, 5350; ACCT 2010, 2020, MATH 1050, 1100; MHR 2990; and STAT 2300. Students must also complete University Studies requirements.

The **Associate of Applied Science Degree in Agricultural Machinery Technology** requires 60 semester credits that include a minimum of 6 credits of University Studies classes, 38 credits in Agricultural Mechanization, and 6-10 credits in business and related classes. Required courses include: ASTE 1010, 1120, 1130, 1610, 1620, 2200, 3030, 3080, 3090, 3600, 3720, and 3730.

Agricultural Machinery Technology Certificate. This one-year agricultural program meets the needs of persons interested in employment opportunities with agricultural dealerships and companies in the areas of parts and service, as well as with farm suppliers, feed and fertilizer agencies, corporate farms and ranches, and other related industries. The vocationally oriented agricultural technology program includes a cooperative occupational experience placement at the end of the first year of instruction.

Requirements for the one-year program include a minimum of ASTE 1010, 1120, 1130, 1610, 1620, 2250, 3030, 3080, 3090, 3710. See major requirement sheet available from the department for more information.

Minor in Agricultural Systems Technology. A minimum of 18 credits approved by a faculty advisor are required.

Bachelor of Science in Family and Consumer Sciences Education (FCSE). This major provides professional preparation for teaching Family and Consumer Sciences Education and Occupational Family and Consumer Sciences Education in public schools, or for employment as a family and consumer scientist in business or government agencies, and extension. Many states, including Utah, require a master's degree to work for extension.

This composite major includes study in nutrition and food sciences, family and human development, interior design, housing, apparel and textiles, and consumer sciences, plus professional education courses.

Student teaching in secondary public schools is required. Internships in extension or business are available.

The suggested sequence for completing required coursework for the Family and Consumer Sciences Education Major includes the following courses.

Freshman Year: ENGL 1010; FCHD 1500; FCSE 2040, 2510; ID 1750, 1790; MATH 1010, 1050; NFS 1020; USU 1320. Computer and Information Literacy (CIL) requirements must be met or waived. Students should also register for the child development lab.

Sophomore Year: CHEM 1110, 1120; ENGL 2010; FCHD 2400, 2450; FCSE 3030, 3040; NFS 1240, 2020; USU 1300. Students should apply to the Secondary Teacher Education Program (STEP) during the spring of their sophomore year.

Junior Year: FCHD 3350, 4550; FCSE 3060, 3300, 3400; NFS 4070; SCED 3100, 3210; SPED 4000; Instructional Technology course (contact advisor for course number); DHA course.

Senior Year: FCHD 4960; FCSE 4300, 4400, 5500, 5630; SCED 4200, 4210.

Graduate Programs

Admission Requirements

See general admission requirements, pages 90-91. Applications will be considered throughout the year. However, students who wish to be considered for financial aid must apply by February 1 for the coming academic year. No application will be considered until all required information arrives at the office of the School of Graduate Studies.

Course Requirements

Master of Science. The MS program requires the completion of a minimum of 30 credits beyond the bachelor's degree. These credits must be approved by a supervisory committee. However, to optimize a student's academic experiences, 36 credits are recommended. A 10- to 15-credit core curriculum is required and includes courses in research/statistics and completion of a Plan A thesis for 6 credits or a Plan C program with a minimum of 33 credits. Students are also expected to select and complete an area of specialization. To complete all requirements, students should expect to be enrolled for a minimum of two semesters.

In the Family and Consumer Sciences Education and Extension specialization, a Plan B option is available. This plan involves 30 credits of instruction (including a minimum of 3 thesis credits) and the development and presentation of a creative project.

The following four specializations are available for the MS in Agricultural Education:

The **Agricultural Extension Education** specialization provides a program for individuals interested in cooperative extension work. The curriculum for the program includes coursework related to managing people; planning, implementing, and evaluating programs to promote technology transfer (adult education); understanding research techniques relevant to agricultural education; and the managing of fiscal affairs.

Electives are selected from each of the following departments: Agricultural Systems Technology and Education; Animal, Dairy and Veterinary Sciences; Economics; Biology; Plants, Soils, and Biometeorology; Forest, Range, and Wildlife Sciences; and Instructional Technology.

The purpose of the **Family and Consumer Sciences Education and Extension** specialization is to expand academic preparation in an area of study such as family studies, housing, textiles and clothing, nutrition and food sciences, and management of personal resources. This specialization places emphasis on teaching and curriculum/program development and/or Extension. Students are prepared for community professions, including secondary teaching (since students earn a teaching license), urban and rural extension, social science, and business. Study may lead to supervisory and administrative positions in business, technical schools, and applied technology colleges, or to consulting positions in mass media and industry. The master's degree *does not* result in a teaching license for public schools.

The **Agricultural Mechanization Systems** specialization allows for theoretical and applied study in the mechanical systems used in agricultural production, processing, and distribution. The curriculum for this program emphasizes coursework related to managing people; planning, implementing, and assessing systems used in the production and processing of agricultural products or services; and understanding research techniques used in agricultural systems technology. The remainder of the program is designed to be interdisciplinary, depending on student needs.

The **International Agricultural Extension** specialization was developed to prepare agriculturally educated people to perform administrative and supervisory roles in less-developed countries. The curriculum for this program includes coursework related to managing people; planning, implementing, and evaluating programs to promote technology transfer; and managing fiscal affairs. Electives are selected from each of the following departments: Agricultural Systems Technology and Education; Animal, Dairy and Veterinary Sciences; Economics; Biology; Plants, Soils, and Biometeorology; and Instructional Technology.

Research

The Utah Agricultural Experiment Station, a component of the College of Agriculture, supports graduate work in several areas of Agricultural Systems Technology and Education. Other state and federal agencies also support research in agricultural systems.

Financial Assistance

Both departmental and formal grant support are available to graduate students and are awarded on a competitive basis. Students requesting financial support should apply to the department.

Research assistantships are available through faculty members who have ongoing projects with the Utah Agricultural Experiment Station or who hold special research grants from the University, private companies, or state-federal agencies. Acceptance to pursue graduate study does not guarantee the student financial assistance.

Requirement Changes

Graduation requirements described in this catalog are subject to change. Students should check with their departments concerning possible changes.

Agricultural Systems Technology and Education Faculty

Professors

Robert L. Gilliland, extension

Bruce E. Miller, agricultural systems and mechanization

Weldon S. Sleight, teacher preparation

Gary S. Straquadine, agricultural education/extension

Adjunct Professor

Kevin C. Kesler, 4-H and youth development programs

Professor Emeritus

Gilbert A. Long, agricultural education

Associate Professor

F. Richard Beard, research and extension, agricultural engineering

Assistant Professors

John D. Harrison, agricultural waste management/extension specialist

Rhonda L. Miller, sustainable agriculture/agricultural systems

Rudy S. Tarpley, agricultural education, teacher preparation

Nancy Thompson, family and consumer sciences education

Instructor

Betty J. Murri, apparel and textiles

Lecturers

Evan P. Parker, agricultural technology and machinery management

Daryl L. Reece, agricultural engineering and equipment repair

Afifa Sabir, education and outreach, Biotechnology Center

Julie P. Wheeler, family and consumer sciences education

Course Descriptions

Agricultural Systems Technology and Education (ASTE), pages 340-342

Family and Consumer Sciences Education (FCSE), pages 397-398

Animal, Dairy and Veterinary Sciences

Department Head: Mark C. Healey
Location: Agricultural Science 230
Phone: (435) 797-2162
FAX: (435) 797-2118
E-mail: advsdept@advs.usu.edu
WWW: http://www.advs.usu.edu

Associate Head: Thomas D. Bunch, Agricultural Science 220, (435) 797-2148, tombunch@cc.usu.edu

Undergraduate Advisor for Animal Science *and* Dairy Science majors: Tami Spackman, Agricultural Science 242, (435) 797-2150, tami.spackman@usu.edu

Undergraduate Advisor for Bioveterinary Science majors: Stanley D. Allen, Veterinary Science 211, (435) 797-1900, sallen@cc.usu.edu

Graduate Programs Coordinator: Jeffrey L. Walters, Agricultural Science 246, (435) 797-2161, jeffrey.walters@usu.edu

Degrees offered: Bachelor of Science (BS) and Bachelor of Arts (BA) in Animal Science, Dairy Science, Bioveterinary Science; Master of Science (MS) in Animal Science, Bioveterinary Science, Dairy Science; Doctor of Philosophy (PhD) in Animal Science and Bioveterinary Science; MS and PhD degrees in Toxicology are available through the Interdepartmental Toxicology program

Undergraduate Emphases: *Animal Science*—Animal Industries, Biotechnology, Science; *Dairy Science*—Dairy Industries, Science; *Bioveterinary Science*—Biotechnology

Graduate Specializations: *Animal/Dairy Science*—Animal Nutrition, Breeding and Genetics, Molecular Biology, Reproductive Biology, Animal or Dairy Management (MS only); *Bioveterinary Science (PhD only)*—Parasitology, Toxicology, Virology

Certificate Program: Dairy Herdsman

Undergraduate Programs

Objectives

Bachelor's degree students majoring in animal or dairy sciences may choose a program from two career emphasis areas: **Science** or **Animal (Dairy) Industries**. The curricula in the animal and dairy sciences are designed to prepare students for a broad base of rewarding careers in the dynamic disciplines of animal agriculture. Teaching and research facilities, flocks, and herds are available for "hands-on" practical laboratory experiences, along with faculty-mentored research projects. An assigned faculty advisor helps students develop, arrange, and expedite their personal undergraduate program.

Preveterinary bachelor's degree programs are intended to prepare students for admission to professional veterinary medical schools and/or graduate study in the biomedical sciences. A preveterinary bachelor's degree is considered a nonterminal degree. Preveterinary students may earn a bachelor's degree in bioveterinary science, or in the science emphasis of animal science or dairy science with a preveterinary option.

Instruction in the ADVS Department also encompasses a diversified co-curricular program including allied clubs, intercollegiate livestock judging and rodeo teams, and involvement with their respective professional societies.

Animal and Dairy Sciences

Science Emphasis. Designed for students desiring education beyond the bachelor's degree, this emphasis is a preparatory course of study for students who have a career interest in the following areas: animal research in genetics; reproductive biology, nutrition (public or private sector); biotechnology; teaching; and advanced degrees (MS, PhD, and veterinary school). The science emphasis requires an especially close student-advisor relationship, as post-graduate training is considered essential for professional success in these disciplines.

Animal (Dairy) Industries Emphasis. This emphasis is designed to prepare students who earn a bachelor's degree for the broadest range of career opportunities in animal agriculture. The Animal Industries Emphasis stresses both traditional skills in the areas of basic and applied animal sciences and related learning experiences in the other agricultural sciences, as well as in the areas of business administration, economics, and management. Students can select either an advanced research project or an internship experience in the animal industries as an integral component of their program of study during the junior or senior year. Graduates from this emphasis may seek career opportunities in production animal agriculture in farm or ranch management, in state or federal government agricultural agencies, and in fields that support or interact with animal agriculture, such as corporate agribusiness, wholesale and retail marketing and sales, economics, accounting, agricultural real estate sales and appraisal, financing and credit operations, public policy, agricultural media and communications, insurance, commodity trading, animal product processing, agricultural cooperatives, and producer/commodity associations.

Animal and Bioveterinary Sciences

Biotechnology Emphasis. This emphasis is designed to prepare students who earn a bachelor's degree for careers in the expanding biotechnology industry or for graduate study in related fields. Nationwide there are more than 1,200 biotechnology/biopharmaceutical companies, with additional start-ups developing every year. Recent increases in federal funding for research in animal biotechnology, along with heightened private sector activity, have led to unprecedented career prospects in molecular biology, genomics, bioinformatics, developmental biology, and associated areas. USU has made a major commitment to biotechnology since 1986. The ADVS Department is heavily involved in biotechnology research and teaching, and the resources of the Center for Integrated BioSystems are also available to support this emphasis.

Those students who enjoy lab work and would like to have a BS degree with good job opportunities, and still qualify to apply to veterinary school, may elect to add the Biotechnology Emphasis in Bioveterinary Science to their degree.

Preveterinary Program

Preveterinary students take courses required by veterinary schools. Classes should be planned to assure meeting the current requirements for the veterinary schools to which the student plans to apply for admission. In most cases, preveterinary preparation requires a major portion of three academic years. Students accepted into veterinary school prior to completion of their BS degree may transfer credits back to USU for completion of their BS degree in bioveterinary science.

Utah participates in WICHE (Western Interstate Commission for Higher Education) which provides state subsidization of Utah resident (5 years or longer at the time of application) students entering any veterinary school that is a WICHE-participating school. At present this includes Colorado State University, Washington State University, Oregon State University, and University of California at Davis. Students may also apply to other veterinary schools as out-of-state applicants.

Vocational Subbaccalaureate Program

Dairy Herdsman Certificate. Students completing the required courses and experience in the Dairy Herdsman's curriculum usually find employment with a commercial or family dairy. Some enter dairy-related businesses. Students desiring to continue their dairy education may complete a BS degree in three additional years with proper planning and suitable academic performance.

Requirements

Departmental Admission Requirements. Undergraduate admission requirements for the animal science and dairy science programs are the same as those described for the University. Students in good standing may apply for admission to the department. New freshmen admitted to USU in good standing qualify for admission to the bioveterinary science major. Students with less than 60 semester credits transferring from other institutions need a 2.2 transfer GPA, and students with less than 60 semester credits transferring from other USU majors need a 2.0 GPA for admission to the bioveterinary science major. All students with 60 or more semester credits need a 2.75 total GPA to be admitted to advanced standing in bioveterinary science.

Departmental Standards. The following minimum requirements apply to all students working toward any bachelor's degree offered by the ADVS department. Bachelor's degree candidates must comply with these requirements in order to graduate: (1) courses required for the major may be repeated only once to improve a grade, and (2) courses required for the major may not be taken for pass-fail credit. In addition to these requirements, animal science and dairy science bachelor's degree candidates must attain a grade point average of at least 2.50 in the ADVS courses specified as requirements in their respective emphasis curricula to graduate. Animal science and dairy science degree candidates must attain an overall GPA of at least 2.25 to graduate. Bioveterinary science degree candidates must attain an overall GPA of at least 3.0 to graduate, *except* for students with a biotechnology emphasis, who must attain an overall GPA of at least 2.50 to graduate.

Graduation Requirements

Courses required and recommended for meeting BS degree graduation requirements in the various options available in the department are as follows.

Animal/Dairy Science: Science Emphasis

The following courses are required for students pursuing a bachelor's degree in the animal science or dairy science Science Emphasis. Courses followed by **(A)** are required for Animal Science majors. Courses followed by **(D)** are required for Dairy Science majors. ADVS 1110, 1910, 2200, two 2000-level species production practices courses (A), 2130 (D), 3000, 3500, 3510, 4200, 4250 or 4800, 4560, 4910, 4920, two 5000-level species management courses (A), 5130 (D); ASTE 3090 (D); BIOL 1210, 1220, 3200, 3300; CHEM 1210, 1220, 1230, 1240, 2310, 2320, 2330, 3700; MATH 1050; MATH 1100 or 1210; STAT 2000.

Animal/Dairy Science: Industries Emphasis

The following courses are required for students pursuing a bachelor's degree in the animal science or dairy science Animal (Dairy) Industries Emphasis. Courses followed by **(A)** are required for Animal Science majors. Courses followed by **(D)** are required for Dairy Science majors. ADVS 1110, 1250, 1910, 2200, three 2000- level species production practices courses (A), 2130 (D), 3000, 3500, 3510, 3650 (A), 4200, 4250 or 4800, 4560, 4910, 4920, two 5000-level species management courses (A), 5030 (A), 5130 (D), 5520 (A); ASTE 3050; BIOL 1010; CHEM 1110, 1120; ECON 1500; MATH 1050; NFS 5030 (D); SOIL 2000 or 3000 (D); STAT 1040 or 2000 or 2300. In addition, students majoring in this emphasis must choose three directed elective courses in animal management from the following: ADVS 3300, 5030 (D), one 5000-level species management course in addition to the two courses required for the major (A), 5520 (D), 5530, 5860 (A); ASTE 3090 (D), 3600 (D), 4100 (D); NFS 5020 (A); PLSC 4320; FRWS 4000 (A); SOIL 2000 or 3000 (A). Furthermore, students majoring in this emphasis must choose four directed elective courses in industry from the following: ACCT 2010; ASTE 3090 (A); BA 3400, 3500, 3700; ECON 2010, 3030, 3050, 4010, 4030, 5030; MHR 2990, 3110.

Animal/Bioveterinary Science: Biotechnology Emphasis

The following courses are required for students pursuing a bachelor's degree in the animal science or bioveterinary science Biotechnology Emphasis. Courses followed by **(A)** are required for Animal Science majors. Courses followed by **(B)** are required for Bioveterinary Science majors. ADVS 1110, 1910 (A), 1920 (B), 2040, 2200, 3200, 4260, 4910 (A), 4920 (A), 5160 (B), 5240 (B), 5260 (B), two 5000-level Methods in Biotechnology courses (A); BIOL 1210, 1220, 3200, 3300; CHEM 1210, 1220, 1230, 1240, 2310, 2320, 2330, 3700; MATH 1050 (A), 1100; STAT 1040 or 2000. In addition, students majoring in this emphasis must complete 12 credits in directed elective courses from the following: ADVS 3000, 3500, 3510, 4200, 4560, 5490, 5700 (B), 5820, one additional 5000-level Methods in Biotechnology course (A); BIOL 4200, 5150; PHYX 2110, 2120.

Bioveterinary Science

This curriculum includes those courses required for application to WICHE veterinary schools after three years of study. Requirements are as follows:

Freshman year: ADVS 1110, 1920, 2200; CHEM 1210, 1220, 1230, 1240; ENGL 1010; MATH 1050; one University Studies Breadth course.

Sophomore year: ADVS 2920; BIOL 1210, 1220; CHEM 2310, 2320, 2330; MATH 1100; STAT 1040; one University Studies Breadth course; electives.

Junior year: ADVS 3000; BIOL 3200; CHEM 3700, ENGL 2010; PHYX 2110, 2120; one University Studies Breadth course; one University Studies Depth course; electives.

Senior year: Choose from among the following courses to complete the University requirements for the bachelor's degree: ADVS 3500, 3510, 4200, 4560, 5160, 5240, 5260, 5490, 5700; BIOL 3300, 4200, 5150, 5330, 5340, 5600, 5620.

BA Degree in Animal/Dairy/Bioveterinary Science

Students must complete requirements for the BS degree in these respective programs (see above), plus two years of a foreign language (see page 50 of this catalog).

Honors

There is also an Honors Plan for students desiring a BA or BS degree "with Honors" in Animal/Dairy/Bioveterinary Science. For details, students should contact their academic advisor.

ADVS Minors

A minor can be valuable when associated with a major in agricultural education, agricultural economics, plant science, nutrition and food science, business, economics, computer science, rangeland resources, and in other disciplines where the animal industry has direct or indirect involvement.

Requirements for specialty or emphasis area minors are listed below. The same departmental standards applying to animal science and dairy science majors also apply to all minors (see page 129).

Requirements for Minors

The following is a listing of courses for the various minor emphasis areas. A specific course may **not** be used to fulfill the requirements of more than one ADVS minor.

General Animal Science: ADVS 1110; choose one or more courses from ADVS 2080, 2090, 2120, 2190; 10 elective ADVS credits with approval of an animal science advisor.

General Dairy Science: ADVS 1110, 2130; 10 elective ADVS credits with approval of a dairy science advisor.

Bioveterinary Science: ADVS 2200, 3000, 4200; 3 elective ADVS credits with approval of a bioveterinary science advisor.

Horse Production: ADVS 1110, 2190, 2250; 6 or more elective ADVS credits with approval of an animal science advisor.

Horse Training: ADVS 1110, 1600, 2190, 2600; 2 or more elective ADVS credits with approval of an animal science advisor.

Dairy Herdsman: ADVS 1020, 1030, 1040, 1050, 1060. *(Not available to Dairy Science Majors.)*

Transfer students must have a minimum of one 3-credit upper-division course in residency with the approval of an ADVS advisor.

Additional Information and Updates

For more information about Bachelor of Science requirements and the sequence in which courses should be taken, see major requirement sheets. For more information on ADVS Department minors, see minor requirement sheet. These are available from the ADVS Department advisor's office (AG S 242).

Successful completion of a bachelor's degree program in the ADVS Department requires that a very close student-academic advisor relationship be established and continued through each student's bachelor's degree program. Each student must take the responsibility of establishing this close working relationship with his or her advisor. Doing this soon after the student's entry into the department can keep academic problems to a minimum.

For updated information on ADVS programs and course offerings, check the departmental home page at:
http://www.advs.usu.edu.

Safety and Liability in Classes and Laboratories

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

Financial Support

In addition to the scholarships and other financial aid available through the University, the department awards designated scholarships to qualified students. The department employs students on a part-time basis to assist with its research and operate its animal facilities. The department also coordinates cooperative education and internship employment opportunities for students. For more information, contact the department.

Graduate Programs

Admission Requirements

In addition to the general admission requirements (see pages 90-91), applicants should have satisfactory (3.0 GPA or better) grades in completion of previous degree programs. GRE exam, verbal, quantitative, and analytical scores at or above the 40th percentile are required.

The applicant for a graduate program in animal or dairy science should have completed a BS undergraduate program similar to the USU animal science or dairy science Science Emphasis BS degree. This background would include the following courses and their prerequisites: BIOL 1210 and 1220 or their equivalents; CHEM 2310 and 2320 or their equivalents; MATH 1050 and STAT 1040 or their equivalents. Applicants with deficiencies in these areas may be admitted to the graduate program subject to the completion of remedial coursework specified by the department. Other preparatory courses may be specified by the student's supervisory committee.

Applicants to the bioveterinary science graduate program should have a degree in bioveterinary science, biology, microbiology, chemistry, or one of the animal sciences. Preveterinary students oriented towards graduate research studies are strongly encouraged to apply.

Degree Programs

Master of Science. The MS is available to qualified students with bachelor's degrees. MS degrees are offered by the department in animal science and dairy science, with five specializations in each, and in bioveterinary science.

Doctor of Philosophy. The PhD degree in animal science is offered with four specializations. It is available to qualified students with master's degrees in related disciplines. Exceptionally well-qualified applicants may be considered for admission to a postbaccalaureate PhD program. The PhD degree in bioveterinary science has three specializations and is available to qualified students holding a DVM or a master's degree in a related discipline, or exceptionally well-qualified postbaccalaureate applicants. The PhD is a terminal research degree that is awarded upon successful completion of a comprehensive program of coursework and original research in an approved area of specialization.

Specializations in Animal/Dairy Science

Animal Nutrition. This specialization involves studies in biochemistry, principles of nutrition, animal management, nutritional physiology, and animal feedstuffs. Cooperation with producers, feed industry groups, other departments of the University, and USDA collaborators, along with research funding from private industry, strengthens the graduate program in this area.

Course requirements: Students in the MS program are required to complete the following courses: ADVS 6800, any four ADVS graduate nutrition courses at the discretion of the supervisory committee; one 5000-level Statistics course. Students in the MS program are required to complete or to have completed CHEM 3700 or its equivalent, but will not receive graduate credit for it. Students in the PhD program are required to meet or have met all MS program requirements, as well as to complete the following coursework: ADVS 6800 (additional to the MS requirement), ADVS graduate nutrition courses as directed by the supervisory committee; CHEM 5700, 5710; one 5000-level Statistics course (additional to the MS requirement); additional coursework at the discretion of the supervisory committee to a total of at least 30 credits.

Breeding and Genetics. This specialization involves studies in quantitative genetics, applied animal genetics, statistics, and animal management. Cooperation with other departments, particularly the Department of Biology and the Department of Mathematics and Statistics, and collaboration with other research institutions, livestock producers, and commercial animal breeding companies broadens the resources of this graduate program.

Course requirements: Students in the MS program are required to complete the following courses: ADVS 6300, 6800; BIOL 6170, 6280; STAT 5110; and a minimum of 6 credits in the student's area of study. Students in the PhD program are required to complete the following courses in addition to those required for the MS degree: ADVS 6800, 6820; MATH 5710, 5720; STAT 6710, 6720.

Molecular Biology. This specialization involves studies in molecular genetics, biochemistry of nucleic acids, cell biology, reproductive physiology, and bioveterinary science. Cooperation with other departments, particularly the Department of Biology and the Department of Chemistry and Biochemistry, the Biotechnology Center, and collaborators at other research institutions allows for a strong graduate program in this area.

Course requirements: Students in the MS program are required to complete the following courses: ADVS 5160 or 5240 or 5260; ADVS 6800; BIOL 4200 or 6210; BIOL 5190; STAT 5200; and a minimum of 6 credits in the student's area of study. Students in the PhD program are required to complete the following courses in addition to those required for the MS degree: ADVS 6800; CHEM 5700, 5710.

Reproductive Biology. This specialization involves studies in physiology and endocrinology of reproduction; embryo technology, including collection, culture, manipulation, storage, and transfer of embryos; disease transmission, cytogenetics and molecular genetics; and environmental and toxicological influences on reproductive processes and fetal development. Cooperation with other departments and research centers of the University and with USDA collaborators allows for a strong graduate program in this area.

Course requirements: Students in the MS program are required to complete the following courses: ADVS 6200, 6800; BIOL 4200; STAT 5200. Students in the PhD program are required to complete the following coursework additional to the MS requirements: ADVS 6800; BIOL 5150, 6210; CHEM 5700, 5710. Additional coursework for the MS and PhD degree may be required at the discretion of the supervisory committee.

Animal or Dairy Management (MS only). This specialization involves studies in the applications of the principles of genetics, reproductive biology, and nutrition to animal or dairy management at an advanced level. Appropriate emphasis is also placed on statistics, economics and business administration, and range management. The management specialization offers the option of degree programs with or without thesis (Plan A or Plan B). Graduates in management from a program including thesis (Plan A) may pursue advanced studies in more specialized fields. The MS in management without a thesis (Plan B) is considered a terminal degree.

Course requirements: Students choosing either the option with thesis (Plan A) or the option without thesis (Plan B) are required to complete the following courses: ADVS 6200, 6300, 6520 or 6530, 6800; plus one of the following (if comparable course not previously completed at the undergraduate level): ADVS 6080, 6090, 6120, 6130, 6190; one 5000-level Statistics course. Additional courses in related areas will be required as directed by the supervisory committee.

Bioveterinary Science

This degree program involves studies in biochemistry, statistics, pathology, toxicology, virology, parasitology, pharmacology, microbiology, and laboratory animal management. Advanced

techniques in laboratory procedures and animal health research are emphasized. Cooperation with other departments and research centers of the University and with federal collaborators and agencies allows for a strong graduate program in bioveterinary science.

Course requirements: Students in the MS program are required to complete the following courses: ADVS 6700, 6800; CHEM 5700; STAT 3000. Students in the PhD program are required to complete the following courses: ADVS 6700, 6800; CHEM 5700, 5710; STAT 5200. Additional coursework will be determined by the supervisory committee.

Research

The ADVS department conducts a broad range of basic and applied research in the areas of animal reproduction, animal nutrition, livestock and dairy management, animal health, virology, parasitology, toxicology, animal behavior, cytogenetics, and molecular genetics. Department facilities include over 30 research laboratories on campus and at local and regional animal research facilities. There are research herds and flocks of beef and dairy cattle, sheep, and swine housed close to the University. There are additional research units housing beef cattle, sheep, and turkeys located throughout the state. Research in the department is funded by a multimillion dollar budget derived from support by the Utah Agricultural Experiment Station and by substantial outside contracts and grants. Cooperation with other departments and research centers of the University and with federal collaborators enhances the ADVS research and graduate programs. Significant in this regard are the University Center for Integrated BioSystems, the Utah State Animal Disease Diagnostic Laboratories, the Laboratory Animal Research Center, the Center for Environmental Toxicology, the Center for the Genetic Improvement of Livestock, and the on-campus USDA Poisonous Plant Laboratory.

Financial Assistance

Both departmental and research grant support are available to matriculated graduate students on a competitive basis. The department funds a number of graduate assistantships, which are available on a competitive basis to matriculated graduate students who are U.S. citizens, nationals, or residents. Students interested in departmental assistantships may request an application form from the department. Applications for assistantships for the following academic year must be submitted by March 15.

Acceptance to graduate study in the ADVS Department does not constitute a guarantee of financial assistance.

Career Opportunities

Career opportunities are available for students who have earned graduate degrees in the MS and PhD programs offered by the ADVS Department as described below.

Animal and Dairy Science Graduate Degree Programs

Animal Nutrition. Career opportunities exist in extension, university and private research, the commercial animal feedstuffs industry, private consulting firms, and international programs.

Breeding and Genetics. Career opportunities exist in extension university and private research, commercial animal breeding and genetic engineering enterprises, and international programs.

Molecular Biology. Career opportunities exist in university, federal, and private research organizations, and in commercial applications in the rapidly growing area of biotechnology.

Reproductive Biology. Career opportunities exist in extension; university and private research; the pharmaceutical, embryo transfer, and artificial insemination industries; private consultation; and international programs.

Animal or Dairy Management. Career opportunities include extension, private consultation firms, farm and ranch management, sales and service to agricultural producers, agricultural finance, and international programs.

Bioveterinary Science Graduate Degree Programs

Career opportunities in this area exist in research, management, and submanagement positions in public and private health research and testing organizations, and in commercial industries in the health field. Graduates from the MS program may seek admission to advanced degree programs in the biological sciences or veterinary medicine.

Animal, Dairy and Veterinary Sciences Faculty

Trustee Professor

Robert W. Sidwell, virology

Professors

Stanley D. Allen, veterinary diagnostics, laboratory animal management
Clell V. Bagley, veterinary medicine
Thomas D. Bunch, cytogenetics, embryo biology
Noelle E. Cockett, molecular genetics, identification of genetic markers
Roger A. Coulombe, Jr., veterinary toxicology, molecular biology
Howard M. Deer, pesticides, environmental toxicology
Mark C. Healey, parasitology
Lyle G. McNeal, sheep production, wool science
Kenneth L. White, reproductive physiology, developmental biology

Research Professors

John D. Morrey, virology, transgenic animals
Kamal A. Rashid, in vitro mutagenesis and DNA repair
Donald F. Smee, viral chemotherapy

Adjunct Professors

J. Talmage Huber, dairy nutrition
Lynn F. James, animal physiology
Michael R. Marshall, veterinary medicine
Kanok Pavasuthipaisit, medical science, anatomy
R. Dean Plowman, dairy genetics, management
Rex S. Spendlove, microbiology

Professors Emeriti

Clive W. Arave, behavior, dairy genetics
John E. Butcher, ruminant nutrition
Jay W. Call, veterinary medicine

Warren C. Foote, reproductive physiology
James LeGrande Shupe, veterinary science, comparative clinical medicine
Ross A. Smart, veterinary diagnostic pathology
Norris J. Stenquist, livestock production, nutrition
Wallace R. Taylor, dairy breeding, dairy herd improvement
Don W. Thomas, veterinary medicine

Associate Professors
Thomas J. Baldwin, veterinary diagnostic pathology
Tilak R. Dhiman, dairy nutrition
David D. Frame, poultry production and management
Jeffery O. Hall, veterinary pathology, toxicology
Kenneth C. Olson, range livestock nutrition, management
Lee S. Rickords, molecular genetics, developmental biology
Randall D. Wiedmeier, beef cattle nutrition, management
Allen J. Young, dairy management, reproduction
Dale R. ZoBell, beef cattle production, management

Adjunct Associate Professors
Dale R. Gardner, chemistry/toxicology
Kip E. Panter, animal science/toxicology
Roy W. Silcox, physiology, nutrition
Bryan L. Stegelmeier, pathology
John T. Stellflug, reproductive physiology, biochemistry, statistics
J. Christopher Wilson, veterinary medicine, fisheries

Associate Professor Emeritus
Larry M. Slade, equine nutrition, management

Research Associate Professors
Dale L. Barnard, virology
Ronald L. Boman, dairy nutrition, management

Adjunct Research Associate Professor
Shiquan Wang, cytogenetics, reproductive physiology

Assistant Professors
Ramona T. Skirpstunas, bacterial diseases of fish, veterinary pathology, veterinary laboratory diagnostic medicine
Quinton A. Winger, reproductive physiology, molecular biology

Adjunct Assistant Professors
William E. Day, equine management, reproductive biology
Breck D. Hunsaker, veterinary immunology
Stephen T. Lee, analytical chemistry
Timothy A. McAllister, ruminant nutrition, microbiology

Research Assistant Professor
Jeffrey L. Walters, dairy cattle breeding, statistics

Clinical Assistant Professors
Douglas S. Hammon, clinical veterinarian, dairy reproduction, nutrition
Eleanor P. Jenson, clinical veterinarian, extension veterinarian

Research Assistant Professor Emeritus
Robert E. Warnick, turkey nutrition

Lecturers
Brett R. Bowman, animal science/nutrition
Parl Galloway, animal science, manager of Animal Science Farm
Justin A. Jenson, dairy herdsman coordinator, dairy youth specialist

Course Descriptions

Animal, Dairy and Veterinary Sciences (ADVS), pages 330-333

Aquatic, Watershed, and Earth Resources

Department Head: Chris Luecke
Location: Natural Resources 210
Phone: (435) 797-2459
FAX: (435) 797-1871
E-mail: chris.luecke@usu.edu
WWW http://www.cnr.usu.edu/awer

Undergraduate Advisors:
Maureen A. Wagner, Natural Resources 120, (435) 797-2448, maureen@cc.usu.edu
Stephanie W. Hamblin, Natural Resources 120, (435) 797-2473, stephanie.hamblin@usu.edu

Degrees offered: Bachelor of Science (BS) in Fisheries and Aquatic Sciences; BS in Watershed and Earth Systems; Master of Science (MS) and Doctor of Philosophy (PhD) in Watershed Science; MS and PhD in Ecology; MS and PhD in Fisheries Biology

Graduate specializations: *MS, PhD in Ecology*—Aquatic Ecology; *MS, PhD in Fisheries Biology*—Aquatic Ecology, Conservation Biology, Fisheries Management

Undergraduate Programs

Objectives

The Department of Aquatic, Watershed, and Earth Resources (AWER) offers comprehensive educational opportunities for graduate and undergraduate students in hydrology, geomorphology, biogeochemistry, water quality, watershed management, fisheries, aquatic ecology, remote sensing, and geographic modeling. Departmental faculty provide expertise in fisheries, the hydrologic cycle, conservation biology, restoration and management of aquatic and riparian ecosystems, and in the remote sensing and geographic analysis of the earth's landcovers. Graduates of departmental programs become scientists and managers for natural resource agencies, professionals with consulting and nonprofit environmental firms, and teachers and researchers at major universities.

Requirements

Departmental Admission Requirements. Admission requirements for the department are the same as those described for the College of Natural Resources (see pages 115-116).

Graduation Requirements. All courses listed as major subject courses must be taken on an *A-B-C-D-F* basis. A grade of *C-* or better is required for all AWER courses used to meet the requirements for a major or minor in the department. The grade point average for all courses taught by the College of Natural Resources must be 2.5 or higher.

For information about changes in requirements, course sequence, and scheduling, students should confer with a departmental advisor. The undergraduate program can be readily tailored to individual student needs with the help of a faculty advisor.

Bachelor of Science in Fisheries and Aquatic Sciences. Students must meet the course requirements for University Studies, in addition to the following departmental requirements. The first two years of study include courses designed to give the student a sound scientific background, an introduction to the field of natural resources management, and an introduction to aquatic and earth resources. Some of these courses may be used toward the University Studies requirements, as indicated by the University Studies designations listed in parentheses following the course numbers. *Science Foundation* courses (35 credits) include: BIOL 1210, 1220 (BLS); CHEM 1210, 1220 (BPS), 1230, 1240; MATH 1050 (QL), 1100 (QL); NR 2220; PHYX 2110; and STAT 3000 (QI). *Common Departmental Core* courses (19 credits) include: AWER 1020, 3700, 4490, 4500, 4930, 4980; and ENVS 5320. *Fisheries Courses* (19 credits) include: AWER 3100 (DSC/CI), 3110, 4510, 4650, 5200, and 5550. Students must also complete *either* AWER 5330 *or* an approved natural resources capstone experience.

In addition to the preceding courses, students in the Fisheries and Aquatic Sciences major must choose a minimum of 24 elective credits. The majority of these elective credits must come from courses directly related to the degree program. **All elective courses must be approved by the student's faculty advisor before enrollment.** The following recommended courses will partially satisfy this requirement: AWER 3000, 3820 (QI), 4530, 5150, 5640; and FRWS 4880.

Fisheries Science Minor (18 credits). This minor is designed for students with a strong background in biology. The department head's approval and a minimum of 18 credits are required. Students must complete the *Fisheries Science Core* (9 credits) which includes: AWER 3100 (DSC/CI), AWER 3700, and NR 2220. They must also complete 9 credits of *Electives*, by selecting three courses from the following: AWER 4500, 4650, 5200, 5550, and FRWS 3810.

Bachelor of Science in Watershed and Earth Systems. All Watershed and Earth Systems majors must complete the following *Science Foundation* courses (19 credits): CHEM 1210, GEOL 1150 (BPS), MATH 1210 (QL), STAT 3000 (QI), and PHYX 2210 (QI). They must also complete the *Common Departmental Core* (19 credits): AWER 1020, 3700, 4490, 4500, 4930, 4980; and ENVS 5320. The following *Watershed and Earth Systems* courses (18 credits) are also required: AWER 3820 (QI), 4750, 5150, 5170, and SOIL 3000. Students must also complete *either* AWER 5330 *or* an approved natural resources capstone experience.

In addition to the preceding courses, 40 elective credits must be completed. The majority of these elective credits must come from courses directly related to the degree program. **All elective courses must be approved by the student's faculty advisor before enrollment.** The following lists of recommended courses could be used to satisfy this requirement.

Watershed Science: AWER 4510, 4530, 5200, 5640, 5660; CHEM 1220 (BPS); and FRWS 5350.

Geographic Information Science: AWER 5250, 5760, 5930; MATH 1220 (QL); PHYX 2220 (QI); and STAT 6810.

Watershed Science Minor (15-16 credits). For the Watershed Science minor, students must complete AWER 3700, 4490, 4530, plus two courses selected from the following: AWER 4500, 5150, 5640, 5660.

Geographic Information Science Minor (18-19 credits). For this minor, students must complete the following *Watershed and Earth Resources Core Courses* (12 credits): AWER 4930, 5930; CS 1700, 1710. Students must also complete 6-7 credits of *Electives* by selecting two courses from the following: AWER 3900, 5250; FRWS 3750; GEOG 4850.

Career Opportunities

Graduates in Aquatic, Watershed, and Earth Resources occupy an expanding niche in the fields of natural resources and environmental management. Degree holders often work as environmental scientists, hydrologists, fisheries biologists, or specialists in geographic information analysis and remote sensing. With experience and/or advanced degrees, AWER graduates may do natural resource assessment, management planning, and resource impact analysis.

Federal agencies, such as the Forest Service, Fish and Wildlife Service, Geological Survey, Bureau of Land Management, Environmental Protection Agency, National Park Service, Bureau of Reclamation, and National Marine Fisheries Service, hire graduates of AWER academic programs. Graduates also find employment with state natural resource agencies, nongovernmental conservation organizations, and private consulting firms.

Financial Assistance

The main sources of undergraduate financial assistance include University scholarships, grants-in-aid, work-study, and loans. In addition, more than 30 scholarships are offered for eligible students in the College of Natural Resources.

Scholarships are awarded for scholastic and professional achievements at the department, College of Natural Resources, and University level. For more information, contact College of Natural Resources academic advisors. Grants-in-aid and work-study are available from the Financial Aid Office. In addition, departmental faculty often employ undergraduate students to assist in research, extension, and outreach projects. These projects often involve field and laboratory data collection, data management and analysis, and report preparation.

Additional Information

For additional information about the Bachelor of Science requirements, course sequencing, and departmental specialization options and their related coursework, as well as updated information describing current programs and courses offered by the Department of Aquatic, Watershed, and Earth Resources, visit the Aquatic, Watershed, and Earth Resources main office, Natural Resources 210, or visit **http://www.cnr.usu.edu/awer**.

Graduate Programs

Admission Requirements

General admission requirements apply, in addition to the requirements which follow. Although admission to the graduate program is treated on an application-by-application basis, the following are usually required: (1) a bachelor's degree from an accredited college or university; (2) a GPA of 3.2 or better (out of 4.0) for the most recent two years of academic coursework; (3) combined verbal and quantitative GRE scores above the 40th percentile; and (4) a letter of "interest and purpose" detailing the applicant's reasons for seeking an advanced degree. Foreign students should have a TOEFL score of at least 550. The written statement of interest helps match applicants with faculty advisors. A faculty member must agree to serve as the major professor in order for an applicant to be accepted. Prospective students are encouraged to contact faculty members early in the application process to investigate mutual interests, projects, and prospects for financial support.

Previous training in the field is not a prerequisite for admission, although a sound background in the physical and biological sciences is recommended. Successful applicants without the necessary background will be expected to obtain it in the course of their studies for the advanced degree.

Degree Programs

A Master of Science degree in Fisheries Biology or Watershed Science, with emphasis on the management of fisheries or watershed resources directed toward decision-making roles in natural resource agencies, is offered for the applicant with previous agency experience and for the student motivated toward an administrative career. A Doctor of Philosophy degree in Fisheries Biology, Ecology, or Watershed Science is provided for students interested in pursuing a research or academic career.

A thesis or dissertation based on original research performed by the student is required. Written comprehensive examinations are required of all students pursuing the PhD degree. At the discretion of the student's graduate supervisory committee, an additional oral examination may be required.

The minimum requirement for an MS degree is 30 credits, including at least 24 credits in residency and 6 credits of thesis research. The minimum requirement for a PhD degree is 60 approved graduate credits in addition to an MS degree, or 90 approved graduate credits with no MS degree. At least one year (a minimum of 32 credits), including a minimum of two consecutive semesters, of full-time registration must be in residence at USU.

With committee approval, graduate credit may be transferred from accredited graduate schools, provided the minimum residency requirement (including thesis and dissertation credit) at USU is met. Transfer credit, which must not have been used for any other degree, will be shown on official USU transcripts at completion of the degree.

Master of Natural Resources. The department also participates in the College of Natural Resources Master of Natural Resources (MNR) degree program. For more information, see page 278.

Specializations

The MS and PhD degrees in Fisheries Biology and Ecology allow students to specialize in either Fisheries Management or Aquatic Ecology.

Financial Assistance

General aspects of financial support for graduate students at Utah State University are listed on pages 89-90 in the *Graduate Financial Assistance* section. This includes important information on the University-wide policies and terms of reference for research and teaching assistantships, graduate tuition obligations and benefits, Western Regional Graduate Programs, and competitive University-wide fellowships and scholarships.

Assistantships

Research assistantships are available through individual faculty members who hold research grants or contracts. Occasionally, teaching assistantships are available through the department. Recipients of teaching assistantships are usually selected from among PhD students.

Western Regional Graduate Programs

The MS and PhD in Watershed Science are Western Regional Graduate Programs. For more information, see page 89.

Aquatic, Watershed, and Earth Resources Faculty

Professors

Charles P. Hawkins, stream ecology, conservation biology, and biomonitoring

Wayne A. Wurtsbaugh, limnology, fish ecology, and watershed biogeochemistry

Adjunct Professors

Christopher Neale, remote sensing

David G. Tarboton, geomorphology, hydrology

James P. Dobrowolski, watershed hydrology, management, and restoration

Professors Emeriti

John A. Kadlec, wetland ecology and biogeochemistry

John M. Neuhold, fisheries biology

Associate Professors

Todd A. Crowl, aquatic ecology and conservation biology

Robert R. Gillies, remote sensing and meteorology

Chris Luecke, lake ecology and fisheries

John C. Schmidt, fluvial geomorphology and water policy

Helga Van Miegroet, biogeochemistry, soils, and ecosystem ecology

Research Associate Professor

Jeffrey L. Kershner, USDA Forest Service, national habitat coordinator, stream ecology and fish-habitat relationships

Adjunct Associate Professor

Joanna L. Endter-Wada, cultural anthropology, natural resource policy and sociology

Assistant Professors

Paul W. Box, geographic information systems, spatial analysis, and modeling

Phaedra E. Budy, assistant leader, fisheries, Utah Cooperative Fisheries and Wildlife Research Unit, fisheries management and aquatic ecology

Michael N. Gooseff, hydrology and hyporheic zone ecology

Nancy O. Mesner, water quality, water policy, and modeling

Michael A. White, ecosystem modeling, remote sensing, and global climatology

Research Assistant Professor

Mark R. Vinson, aquatic invertebrate ecology and biomonitoring

Adjunct Assistant Professors

Michelle A. Baker, ecology, hydrology

David A. Beauchamp, food webs, bioenergetics models, predator-prey interactions, visual foraging

Nicolaas W. Bouwes, Jr., fisheries management, aquatic ecology

David G. Chandler, hydrology

Joel L. Pederson, geomorphology, paleoclimatology, and sedimentology

Brett Roper, USDA Forest Service Aquatic Monitoring Center Program Leader, aquatic ecologist

Juergen Symanzik, computational and graphical statistics

J. Christopher Wilson, director, State of Utah Division of Wildlife Resources Fisheries Experiment Station, fish pathologist/nutritionist

Course Descriptions

Aquatic, Watershed, and Earth Resources (AWER),
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Art

Department Head: John Neely
Location: Fine Arts Visual 122
Phone: (435) 797-3460
FAX: (435) 797-3412
E-mail: mroberts@hass.usu.edu
WWW: http://www.usu.edu/artdept/

Assistant Head and Undergraduate Program Director:
Sara J. Northerner, Fine Arts Visual 134, (435) 797-3460, northern@cc.usu.edu

Assistant Head and Graduate Program Director:
Christopher T. Terry, Fine Arts Visual 216, (435) 797-3409, ctterry@cc.usu.edu

Art Education Undergraduate Advisor: Jane S. Catlin, Fine Arts Visual 114, (435) 797-3469, jcatlin@hass.usu.edu

Degrees offered: Bachelor of Arts (BA), Bachelor of Science (BS), Bachelor of Fine Arts (BFA), Master of Arts (MA), and Master of Fine Arts (MFA) in Art

Undergraduate emphases: Art Education, Art History, Ceramics, Drawing, Graphic Design, Painting, Photography, Printmaking, Sculpture

Graduate specializations: Ceramics, Drawing, Graphic Design, Painting, Photography, Printmaking, Sculpture

Undergraduate Programs

Objectives

The Department of Art's primary goal is to prepare undergraduate students for careers in either teaching or the applied and fine arts. Requirements in nine different emphasis areas address the specific needs of each career. The Department of Art also serves the University community by offering courses in the University Studies program and by offering training in applied art areas for students in related degree programs.

Departmental Admission Requirements

Entering freshmen are admitted to the Department of Art as BS candidates by meeting the Utah State University admission requirements. New freshmen admitted to USU in good standing must submit a portfolio of 10 35 mm slides of their best work. Details are available from the Art Department. Entrance to the BFA program in studio art is accomplished by formal application after completion of the department's foundation courses. Students applying for this degree program should have a GPA of at least 2.75. Application to the BFA program is done by portfolio review and should be made during the spring semester in which the prerequisites will be completed. Transfer students should make application during the spring semester prior to their entrance to USU to arrange for the portfolio review of their work prior to acceptance in the department. Participation in the BA program in Art History is limited to students with at least a 2.5 GPA.

Degrees Offered

Bachelor of Science Degree

The BS degree is a general art degree for the student who is not interested in specializing in one area of art. This degree requires 50 semester credits in Art courses, 30 credits in University Studies courses, and allows for 40 elective credits. A GPA of 2.5 is required for the BS degree. No grade less than *C* is acceptable in any art class. Art classes may be retaken for a higher grade. This degree does not fulfill the requirements for entrance into graduate schools of art.

Bachelor of Arts Degree

This degree is available primarily to students selecting an emphasis in Art History at USU. BA degree candidates should complete the majority of University Studies lower-division requirements, the modern language requirement, and the foundation curriculum by the end of the sophomore year. This will allow concentration in an area of specialization during the junior and senior years.

In addition, BA candidates must either complete requirements for the Art History Emphasis, as listed below, or the general art requirements as listed under the BS degree. The major professor may also prescribe other courses to serve the particular needs of different students. A minimum of 39 semester credits in art is necessary for this degree.

Bachelor of Fine Arts Degree

The BFA is a professional art degree requiring above-average accomplishment in art. Only students demonstrating considerable promise will be accepted for this more demanding professional degree program. Admission to the Art Department BS program *does not* guarantee admission to the BFA program. Entrance to the BFA program is by application only. Each emphasis area specifies classes that must be completed, along with the common foundation courses, prior to application to the BFA program. For most students, this will occur at the end of their sophomore year. Transfer students may make application during the spring semester prior to their planned entrance into the department.

To graduate with a BFA degree, students must meet the following minimum requirements:

1. An overall GPA of at least 2.75 must be attained.
2. Students must maintain a minimum GPA of at least 2.75 in the Art Foundation and Art Basic Core classes.
3. No grade lower than a *C* will be accepted in any art class.
4. In any emphasis area class, no grade lower than a *B-* is acceptable. Emphasis classes may be retaken for a higher grade.

A minimum of 70 semester credits in art must be completed for the BFA degree. This includes 6 credits of upper-division art history. During the spring semester of their senior year, students must take ART 4910 (Senior BFA Exhibition). Students must also fulfill the standard University Studies requirement of 30 credits, as well as complete 20 credits of electives. Any student unable to complete the necessary requirements for the BFA may still qualify for the BS degree.

Department of Art Curriculum

Foundation Courses. Students in the BS, BA, and BFA degree programs (except for students in the Art History emphasis) need to complete the following foundation curriculum. (Art History students should *instead* complete the BA foundation courses, which are listed in the *Art History* section.)

Suggested Sequence:

Freshman year—first semester: ART 1110 (or 1140), 1120 (or 1150), 2710.

Freshman year—second semester: ART 1130 (or 1160), 2140, 2720.

Subsequent curriculum requirements are specific to these individual emphasis areas:

Art Education. The art education curriculum prepares students to teach art in the public schools. Students graduate with a Bachelor of Fine Arts (BFA) degree in art and obtain a secondary education teaching license. The BFA degree requires 70 credits in Art courses. A minimum of 45 credits must be completed in the core and broadening area: ART 1110 (or 1140), 1120 (or 1150), 1130 (or 1160), 2140, 2200, 2230, 2400, 2600, 2650, 2710, 2720, 2800 or 2810, and 6 credits in upper-division art history courses. A minimum of 25 art credits must be taken in a specialization area. The secondary education teaching license requires the following courses: ART 3000, 3300, 4000, 4300, 5500, 5630; Instructional Technology course (contact advisor for course number); SCED 3100, 3210, 4200, 4210; SPED 4000.

Art History (55 total credits). For the BA degree in Art with an emphasis in Art History, all students must take the following required foundation courses (18 credits): ART 2710, 2720, one studio art course of student's choice (note prerequisites where necessary), HIST 1040, 1050, and ENGL 2100.

All majors must choose between the following two tracks, and must meet with their advisor to determine a concentration and special area by the beginning of their sophomore year. In addition, the student should have produced two research papers of 10-15 pages each by the senior year.

Track I (18 credits): Students must complete six upper-division courses in art history, consisting of three interrelated courses (e.g., by period) and three distributed widely (i.e., a concentrator in a modern period of art history would select courses from the ancient or medieval, renaissance, and Baroque periods to achieve the wide distribution).

Track II (interdisciplinary track) (18 credits): Students must complete three upper-division courses in art history and two upper-division courses outside the department that make up a special field (these may be combined from area studies, such as the British Commonwealth, French Studies, American Studies, Folklore, or Anthropology; or may consist of a selection of courses that deal with post-colonialism, Women and Gender Studies, and the intersections between art and the history of science, for example; or may include courses that deal with a certain period).

The student must formally apply, in consultation with his or her advisor, to determine the concentration and special area. One additional course in art history (outside the special field) must also be completed. All majors are required to take ART 4790, Research/Writing/Methods (3 credits, offered every year). Students will be advised to take this seminar after they have written a research paper. Students are required to produce a self-assessment portfolio. During the second semester, senior majors must provide a portfolio of their work in art history. No credit is granted for the portfolio (which is not a class). The portfolio consists of a two-page self-assessment of the student's work and progress in the major; a list of classes taken in art history, studio art, and any related fields that have contributed to the student's understanding of art history; and examples of the student's work in art history at all levels, including study-abroad work and internship experiences.

Foreign Language (16 credits): Four semesters of one foreign language are required. (French and German are especially recommended for students who plan to go on to graduate school, but a student may petition to have another foreign language count toward this goal.)

Including foundation, foreign language and major classes, the Art History emphasis requires a total of 55 credits.

Ceramics. Contemporary ceramics represents the extension and synthesis of clay sculpture and vessel traditions. Students are acquainted with the technology of ceramic materials and firing processes, while developing sound craftsmanship as a means to personal expression. Enrichment is provided through the ceramics collection of the Nora Eccles Harrison Museum, numerous ceramics exhibitions, and visiting guest artists. Juniors and seniors in the program may compete for one of the Ellen Stoddard Eccles Scholarships, an endowed scholarship fund set aside especially for undergraduate ceramics majors. Students must complete the following courses for a Ceramics emphasis: ART 2600, 2650, 3610, 3650, 3660, 4610, 4640, 4650, 4910; CHEM 1010 **or** CHEM 1110 and 1130; and GEOL 1100 or 1150. ART 4640 is repeatable for credit, and must be taken during at least two semesters. ART 4650 is repeatable for credit, and must be taken during at least four semesters.

Drawing. Drawing is the two-dimensional study of form and space, as well as the exploration of drawing media, graphic elements, and visual dynamics. It is an essential discipline for all artists, as it provides the fundamental visual skills needed in their search for a personal idiom. At the same time, drawing itself is also a vehicle of creative expression, visual adventure, and self-discovery. Students must complete the following courses for a Drawing emphasis: ART 2200, 2230, 2400, 3200, 3260, 3610, 4100, 4250, 4260, 4710, and 4910. One course must be chosen from ART 3230, 3240, and 3250. Two additional upper-division art history courses are also required. The remainder of the 70 semester credits can be taken as electives.

Graphic Design. Graphic design is the study of visual communications and the art of presenting information. Visual elements, such as animation, photography, illustration, symbols, and type, are designed or arranged using various techniques and materials. Materials range from traditional ink, paper, and printing presses to video and the internet, using the latest computer software and hardware. Students in graphic design complete a variety of courses that involve working with symbols, trademarks, typography, layout, and all formats of print and publication design. Illustration, digital imaging, motion graphics, animation, and interactive media are also part of the graphic design curriculum. Seniors may specialize in one or more of these areas of study and create a professional portfolio specific to their interests. Graphic Design emphasis students should complete the following courses: ART 2400, 2800 (or 2810), 3400, 3410, 3420, and 4910. A total of 18 semester credits must be taken in 4000-level graphics courses, and 6 semester credits of 4000-level art history courses must be completed.

Painting. The painting curriculum emphasizes an analysis of historical approaches to painting, and the exploration of new ideas, techniques, and materials. Basic courses are designed to foster a respect for the craft of painting, and subsequent courses encourage application of the craft to expressive goals. Central to the focus of painting study at USU is the development of a personal portfolio reflecting the specific interests of the individual. Students must complete the following courses for a Painting emphasis: ART 2200, 2230, 2400, 2600, 2650, 3200, 3260, 3610, 4200, 4210, 4260, and 4910. In addition, one course must be selected from the following: ART 3230, 3240, or 3250. Also, two upper-division courses (3000 level and above) in Art History are required.

Photography. Found throughout all of contemporary life, photographic images shape the way we document, interpret, and direct our lives. As an art form, photography constantly reinvents our concept of beauty, reality, and culture. Within the program in photography, students learn the aesthetic and technical skills of the medium. The fundamentals of craft and the "hands on" application of knowledge at each level will enable the student to pursue a variety of photographic professions. Requirements for the Photography emphasis include: ART 2400, 2810, 3810, 3820, 3830, 4810, 4820, 4830, 4840, 4850, 4860, 4870, and 4910.

Printmaking. Students in the printmaking emphasis have the opportunity to explore all aspects of traditional and contemporary printmaking. After an introduction to the basics of intaglio, lithographic, silkscreen, and relief processes, students are encouraged to continue their development in a specific area of interest. Independent studio projects will investigate the wide field of printmaking, providing a framework for the student to become engaged in a creative pursuit involving both technical and aesthetic considerations. Requirements for the Printmaking emphasis include: ART 2230, 2400, 2800 (or 2810), 3230, 3240, 3250, 3260, 4250, and 4910. Also, students must choose two of the following courses: ART 4710, 4720, 4730, 4740, 4750, and 4760.

Sculpture. Sculpture is the three-dimensional expression of ideas. Its range extends from discrete, permanent objects to ephemeral, multi-media environments.

Students in the sculpture emphasis develop a base of knowledge in traditional approaches to the creation of form. After gaining competency in figure modeling, as well as in stone or wood carving, they explore both site-specific sculpture and sculptural installations. Intemediate and advanced students investigate specific problems involving technical, aesthetic, and conceptual considerations. They develop their own direction, based on both experience with form, materials, and techniques, and an understanding of traditional concerns and contemporary issues in the vast field encompassed today by sculpture.

The following courses are required for students in the sculpture emphasis: ART 2400, 2600, 2650, 2800 (or 2810), 3610, 4610, 4620, 4660, and 4910. In addition, students must complete 6 credits of 4000-level art history courses. Also, ART 3260 is recommended. Other required courses outside of the Art Department are: two Industrial Technology and Education (ITE) courses, and one design course taken through Landscape Architecture and Environmental Planning (LAEP), Theatre Arts (THEA), or Interior Design (ID).

Minor Requirements

Art Minor

The requirements for a minor in studio art are flexible. Generally, the minimum requirements include ART 1110, 1120, and 1130, plus 3 semester credits from the art history group (ART 2710 or 2720), and 12 credits in art. To plan a minor in Art, students should meet with an advisor.

Art History Minor

The requirements for a minor in art history include 24 credits from classes in the the art history group, excluding Art 1100.

USU does not offer an art teaching minor for secondary teachers. Students choosing to train for teaching art in secondary schools must complete the art education major listed under art specialties and must comply with all requirements listed by the Department of Secondary Education.

Graduate Programs

The Department of Art offers two graduate degrees and cooperates with the College of Education and Human Services on another degree. The Master of Arts (MA) and the Master of Fine Arts (MFA) are offered by the Art Department. A Master of Education (MEd) with a specialization in art is offered through the College of Education and Human Services.

Master of Arts

Students are selected for the MA program on the basis of a portfolio demonstrating artistic individuality and a level of development beyond the need of classroom instruction.

Admission Requirements

All applicants are required to have earned a bachelor's degree in the visual arts or its equivalent. During the last two years of undergraduate work, the GPA in art courses must have been at least 3.0 on a 4 point scale. MAT scores should be at or above the 40th percentile. Applicants taking the GRE should have verbal and quantitative scores at or above the 40th percentile.

Degree Requirements

Candidates for the MA must complete a minimum of 30 credits, to include: (1) 21 graduate studio credits, which may be divided into two or three areas of study at the graduate level; (2) 3 credits which may be earned in classes outside the department; (3) 3 credits of art history; and (4) 3 credits of Research and Thesis.

A total of 12 credits of art history, including undergraduate credits, is required for graduation, but only 3 credits earned as a matriculated graduate student at USU may be applied toward the 30-credit MA requirement. The additional 9 credits of art history may include credits earned at the undergraduate level.

A candidate must complete a minimum of two semesters in residency. Nine credits per semester is considered full-time graduate enrollment, while 12 credits are considered the maximum enrollment. A minimum of three semesters is thus required to complete the 30-credit program.

Master of Fine Arts

The Master of Fine Arts degree is the terminal degree in the visual arts field. The MFA program is designed to allow students to mature to a level of professional competence in the making of art. Related studies augment a rigorous studio program. The prospective student must exhibit both academic excellence and a well-developed personal artistic vision.

Admission Requirements

All applicants are required to have earned a BFA degree in the visual arts or its equivalent, including a minimum of 12 credits of art history. *Students must submit either MAT or GRE scores.* GPA in art courses must have been at least 3.0 on a 4-point scale. MAT scores should be at or above the 40th percentile. Applicants taking the GRE should have verbal and quantitative scores at or above the 40th percentile.

Degree Requirements

Students must earn 60 credits, to include: (1) 43 credits of graduate-level studio art as determined by the student in consultation with his or her major professor, including a minimum of 6 credits outside of the emphasis area; (2) 6 credits of Graduate Seminar; (3) 2 credits of Graduate Interdisciplinary Critique; (4) 6 credits outside the Art Department as specified by the supervisory committee; and (5) 3 credits of Research and Thesis, which concludes with an MFA thesis exhibition and an oral defense. The MFA thesis is a visual presentation, the equivalent of a written dissertation in other disciplines. The thesis exhibition is the single most important feature of the MFA program; the culmination of at least two years, and often three or more years, of intensive study in a single discipline. The student must also submit a selection of slides documenting the exhibition.

The MFA program is a resident program; it is not possible to complete the requirements for graduation by correspondence. The program is predicated upon the assumption that students will live in the Logan area. Students must complete a minimum of four semesters in residency. Nine credits per semester is considered full-time graduate enrollment, while 12 credits are considered the maximum enrollment. A minimum of five semesters is thus required to complete the 60-credit program; most students require three years.

Application Procedures

Completed applications must include: (1) completed application forms; (2) a letter of intent; (3) transcripts of all previous graduate and undergraduate work; (4) three letters of recommendation from qualified professionals; (5) GRE or MAT scores; and (6) the $40 application fee.

These materials must be sent directly to the School of Graduate Studies. When complete, applications will be forwarded by the School of Graduate Studies to the Art Department for review.

A portfolio of twenty 35mm slides of recent work must be mailed directly to: Graduate Coordinator, Department of Art, Utah State University, 4000 Old Main Hill, Logan UT 84322-4000.

Completed applications and slide portfolios must be received by **February 1**. Students should note that applications will be considered *only* at this time, and *only* completed applications will be reviewed. Admission will *only* be considered for fall semester. The deadlines for financial aid may be earlier than the admissions deadline. For further information about financial aid, visit the Financial Aid Office in Taggart Student Center 106; write to: Financial Aid Office, Utah State University, 1800 Old Main Hill, Logan UT 84322-1800; or phone (435) 797-0173.

Applications are reviewed by the Art Department faculty. Candidates are selected primarily on the basis of their **portfolio**, which should demonstrate a level of development beyond the need of classroom instruction and encouragement. The faculty will also look in the portfolio for evidence of significant personal exploration.

Secondary to the portfolio, but important nonetheless, the applicant's **letter of intent** and **letters of recommendation** will also be given careful consideration. In reviewing these letters, the faculty will look for, among other things, indications that the applicant will be capable of prolonged and concentrated effort, guided by realistic personal goals. Letters should address both academic and artistic accomplishments, as well as potential for further growth in both of these areas.

Applicants are strongly encouraged to visit the USU campus and meet with the faculty in their proposed field of study *well in advance* of the February 1 application deadline.

Important Note. Please note that the graduate programs in the Art Department have limited enrollment; admission is *very* competitive. Because only a small fraction of applicants can be accommodated, there can be no guarantee that applicants who meet minimum admission requirements will be acccepted into master's programs.

Financial Assistance

Departmental support is available to graduate students on a competitive basis. Students requesting financial support should apply to the department by February 15. Other assistance is available through the University Financial Aid Office. Students should note that applications for Federal work-study should be mailed during the first week of February.

Art Faculty

Professors

Craig J. Law, photography

John Neely, ceramics

Christopher T. Terry, drawing, painting

Professors Emeritus

Jon I. Anderson, graphic design

Glen L. Edwards, illustration

Adrian Van Suchtelen, drawing

Associate Professors

Jane S. Catlin, art education, painting

Alan Hashimoto, graphic design

Sara J. Northerner, photography

Gregory Schulte, drawing, painting

Associate Professor Emeritus

Marion R. Hyde, printmaking, art education

Assistant Professors

Eileen Doktorski, sculpture

Danielle Foushée, graphic design

JinMan Jo, sculpture

Julie M. Johnson, art history

Laura Johnson, drawing, painting

J. Daniel Murphy, ceramics

Robert Winward, graphic design

Koichi Yamamoto, printmaking

Course Descriptions

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Biological and Irrigation Engineering

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FAX: (435) 797-1248
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Undergraduate Advisor: Ronnie Green, Engineering 312, (435) 797-2790, ronnie@engineering.usu.edu

Degrees offered: Bachelor of Science (BS), Master of Science (MS), and Doctor of Philosophy (PhD) in Biological Engineering; MS and PhD in Irrigation Engineering

Undergraduate options: *BS*—Bioprocess; Bioenvironmental; Biomedical; and Soil and Water Resource Systems Engineering

Graduate specializations: *MS, PhD*—Agricultural Hydrology; Crop Water-Yield Analysis; Drainage; Evapotranspiration; Groundwater Management and Simulation; Irrigation Conveyance and Control Structures; Irrigation Project Planning, Design, and Operation and Management; Molecular Biology; On-Farm Water Management; Remote Sensing and Geographical Information Systems; Surface, Sprinkle, and Trickle Irrigation Methods

Mission

The mission of the Department of Biological and Irrigation Engineering (BIE) is to teach students preparing to become biological engineers how to apply engineering principles and the knowledge of biological sciences to the solutions of bioresource and biotechnology problems. The department also prepares students for entry into other professions, such as biomedical engineering, medicine, and law.

The BIE program is designed to help students learn to manipulate biological materials for useful purposes, understand the biological literature, and be able to communicate with biological scientists. Biological engineering encompasses engineering applications in a broad range of biological systems. The biological engineering curriculum at USU emphasizes bioprocess and biomedical engineering, as well as soil and water resource systems engineering. The curriculum at both the Bachelor of Science and graduate levels is designed to prepare students for a wide variety of professional jobs related to the utilization, management, and protection of bioresources from nanoscale to watershed scale.

Scope and Objectives

The objective of the Biological Engineering Program is to provide students with broad-based engineering skills necessary to solve biological-based problems. Students first learn to integrate biological sciences with conventional studies in mathematics and chemistry. These skills are broadened with a liberal exposure to humanities and social sciences, then sharpened with the study of engineering topics that develop practical problem-solving abilities; expand a sensitivity to the economic, social, and legal dimensions of technical problems; provide an understanding of ethics and professional responsibility; and stimulate a desire for life-long learning.

Outcomes

The Biological Engineering curriculum emphasizes three important outcomes:

1. The knowledge needed to identify, formulate, and perform the functions of a biological engineer.

2. The intellectual skills and creative abilities graduates should possess in order to design systems and conduct experiments in an interdisciplinary team setting, as well as the ability to use these skills in modern engineering practice.

3. The specific career-preparation competencies of ethical responsibility, effective communications, comprehension of engineering in the global context, and a commitment to life-long learning and self-improvement.

Assessment and Evaluation

The BIE Department is committed to an assessment process aimed at evaluating the effectiveness of BIE programs in preparing graduates as productive professionals. The foundation of departmental assessment is the undergraduate accreditation by the Engineering Accreditation Commission (EAC) of the Accreditation Board for Engineering and Technology (ABET).

The accreditation activities performed every six years by the EAC/ABET provide the only formal and external review of the undergraduate program. This assessment ensures that the USU program meets an overall objective and structure consistent with similar programs in the U.S. and Canada.

The biological engineering program is continuously improved through integrating the results of this formal assessment with the day-to-day assessments obtained from both students and faculty. To ensure the overall quality of the program, the department conducts several specific assessments. These are:

1. Annual faculty survey
2. Teaching evaluations
3. Graduating student exit interviews
4. Fundamentals of Engineering Examination performances
5. Biological and Irrigation Engineering Advisory Board, involving employer responses and board reviews
6. Alumni survey

Undergraduate Programs

General biological engineering concepts include the properties of biological materials, electronics and bio-instrumentation, computer use and programming, engineering mechanics, thermodynamics, computer-aided drafting, bio-environmental transport phenomena, and fluid mechanics.

Students gain a strong foundation in biological, chemical, and physical sciences. Each student then selects an option within the field, based on personal interest. These areas of study are tailored for each student with 24 semester credits of technical electives and one-on-one academic advisement with a member of the faculty. Design is a major theme of both the student's general coursework and specialization, with most courses including open-ended design problems. The entire design experience is brought together in a capstone design course.

The Biological Engineering Program is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC/ABET).

Requirements

Admission and Graduation Requirements. The student who is majoring in or planning to major in Biological Engineering needs to be aware of the College of Engineering requirements concerning admission to the college, pre-engineering, admission to the professional engineering school, general education, and other academic requirements. Additional information concerning these items is given in the College of Engineering requirements on pages 107-109. It is the responsibility of the student to be aware of these rules and regulations.

Biological Engineering Curriculum

Biological Engineering is divided into a preprofessional and a professional program involving either a four-year or a five-year schedule that will satisfy the requirements for a BS degree in Biological Engineering. Students receiving credit from the College Level Examination Program (CLEP) or from Advanced Placement (AP) may complete a BS degree program in less than four years. The academic work, particularly in the junior and senior years, is supplemented by hands-on laboratories which are required as part of the coursework. Modification in the program to meet special needs and priorities of a student may be obtained with the approval of the department head and advisor.

Preprofessional Program: BIE 1880, 2330; CHEM 1210, 1230, 2300, 2330; ENGR 1010, 2000, 2020, 2200; BIOL 1210; ENGL 2010; ITE 2270; MAE 2400; MATH 1210, 1220, 2250; PHYX 2200; and three credits of Communications Literacy.

Professional Program: BIE 3000, 3200, 3670, 3870, 4880, 4890; BIOL 3300, 5200; CEE 3500; CHEM 3700, 3710; STAT 3000; ECE 2200; Biological Engineering Electives (6-21 credits); Engineering Electives (0-15 credits); Technical Electives (0-12 credits); and University Studies (18 credits).

Additional Information

For more information about the Bachelor of Science requirements and the sequence in which courses should be taken, see major requirement sheet, available from the Biological and Irrigation Engineering Department.

Financial Support

Scholarships, assistantships, grants-in-aid, and work-study programs are available through the University. In addition, the department employs students to assist in engineering research and development. Cooperative education and industrial employment opportunities for students are coordinated by the University Placement Office.

Concurrent BS/Master's Program

The concurrent BS/Master's program allows engineering students to begin taking graduate-level classes during their senior year. This permits them to complete requirements for *both* the BS degree *and* the master's degree concurrently during two years. Students in this program have a greater selection of graduate courses, since many graduate courses are taught during alternate years. In addition, the student's senior design project could be a start for a graduate design project or thesis. After completing their BS degree, students in the program can earn a master's degree in only one additional year. Both the BS and the master's degree can generally be earned with 150 total credits, although students should note that a Plan C MS requires 3 extra credits. Finally, students with a master's degree can expect a much higher starting salary following graduation. (For more information, see *College of Engineering* section of this catalog, page 109.)

Graduate Programs

Admission Requirements

See general admission requirements identified in this catalog. Admission committees also consider experience, undergraduate record and curriculum, and formal recommendations. A student without an undergraduate engineering background will be required to complete selected undergraduate courses prior to or concurrently with enrollment in graduate courses.

Prerequisites for Matriculation. Students who are admitted provisionally or who have been changed from matriculated to probationary matriculated status will have their records reviewed by a faculty committee when they have completed 12 credits of coursework (among which must be formal engineering courses) or at the end of their second semester at USU. Those students who have earned a 3.0 GPA at that time and desire to be matriculated may apply to the department to have their status changed. If they meet all other academic requirements of the School of Graduate Studies and the department, they will be matriculated and admitted to the degree program. When a student is admitted as a degree candidate, the committee may allow up to 12 credits taken while on nonmatriculated status to be transferred. Nonmatriculated students may continue to study at USU but without degree candidate status. At the end of their studies, nondegree students are granted a Certificate of Completion.

Prerequisite Requirements. All students must have had **formal** courses in engineering and computer programming, as well as at least one year of calculus. Students without this background can satisfy these requirements by taking the appropriate undergraduate courses at USU. An additional year of calculus (MATH 1210, 1220, and 2250, or equivalent) is required for the MS degree in Irrigation Engineering and for all PhD programs. These background courses will not be counted toward the degree credit requirements.

MS in Biological Engineering and in Irrigation Engineering

Students must have a BS from an ABET-accredited engineering program in the U.S. or its equivalent in their home countries or must take the make-up coursework required for a BS in engineering at USU. It is assumed that the bachelor's degree mathematical training includes courses in calculus, linear analysis, and differential equations.

Three MS options are available: research (Plan A), technical practice (Plan B), and training/extension (Plan C). All MS students are admitted initially into the technical practice (Plan B) option. They may subsequently transfer to one of the other two options depending upon interests and skills.

Research Option. Students wishing to gain experience in research may select the research option, particularly if they have a long-term goal of PhD study. The minimum requirements for this option are 30 credits, of which 8 may be awarded for the thesis.

Technical Practice Option. Some students may not be interested in pursuing a PhD degree or in doing the research necessary for a thesis. For such students, the technical practice (Plan B) option is offered. The requirements for the degree are similar to those for the research option, with the exception of the thesis. The 8 thesis credits are replaced by 4 credits for a significant engineering report or design project and 4 additional credits of coursework. The minimum course requirement for the technical practice option is 30 approved graduate credits.

Training/Extension Option. Students expecting to terminate their graduate studies at the MS level and wishing to develop an emphasis in the training and/or extension fields of biological engineering or irrigation engineering, may choose the training/extension option (Plan C). The same engineering BS or equivalent requirements noted under the Plan A option apply. The minimum requirements for this degree are 30 approved graduate credits. No report or thesis is required. The degree requirements under this option can be met by taking courses.

Doctor of Philosophy

Two PhD programs are offered in the department: (1) **Biological Engineering** and (2) **Irrigation Engineering**. Students who have completed an MS with a thesis (Plan A or equivalent) in an engineering discipline are eligible to apply for admission to a PhD program. Admission will be based on the students' prior academic records and, if they are graduates of USU, the recommendations of their graduate committees. It is assumed that students are adequately prepared in mathematics and engineering design courses to compete at the PhD level. If such is not the case, a program of courses to make up the deficiency will be required.

In addition to any prescribed review courses and seminars, the minimum requirements for a PhD program include 60 credits of approved graduate courses beyond a master's degree, satisfactory completion of the comprehensive examinations after completion of the formal coursework, and the writing of a dissertation based on an original research project. The degree requirements beyond a master's degree can be met by taking courses in engineering design, synthesis, and systems; mathematics; and related science.

Research

In more than 80 years of irrigation engineering experience, USU has attained worldwide prestige through the successful professional records of its many graduates.

The department is heavily involved in overseas research and training activities concerned with managing irrigation systems, on-farm water management, and water resource development.

Research projects in several areas of irrigation and drainage engineering are currently being conducted by the department. Hence, graduate students have the opportunity to conduct research for their degree programs and obtain financial support. Current projects include hydraulics of surface irrigation, consumptive use, return flow quantity and quality of irrigation waters and application techniques, transient flow in tile drainage systems, drain envelopes, sprinkler irrigation, trickle irrigation, crop production and water requirements, salt movement, regional groundwater modeling for optimizing sustainable yield, conveyance system modeling and control, and remote sensing.

Specific research projects in the biological engineering option include tissue and biomedical engineering, biosensor design and development, microbial fermentations, environmental control of livestock buildings, the contribution of rural municipalities to nonpoint source pollution, agricultural waste management, and land-based waste treatment systems.

Land application of food processing wastes, extrusion of dairy-based foods, multi-stage anaerobic digestion of biological materials, functional properties of foods, and biological detoxification of metals are some of the topics researched in food engineering.

Financial Assistance

The large departmental research programs make it possible to offer graduate students financial support in the form of assistantships and traineeships. The financial support is mainly available to U.S. citizens with a small number of assistantships for others. The traineeships and assistantships are attached to research projects on the Logan campus and overseas. Traineeships carry tuition waivers and additional financial support.

Additional Information

Two guides are available from the department to assist students: (1) *Report, Thesis, and Dissertation Format Guidelines and Policies*, and (2) *Policies and Procedures for Graduate Study*.

Biological and Irrigation Engineering Faculty

Professors

Conly L. Hansen, food engineering

Thomas B. Hardy, natural systems

Robert W. Hill, irrigation and water resource extension

Christopher M. U. Neale, remote sensing

Richard C. Peralta, groundwater

Linda S. Powers, bioprocess engineering

Ronald C. Sims, biological process engineering

Wynn R. Walker, surface irrigation, Associate Dean of College of Engineering

Research Professors

Darwin L. Sorensen, soil microbiology

L. Humberto Yap-Salinas, drainage

Adjunct Professor

Bart C. Weimer, microbiology, Director of Center for Integrated BioSystems

Professors Emeritus

Richard E. Griffin, irrigation extension

George H. Hargreaves, crop water requirements

Jack Keller, sprinkle and drip irrigation

Howard B. Peterson, water quality

Gaylord V. Skogerboe, waterlogging and salinity

Glen E. Stringham, surface irrigation

Lyman S. Willardson, drainage

Associate Professors

Gary P. Merkley, conveyance systems

Timothy A. Taylor, bioprocessing

Research Associate Professors

Joan E. McLean, soil chemistry

Judith L. Sims, soil biology

Adjunct Associate Professor

Daryll B. DeWald, cell biology, Associate Director of Center for Integrated BioSystems

Associate Professor Emeritus

Edwin C. Olsen III, international irrigation, water management

Assistant Professors

David W. Britt, biomedical engineering

Kytai T. Nguyen, biomedical engineering

Anhong Zhou, nanobiotechnology

Research Assistant Professors

Arnulfo González-Meza, irrigation system transfer

Babukannan Kasilingam, canal hydraulics

Adjunct Research Assistant Professor

Charles D. Miller, biology

Research Assistant Professor Emeritus

R. Kern Stutler, irrigation structures

Course Descriptions

Biological and Irrigation Engineering (BIE), pages 347-349

Biology

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Associate Head: Timothy A. Gilbertson, Biology-Natural Resources 327, (435) 797-7314, tag@biology.usu.edu

Director of Undergraduate Studies: Dennis L. Welker, Biology-Natural Resources 101, (435) 797-3552, dennis.welker@usu.edu

Director of Graduate Studies: John M. Stark, Veterinary Science and Bacteriology 331, (435) 797-3518, jstark@biology.usu.edu

Advisor for Prehealth Professions Programs: D. M. Andy Anderson, Veterinary Science and Bacteriology 231, (435) 797-1913, andy@biology.usu.edu

Advisor for Public Health Major: David Wallace, Biology-Natural Resources 333, (435) 797-7155, dwallace@biology.usu.edu

Advisor for Nursing Program: Susan L. Haddock, Biology-Natural Resources 101, (435) 797-2577, susanlh@biology.usu.edu

Degrees offered: Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), and Doctor of Philosophy (PhD) in Biology; BS and BA in Composite Teaching—Biological Science; BS in Public Health; MS and PhD in Ecology; MS and PhD in Toxicology is avaliable through the Interdepartmental Program in Toxicology.

Undergraduate emphases: *Biology BS, BA*—Biology, Cellular/Molecular, Ecology/Biodiversity, Environmental; *Public Health BS*—Industrial Hygiene, Environmental Health, Public Health Education

Undergraduate Programs

Objectives

Biology. The Department of Biology offers programs leading to a Bachelor of Science or Bachelor of Arts degree. Majors will complete a core of courses which provide an understanding of biological principles. Upper-division courses provide integration, in-depth study, and an opportunity for specialization within the different degree emphases. Additional coursework in chemistry, physics, statistics, and mathematics provides knowledge and analytical skills in these important related fields. Most biology degrees provide a foundation for graduate work. Biology majors can add a minor area of study, such as business or chemistry, to enhance their employment opportunities.

Prehealth Professions Programs. The Department of Biology supervises premedical, predental, and other health professions. These programs satisfy entrance requirements for most medical and dental schools in the United States and Canada and are recognized for the high quality preprofessional preparation they provide. After four years, the student receives a BS degree in Biology or another major. **Coordinator:** Susan L. Haddock, Biology-Natural Resources 101. **Advisor:** D. M. Andy Anderson, Veterinary Science and Bacteriology 231.

Composite Teaching—Biological Science. This major combines content training in biology and related fields (including chemistry, physics, geology, mathematics, and statistics) with education courses. Graduates are licensed to teach at the secondary level. **Advisor:** Richard J. Mueller, Eccles Science Learning Center 245.

Public Health. The Department of Biology offers preprofessional training in public health. Individuals completing the BS degree have employment opportunities in such areas as environmental health, industrial hygiene, public health education, administration, nursing, nutrition, mental health, and social work. **Advisor**: David O. Wallace, Biology-Natural Resources 333.

The Department Head, the Director of Undergraduate Studies, and advisors in the Department of Biology are available to provide undergraduate majors with additional information regarding specific programs and career opportunities. The Biology Advising Center and the Director of Undergraduate Studies are located in BNR 101. Program requirements, advising information, and an **"Ask an Advisor"** e-mail service are on the Department of Biology web page at **http://www.biology.usu.edu**.

Students with majors in the Department of Biology should consult with their advisors regularly as they plan their course of study. Students have the responsibility to keep themselves aware of major requirements and course prerequisites. General requirements, specific course offerings, and the semesters that courses are taught may change.

Mathematics is an important and required skill to enhance one's success in the sciences. Proper course level placement in mathematics at the beginning of the degree program is essential. Students should consult with an advisor to determine the appropriate level to begin their mathematics studies for meeting requirements and completion of their major. For detailed information, obtain an official Major Requirement Sheet from the Biology Advising Center.

Requirements

University Requirements. Students are responsible for meeting all University requirements for total credits, upper-division credits, credits of *C*- or better, and the University Studies Program. (See pages 42-52 in this catalog.)

College of Science Requirements. All college requirements are met by completing the departmental degree requirements; no additional coursework is required.

Departmental Admission Requirements. New freshmen admitted to USU in good standing qualify for admission to the Biology and Public Health majors. Transfer students from other institutions need a 2.25 transfer GPA, and students transferring from other USU majors need a 2.25 cumulative GPA for admission to the Biology and Public Health majors in good standing. Admission requirements differ for the Composite Teaching—Biological Science Major, as explained below.

Admission Requirements for the Composite Teaching—Biological Science Major. New freshmen admitted to USU in good standing qualify for admission to this major. To qualify for admission to the Secondary Teacher Education Program (STEP), new freshmen must acquire a cumulative 2.75 GPA and 60 credits of coursework. Transfer students from other institutions or other USU majors need a cumulative 2.75 GPA and 60 credits of coursework to be admitted to the major and the STEP. For information on additional admission criteria, students should contact the Department of Secondary Education.

GPA Requirement. To graduate, a candidate for any bachelor's degree offered by the Department of Biology must maintain a grade point average of 2.25 in all Department of Biology (BIOL or PUBH prefix) courses required for the major (Composite Teaching also requires a 2.75 cumulative GPA) and a grade of *C-* or better in BIOL 1210 and 1220. The *Pass-Fail* option is not acceptable for any course required for the degree, but *D* grades are permitted within the restrictions of the 2.25 GPA. The Composite Teaching—Biological Science Major requires a cumulative overall GPA of 2.75 for admission and graduation. The 2.25 GPA requirement applies to the Biology, Public Health, and BioMath minors.

BS Degree in Biology. Four different emphases are available within the Biology degree. The **Biology Emphasis** is the most flexible option. Electives may be selected in any subdiscipline the student wishes to emphasize (e.g., botany, ecology, zoology, entomology, microbiology, etc.). The **Cellular/Molecular** and **Ecology/Biodiversity** emphases provide more directed training that is appropriate for research or other technical employment in academic institutions, government agencies, and the private sector. They also provide excellent preparation for graduate work. The **Environmental Emphasis** prepares students in the biological and physical sciences as they relate to environmental problems and concerns. This degree serves as a foundation for graduate work and provides practical training for employment at the bachelor's degree level. Emphases will be listed on transcripts to indicate the student's specialization. The course requirements are as follows:

Biology Emphasis: BIOL 1210, 1220, 2220, 3200; BIOL 3300 or 5210; BIOL 5250; one of BIOL 2410, 3050, 3220, 4500, 5400, 5530, 5550, 5560, or 5570; a physiology course with a lab selected from: BIOL 4400 or 5300 or 5540 *or* BIOL 5600 and 5610 *or* BIOL 5620 and 5610; 10 credits of 4000-level and above BIOL or PUBH prefix courses as electives. In addition, students must complete: CHEM 1210, 1220, 1230, 1240, 2300, 2330, 3700, 3710; PHYX 2110 and 2120 *or* PHYX 2210 and 2220; MATH 1210; and STAT 3000.

Cellular/Molecular Emphasis: BIOL 1210, 1220, 2220, 3200, 4100, 5190, 5210, 5220, 5250; a physiology course with a lab selected from: BIOL 4400 or 5300 or 5540 *or* BIOL 5600 and 5610 *or* BIOL 5620 and 5610; one of BIOL 5160, 5240, or 5260; nine credits of 4000-level and above BIOL prefix courses as electives. In addition, students must complete: CHEM 1210, 1220, 1230, 1240, 2310, 2320, 2330, 2340, 5700, 5710, 5720; PHYX 2110 and 2120, or PHYX 2210 and 2220; MATH 1210; and STAT 3000.

Ecology/Biodiversity Emphasis: BIOL 1210, 1220, 2220, 3200, 3220, 3300, 5250; a physiology course with a lab selected from: BIOL 4400 or 5300 or 5540 or BIOL 5600 and 5610; one of BIOL 2410, 3400, or 5400; one of BIOL 4500, 5530, 5550, 5560, 5570 or 5580; one of BIOL 4060, 5010, 5020, 5170, or 5590; an additional course from one of the three previous groups or the following list: BIOL 4100, 4410, 5280, 5310, 5350 or 5800. In addition, students must complete: CHEM 1210, 1220, 1230, 1240, 2300, 2330, 3700, 3710; PHYX 2110 and 2120, or PHYX 2210 and 2220; MATH 1210; STAT 3000; Soil 3000; and GEOL 1150.

Environmental Emphasis: BIOL 1210, 1220, 2220, 3200, 3220, 3300, 5250; a physiology course with a lab selected from: BIOL 4400 or 5300 or 5540 or BIOL 5600 and 5610; one of BIOL 2410, 3400, or 5400; twelve elective credits from: BIOL 4500, 5020, 5050, 5310, 5320, 5410, 5800; PUBH 3610; CEE 5620; ADVS 5400; GEOL 1150; SOIL 3000. In addition, students must complete: CHEM 1210, 1220, 1230, 1240, 2310, 2320, 2330, 2340, 3600, 3610, 3700, 3710; PHYX 2110 and 2120, or PHYX 2210 and 2220; MATH 1210; and STAT 3000.

BS Degree in Composite Teaching—Biological Science. The Composite Teaching—Biological Science Major leads to licensure to teach in secondary schools. The course requirements are as follows: BIOL 1210, 1220, 2000, 2220, 3200, 3220, 3300, 4100, 5250; a physiology course with a lab selected from: BIOL 4400 or 5300 or 5540 *or* BIOL 5600 and 5610 *or* BIOL 5620 and 5610; GEOL 1150; SCI 4300; MATH 1210; STAT 3000; PHYX 2110, 2120; CHEM 1110, 1120, 1130. In addition, students must be accepted into the Secondary Teacher Education Program (STEP) and complete the following: Instructional Technology course (contact advisor for course number); SPED 4000; SCED 3100, 3210, 3300, 3400, 4200, 4210, 4300, 4400, 5500, and 5630.

BA Degrees in Biology and Composite Teaching—Biological Science. The student must complete the requirements for the BS (above) plus two years of a foreign language. (See page 50 of this catalog.)

BS Degree in Public Health. A four-year program leading to the Bachelor of Science in Public Health is offered by the Department of Biology with options in the following areas: environmental health, industrial hygiene, and public health education. Individuals completing the environmental health option are qualified to take the Registered Sanitarian's Examination. Those completing the industrial hygiene option qualify to sit for examination by the American Board of Industrial Hygiene following one year of professional experience. The Public Health degree requires a core of biology courses similar to that required for the biology degrees; additional biology and public health courses; and chemistry, physics, mathematics, statistics, and allied science and engineering courses appropriate to each emphasis. Three different emphases are available. The course requirements are as follows:

Industrial Hygiene Emphasis: BIOL 1210, 1220, 2000, 2220, 3200, 3300; PUBH 3310, 3610, 5020, 5310, 5320, 5330, 5350, 5500; ADVS 5400; three elective credits from: CEE 5610, 5670, 5730, 5790, or PUBH 5300. In addition, students must complete: CHEM 1210, 1220, 1230, 1240, 2300, 2330, 3600, 3610, 3700, 3710; PHYX 2110 and 2120, or PHYX 2210 and 2220; MATH 1210; and STAT 3000.

Public Health Education Emphasis: BIOL 1210, 1220, 2000, 2220, 3200, 3300; PUBH 3120, 4000, 5000, 5010, 5020, 5500; SPCH 1050; NFS 1020, 5210; SOC 3330, 3500; HEP 2000, 2500, 3000, 3600, 3800, 3900, 4200. In addition, students must complete: CHEM 1120, 1210, 1220, 1230, 1240; PHYX 1200; MATH 1210; and STAT 3000.

Environmental Health Emphasis: BIOL 1210, 1220, 2000, 2220, 3200, 3300; PUBH 3310, 3610, 4000, 5000, 5010, 5020, 5310, 5500; NFS 5110; CEE 5730; ten elective credits from: BIOL 3050, 3220, 3400, 5550; SOIL 3000; SPCH 1050; ADVS 5400; and CHEM 3700, 3710. In addition, students must complete: CHEM 1210, 1220, 1230, 1240, 2300, 2330; PHYX 2110 and 2120, or PHYX 2210 and 2220; MATH 1210; and STAT 3000.

Biology Minor. The Biology minor requires completion of the following: BIOL 1210, 1220; and 12 credits of upper-division (3000-level and above) BIOL prefix courses.

BioMath Minor. This minor requires mathematics and quantitative biology courses beyond those required for the basic biology degrees. It is an excellent option for students considering graduate work. Biology majors may take this minor through the Mathematics and Statistics Department. For details, contact the Biology Advising Center (BNR 101) or James W. Haefner (BNR 233).

Public Health Minor. The Public Health minor requires completion of the following: BIOL 1210, 1220; and 12 credits of upper-division (3000-level and above) Public Health elective courses.

Honors. An Honors Plan is available for students desiring a BS or BA degree "with Honors" in Biology. Departmental Honors requires the completion of 9 credits of Honors coursework in upper-division BIOL courses, BIOL 5800H, and a research-based Bachelor's Thesis. For details, students should contact Kimberly A. Sullivan (BNR 313).

Field Trips. Many biology courses require field trips. Those enrolled are expected to dress appropriately for the conditions and observe any safety precautions issued by instructors. Many courses require modest laboratory fees.

Undergraduate Research—Bachelor's Thesis in Biology

Students may do undergraduate research work under the supervision of selected faculty members. To receive academic credit, a student must enroll in BIOL 5800, Undergraduate Research. To complete the research project and write a thesis, a student must be enrolled in BIOL 5810, Bachelor's Thesis, for 3 credits. A thesis supervisory committee must be organized, consisting of an approved biology faculty member and at least one other faculty member. The supervisory committee is subject to the approval of the Director of Undergraduate Studies. Three credits of BIOL 5800H or 5810 may be applied toward elective requirements in some degree programs. Contact the Director of Undergraduate Studies, BNR 101, or Kimberly A. Sullivan (BNR 313) for assistance.

Financial Support

Scholarships, assistantships, grants-in-aid, and work-study programs are available from the University. Both the College of Science and the Department of Biology offer scholarships. Contact the College of Science office (SER 101) and the Biology Advising Center (BNR 101) for details.

Graduate Programs

Admission Requirements

See general admission requirements on pages 90-91. To be recommended for matriculated status, an applicant must have earned a bachelor's degree (or equivalent) from an accredited institution, and a Biology faculty member must agree to serve as major professor for that applicant. The Department of Biology also considers these guidelines for admission: (1) the transcript should show a minimum GPA of 3.0 (*B*); and (2) the scores on the verbal and quantitative GRE should be above the 50th percentile and the analytical writing score should be 3.5 or above. Advanced GREs (especially biology) are also recommended. Applicants for whom English is not the primary language must have scored at least 575 on the TOEFL. The applicant's undergraduate program should be similar to that offered by the Department of Biology at Utah State University, which includes the following and their prerequisites: general biology, microbiology, genetics, ecology, physiology, cell biology, developmental biology, and evolution; general and organic chemistry; calculus; statistics; and physics. Other preparatory courses may be specified by the student's supervisory committee.

Degree Programs

For those who have demonstrated strong academic capability as well as research interest, the Department of Biology offers the **Master of Science Degree** and the **Doctor of Philosophy Degree** in either Biology or Ecology. Graduate degrees in **Toxicology** are available through the Interdepartmental Program in Toxicology.

Undergraduate majors in Biology at USU with especially strong backgrounds and interest in research may apply for study of the Master of Science degree as **transitional students**. Acceptance as a transitional student allows undergraduates with advanced standing to integrate up to 9 credits of graduate work into the final semesters of their Bachelor of Science study. Acceptance into this program, as into all graduate programs in Biology, is closely regulated. Formal application through the School of Graduate Studies is required.

Course Requirements

Biology MS and PhD Degrees. Course requirements are determined by the student's supervisory committee. They will vary depending on the research emphasis selected and the background of the student.

Ecology MS and PhD Degrees. For specific requirements, see the description of the Ecology Interdepartmental Program (pages 179-180).

Research

The Department of Biology provides a dynamic and broad base for research and graduate study through a balanced program of basic and applied studies at ecosystem, population, organismal, cellular, and molecular levels. An outstanding variety of field sites; animal, plant, and microbe growth facilities; and modern well-equipped laboratories are available. Also, the Intermountain Herbarium, an excellent insect collection, the USDA/ARS U.S. National Pollinating Insects Collection, the Stable Isotope Laboratory, and the Center for Integrated BioSystems exist as research and support facilities.

Faculty members participate in and are supported by several interdepartmental programs, including the Ecology Center and the Center for Environmental Toxicology. In addition, many less formal contacts and interactions exist with colleagues in the colleges of Agriculture, Natural Resources, and Science.

Students are encouraged to carefully consider how their career goals match the faculty's research interests. Prospective students are strongly encouraged to contact faculty members with whom they are interested in working. Because of the combination of a diverse interdisciplinary base and excellent focused research programs, students have an opportunity to learn the philosophies and methods of many branches of biology.

Financial Assistance

Research assistantships are available from the grants of major professors and from Utah Agricultural Experiment Station funds. Teaching assistantships are awarded annually. All awards are made on a competitive basis and specific teaching needs are considered in awarding teaching assistantships. Given satisfactory performance, MS students are supported for at least two years and PhD candidates for at least four years on teaching assistantships. The department may also recommend particularly qualified students for College of Science or University fellowships. Admission to the graduate program of the Department of Biology does not guarantee financial support; however, applicants will not normally be admitted without financial support.

Career Opportunities

Completion of graduate degrees in Biology prepares students for careers in teaching and research in universities and colleges. Many graduates also find employment with private industry and state and national governmental agencies. Specific employment possibilities will depend on the nature of the graduate program pursued. The extensive background provided by a graduate degree also prepares students for eventual administrative responsibilities.

Research Emphases

Research areas of departmental faculty are diverse. Areas of research currently include: **Cellular and Molecular Biology:** plant-microbial interactions; molecular neurobiology and biophysics; gene regulation and signal transduction; membrane transport; molecular virology; **Ecology and Behavior:** community and ecosystem ecology; insect ecology and behavior; pollination biology; plant-insect interactions; vertebrate behavioral ecology; mathematical and computer modeling; soil microbiology; fungal ecology; biological control; integrated pest management (IPM); **Physiology and Comparative Biology:** toxicology and industrial hygiene; insect pathology; plant physiology and pathology; and **Systematics and Evolution:** systematics and evolution of plants, fungi, insects, reptiles, and amphibians; evolutionary quantitative genetics; biogeography; evolution of chemical defenses and resistance in microorganisms, insects, reptiles, and amphibians.

Research and Teaching Facilities

Herbarium. Graduate study in plant taxonomy offered in the Department of Biology utilizes the extensive facilities of the Intermountain Herbarium. The collection includes over 220,000 research specimens. About 50 percent are from the Intermountain Region, while most of the remainder are from other regions of North America.

Insect Collection. Comprising over a million specimens, the insect collection is available to scientists and graduate students involved in taxonomic research and to those requiring identification of insects in various research projects. The collection primarily covers the Intermountain Region, but it also contains species from nearly all areas of the world. The BNR Building also houses the USDA/ARS U.S. National Pollinating Insect Collection.

Laser Scanning Confocal Microscope. The Department of Biology has a BioRad 1024 Laser Scanning Confocal Microscope. This state-of-the-art technology utilizes highly tuned lasers to give detailed sectional views of the interior of intact structures such as cells and tissues, and greatly extends the advantages of fluorescence microscopy. This microscope is utilized by researchers campuswide, and is an indispensable tool for molecular and cellular studies.

Center for Integrated BioSystems (CIB). The CIB operates three service laboratories and a variety of research projects. The service laboratories provide essential biological resources for biotechnology research and development including: DNA sequencing, peptide synthesis, protein sequencing, antibodies, and fermentation.

Biology Faculty

Professors

Anne J. Anderson, microbiology and plant pathology
Kandy D. Baumgardner, genetics
Edmund D. Brodie, Jr., behavior and evolution
E. W. "Ted" Evans, insect ecology
James W. Haefner, systems analysis
Joseph K.-K. Li, virology
James A. MacMahon, community ecology
Frank J. Messina, insect biology
Keith A. Mott, plant physiology
William J. Popendorf, industrial hygiene
Peter C. Ruben, neurobiology
Jon Y. Takemoto, microbiology

Associate Professors

Brett A. Adams, cell signaling
Diane G. Alston, integrated pest management
Mary E. Barkworth, plant systematics
Daryll B. DeWald, cell biology
Timothy A. Gilbertson, neurobiology
Bradley R. Kropp, mycology

Joseph R. Mendelson, III, vertebrate systematics
Richard J. Mueller, plant morphology
Gregory J. Podgorski, developmental biology
John M. Stark, microbial ecology and biogeochemistry
Kimberly A. Sullivan, behavioral ecology
Carol D. von Dohlen, insect biology
Dennis L. Welker, molecular biology
Paul G. Wolf, systematics and molecular biology

Assistant Professors
Michelle A. Baker, aquatic ecology
Michael E. Pfrender, evolutionary quantitative genetics

Professors Emeriti
William A. Brindley, entomology and toxicology
Donald W. Davis, entomology and pest management
Keith L. Dixon, ornithology and mammalogy
LeGrande C. Ellis, endocrinology and reproductive physiology
James A. Gessaman, vertebrate physiological ecology
Ting H. Hsiao, insect physiology and biochemistry
Gene W. Miller, plant biochemistry and physiology
Ivan G. Palmblad, evolutionary ecology
Frederick J. Post, aquatic microbiology and microbial ecology
Reed S. Roberts, entomology
Richard J. Shaw, vascular plant taxonomy
John R. Simmons, biochemical genetics
John J. Skujins, soil biochemistry and microbial ecology
Sherman V. Thomson, plant pathology
Nabil N. Youssef, cell biology and parasitology

Associate Professors Emeriti
David B. Drown, environmental health
Wilford J. Hansen, systematic entomology
Raymond I. Lynn, algology and microbial ecology
George W. Welkie, plant physiology and virology

Research Professor
Donald W. Roberts, insect pathology

Research Associate Professor
Vijendra K. Singh, immunology

Research Assistant Professors
Michelle A. Grilley, molecular biology
Joanne E. Hughes, molecular genetics
Charles D. Miller, plant pathology
Mark P. Miller, genetics

Adjunct Professors
James H. Cane, bee biology
Noelle E. Cockett, biotechnology
Robert Fogel, mycology
William P. Kemp, insect ecology
J. Russell Mason, predation, ecology, and behavior
Darwin L. Sorensen, aquatic microbiology
Rex S. Spendlove, virology

Adjunct Associate Professors
John C. Bailey, public health
Dale L. Barnard, chemotherapy of viruses
Jay B. Karren, entomology
Vincent J. Tepedino, entomology

Adjunct Assistant Professors
Daniel A. Boston, DDS, dentistry
Terry Griswold, bee biology
Rosalind R. James, entomology
James P. Pitts, entomology
Theresa L. Pitts-Singer, entomology

Principal Lecturer
David M. "Andy" Anderson, medical technology

Lecturers
John A. Flores II, public health, industrial hygiene
Alice M. Lindahl, invertebrate biology
David O. Wallace, public health, industrial hygiene

Course Descriptions

Biology (BIOL), pages 349-354
Public Health (PUBH), page 472

Business Administration

Department Head: Alan A. Stephens
Location: Business 811
Phone: (435) 797-2362
FAX: (435) 797-2634
E-mail: busadm@b202.usu.edu
WWW: http://www.usu.edu/cob/admin

Undergraduate Advisor: Janet P. Lyons, Business 818, (435) 797-3722, jan.lyons@usu.edu

Degrees offered: Bachelor of Science (BS) and Bachelor of Arts (BA) in Business Administration, Finance, Marketing, and Production Management. The Department of Business Administration participates in the College of Business MBA (Master of Business Administration) degree (see pages 153-154).

Undergraduate Programs

Objectives

The Department of Business Administration offers programs to prepare students for administrative positions in business, government, and other institutions. Specialized training is provided within specific functional fields of business, as well as training directed at understanding the broader aspect of business as it functions within our economy. Training is specifically provided in three areas: (1) **Finance**, leading to careers in banking, brokerage activities and investment, and positions as financial analysts in industry; (2) **Marketing**, involving positions in sales, advertising, retailing, distribution, and other similar activities; and (3) **Operations Management**, leading to careers related to supply chain management, operations planning and scheduling, project management, quality management, and consulting.

College of Business Requirements

All students desiring to major in the Business Administration Department must satisfy the College of Business admission requirements, provided on pages 101-102. Academic advising about these requirements is available in the College of Business Career and Education Opportunities Center, Business 310A.

Business Core. All majors in the Department of Business Administration must complete the following prerequisite courses and business core courses in addition to the specific courses listed for the major.

Prerequisite Courses: ECON 1500; MATH 1100; STAT 2300; and PSY 1010 or SOC 1010. Business majors must take these courses as prerequisite to 3000-, 4000-, and 5000-level courses in the College of Business.

Business Core Courses: ACCT 2010, 2020; BA 3400, 3500, 3700; BIS 2450, 2550; BUS 3250; ECON 2010, 3400; MHR 2990, 3110; and MHR 4880 or 4890. All 3000-, 4000-, and 5000-level courses in the College of Business are restricted to students admitted to the College of Business or another USU major with an overall GPA of at least 2.67 and completion of at least 40 credits.

Majors

The Department of Business Administration offers four majors. An overall GPA of at least 2.50 is required to graduate. Course requirements for each major are listed below.

Finance Major. Finance is concerned with how individuals and firms allocate resources over time. Solutions to allocation problems rely upon the existence of capital markets that allow the exchange of resources over time, and firms that allow individuals to transform current resources into resources available in the future. In particular, finance deals with the financial management of firms, investment management, and the management of financial institutions. In addition to completing the departmental core, students majoring in finance must take BA 4450, 4460; ECON 4010, 4020; and three finance electives. Students must choose two of the following: BA 4300, 4410, 4420, 4430. The third elective may be selected from the required finance electives or from BA 3080; ACCT 3310, 3410; PFP 5060, 5070, 5080; ECON 4030, 5030, 5330, 5600.

Marketing Major. Modern marketing consists of a system of activities designed to help the marketer understand and influence buyer and seller behavior. Within the socio-economic and political environment, the marketer must plan, price, promote, and distribute want-satisfying goods and services to society. The following courses, designed to prepare students in all areas of marketing, must be taken in addition to the departmental core: BA 4510, 4530, 4540, 4550, 4590. Because of prerequisite requirements, some of these courses should be taken during the junior year.

Operations Management Major. Operations management involves planning, directing, controlling, and improving the activities related to providing goods and services. The operations manager is responsible for assuring that customer expectations are met, and even exceeded, with regard to quality, delivery, and price. To execute their responsibilities, operations managers must understand how to convert customer demand into specific material, equipment, and labor resources. In addition, they must work with and develop good suppliers, customer relationships, and internal work activities. Required courses include: BA 3080, 4720, 4750, 4790, 5730; MAE 5600 *or* STAT 5300; and one production elective chosen from ACCT 3310, ECON 5670, or MHR 4630.

Business Administration Major. A major in business administration is available for those students who have a special career objective that does not fit the other majors. A written proposal is designed by the student and submitted to the department head for approval. This proposal will include a written justification and a list of courses totaling at least 21 credits. For instructions, students should contact the departmental advisor.

Minors

The Department of Business Administration offers three minors. A grade point average of 2.50 in the five or six courses of a minor is required. Many of the courses listed under each minor have prerequisites.

Marketing Minor. ACCT 2010; MHR 3110; BA 3500, 4510, 4550; and either BA 4530 or 4540.

Finance Minor. BA 3400, 3500, 4450, 4460; and one of the following: BA 4300, 4410, 4420, 4430.

Operations Management Minor. BA 3500, 3700, 4720; and two of the following: BA 3080, 4750, 4790, 5730.

Other Minors. The College of Business sponsors two minors, a general business minor and an international business minor. Information about these minors can be obtained from the College of Business Career and Education Opportunities Center, Business 310A.

Other Degree Options

Dual Majors. Dual majors are available in accounting, human resources, management, business information systems, and economics. See the applicable department for information.

Second Bachelor's Degrees. Second bachelor's degrees are available for all four majors. For information, contact the College of Business Career and Education Opportunities Center, Business 310A.

Additional Information

Advising sheets for majors, minors, second bachelor's degrees, and the Business Administration major are available from the Department of Business Administration, Business 815, and from the College of Business Career and Education Opportunities Center, Business 310A. These sheets can also be found online at: **http://www.usu.edu/cobssc/web/requirementsheets.htm**.

Graduate Programs

For information about the **Interdepartmental Curriculum for the Master of Business Administration (MBA)**, see pages 153-154. Master's degrees are also offered by the following departments in the College of Business: Accountancy, Business Information Systems, and Economics. For further information, refer to the appropriate sections of this catalog.

Business Administration Faculty

Professors

Kenneth R. Bartkus, promotion management

Drew Dahl, financial institutions and international finance

Peter M. Ellis, production and operations research

J. Robert Malko, corporate and energy utility finance

C. R. Michael Parent, marketing research and strategy

Philip R. Swensen, corporate finance, investments, and managerial economics

Professors Emeritus

Allen D. Kartchner, production and operations research

Eugene C. Kartchner, production and operations research

Calvin D. Lowe, marketing

Paul A. Randle, corporate finance and valuation analysis

Associate Professors

J. Brian Atwater, "theory of constraints," quality management, lean manufacturing

Cathy L. Hartman, consumer behavior and environmental sustainability

Vijay R. Kannan, supply chain and quality management, cellular manufacturing

Edwin R. Stafford, marketing management, strategy, environmental sustainability

Alan A. Stephens, corporate finance and investments

Assistant Professors

Haiyan Hu, retailing and consumer behavior, international retailing, visual merchandising and promotion

Seung-Woog Kwag, investments and corporate finance

Instructors

Stacey B. Hills, marketing research, strategy, and product management

Janet P. Lyons, operations and marketing

Course Descriptions

Business Administration (BA), pages 346-347

Master of Business Administration (MBA)

Director of Business Graduate Programs: Mary Jo Blahna
Location: Business 302B
Phone: (435) 797-2274
FAX: (435) 797-2399
E-mail: maryjo.blahna@usu.edu
WWW: http://www.usu.edu/cob/

Degree Offered: Master of Business Administration (MBA)

Graduate Specializations: Accounting, Agribusiness Management, Business Information Systems, Entrepreneurship, Human Resource Management, Manufacturing Management, Personal Financial Planning

Graduate Program

Objectives

The MBA program is an interdepartmental program administered by the College of Business. The MBA program is designed to provide students with an understanding and analytical tools necessary for effective and efficient management in today's complex business world. The curriculum prepares students with a working knowledge of the fundamental business functions and a sensitivity to the legal, ethical, social, technological, and international forces in the business environment. The MBA program's focus is the development of the analytical, communication, interpersonal, and leadership skills needed for a successful career in a variety of organizations. The MBA program is accredited by AACSB International—The Association to Advance Collegiate Schools of Business.

Admission Requirements

For consideration for admission to the MBA program, applicants must submit an application form and fee, all undergraduate transcripts, Graduate Management Admissions Test (GMAT) scores (the GRE is also accepted), and three letters of recommendation from qualified professionals, at least two of whom must be academics. TOEFL scores are required for candidates from abroad, with a minimum of 550 deemed acceptable. International students with a prior degree from an English-speaking university are exempted from the TOEFL exam.

Application Deadline for Fall Semester. No applications will be considered until all required information arrives in the School of Graduate Studies at Utah State University. In addition, the student desiring to pursue the MBA degree must have been accepted as a matriculated student before he or she will be permitted to register for 6000-level courses that will be part of the student's advanced program. Full-time business experience is also preferred. Students who wish to be considered for financial aid must submit applications by **February 15** for the coming academic year.

Students with or without an undergraduate degree in business may enter the MBA program. However, before taking advanced core or elective courses, basic competencies in business that have not been acquired through prior courses or experience must be developed by completing prerequisite courses as outlined in the business core described below under *Degree Requirements*. Applicants not meeting minimum requirements may be allowed to correct deficiencies concurrently with graduate coursework. Before entering the program, each student must meet with an advisor to plan his or her course of study.

Degree Requirements

Business Core. The MBA Business Core curriculum provides skills and knowledge in statistics, written communication, computer literacy, mathematics, information systems, economics, accounting, finance, marketing, management, and organizational behavior. Students who have completed a bachelor's degree must have coursework equivalent to the core subject matter areas of the AACSB for direct entry into the advanced program.

Accelerated Business Core. Students who have not completed a bachelor's degree accredited by the AACSB may choose to gain the necessary basic business competencies by attending the 18-credit Accelerated Business Core (ABC), which is offered during the summer semester only. The ABC is a uniquely efficient and effective way of delivering the basic program curriculum. It is a single, team-taught course covering the topics and functions, which form the context and offer perspectives in business. The ABC enables students from nonbusiness backgrounds to prepare quickly and similarly for the Advanced Program Courses.

Alternatively, students may acquire the necessary basic competencies by completing courses satisfying the common body of knowledge requirement: ACCT 2010, 2020; BA 3400, 3500, 3700; BIS 2450; ECON 1500, 2010; MHR 2990, 3110; MATH 1100; and STAT 2300. Students may not be required to take courses which duplicate prior academic or industrial training and are required to meet with the director of the MBA program to plan their course of study.

The advanced required courses, along with electives, consist of 30 credits. Students must complete the advanced course requirements listed below. In addition, students may choose to complete the course of study for an MBA or select among several specializations, which are also described below.

Advanced Required Courses (21 credits). Students must complete MHR 6890 to fulfill the integrative component of the MBA. Students must also successfully complete the following courses to fulfill advanced course requirements: ACCT 6350; BA 6420, 6520, 6720; ACCT 6500 or BIS 6700; MHR 6500.

Course of Study for MBA (9 credits). Working with the MBA director, students select a minimum of three electives (9 credits). One approved 5000-level course may be used. In addition, students must complete an approved College of Business graduate course (3 credits) which meets the Graduate School's research requirement. Electives taken outside of the College of Business may require the completion of prerequisite courses.

Specializations (12 credits)

Students may select a specialization in one of several areas listed below. Classes taken as part of the MBA advanced required courses cannot be used as part of a specialization. One course in each specialization will be designated as research intensive to meet the University's research requirement.

Accounting. Students admitted to the USU MBA Program may earn an Accounting Specialization by completing the MBA curriculum, 21 credits, and at least 12 approved credits in accounting. To qualify for this specialization, students must complete, or have previously completed, the equivalent of ACCT 3110, 3120, 3310, 3410, 5210 (or 6210), 5220 (or 6220), 5400 (or 6400), and 6510. At least 9 credits must be taken in accounting courses numbered above 6010. The USU Graduate School research requirement may be satisfied by completing ACCT 6410 or 6610.

Agribusiness Management. This specialization consists of ECON 6030, 6040, 6300; and either ECON 6500 or 6700. ECON 6330 should be taken to satisfy the quantitative methods requirement.

Business Information Systems. This specialization requires students to complete BIS 6700 and three of the following courses: BIS 6200, 6330, 6410, 6500, and 6750.

Entrepreneurship. This specialization consists of MHR 6410, 6430, 6470, and an approved elective.

Human Resource Management. This specialization requires students to complete MHR 6690 and to select any three of the following courses: MHR 6510, 6550, 6630, 6670, and 6760.

Manufacturing Management. This specialization includes BA 5730, 6740; and MHR 6350, 6370.

Personal Financial Planning. This specialization consists of PFP 6060, 6070, 6080, and an approved elective. Students must have completed (or complete as part of their graduate work): BA 3460 or 4460, and ACCT 3410. This specialization satisfies requirements to sit for the national Certified Financial Planner (CFP) examination.

Financial Assistance

Graduate assistantships, scholarships, and fellowships are available to outstanding on-campus students. Graduate assistantships and scholarships generally range between $1,000 and $3,000 for nine months. Application for assistantships must be made by **February 15**. A recipient of a graduate appointment is usually eligible for a waiver of the out-of-state portion of his or her tuition.

Master of Business Administration Faculty

Professors

Kenneth R. Bartkus, promotion management

Caryn L. Beck-Dudley, business law and social responsibility

Basudeb Biswas, international trade and economic development

Gaylen N. Chandler, human resources, management, and entrepreneurship

Drew Dahl, financial institutions

Peter M. Ellis, production and operations research

Christopher Fawson, public finance and econometrics

L. Dwight Israelsen, comparative systems and economic history

Paul M. Jakus, economics

Richard L. Jenson, information systems and managerial accounting

I. Richard Johnson, financial, managerial, advanced, and agency accounting

J. Robert Malko, corporate and energy utility finance

Glenn M. McEvoy, organizational behavior, human resources, and management

C. R. Michael Parent, marketing research and strategy

Richard L. Ratliff, auditing, financial, internal audit, and principles

Clifford R. Skousen, international and managerial accounting

David B. Stephens, business strategy and labor relations

Philip R. Swensen, finance

Associate Professors

J. Brian Atwater, "theory of constraints," quality manufacturing, lean manufacturing

Ronda R. Callister, organization behavior, management

Steven H. Hanks, business strategy, management, and entrepreneurship

Cathy L. Hartman, consumer behavior and environmental sustainability

Jeffrey J. Johnson, information systems

Vijay R. Kannan, supply chain and quality management, cellular manufacturing

Irvin T. Nelson, accounting

David H. Olsen, database manager

David J. Paper, web development

Edwin R. Stafford, marketing

Alan A. Stephens, corporate finance and investments

Assistant Professors

Dawn DeTienne, entrepreneurship

David L. Dickinson, labor and employee relations, labor economics

E. Vance Grange, accounting

James Hayton, human resources

Haiyan Hu, retailing and consumer behavior, international retailing, visual merchandising and promotion

Yong Seog Kim, e-commerce, information systems strategies

Seung-Woog Kwag, finance

Robert J. Mills, visual basic

Troy V. Mumford, organizational behavior, human resource management, compensation

Jean A. Pratt, e-commerce/web design

Instructor

Stacy B. Hills, marketing research, strategy, and product management

Senior Lecturer

Alan P. Warnick, human resources

MBA Courses

Descriptions of MBA courses can be found listed alphabetically by prefix in the *Course Descriptions* section of this catalog.

Business Information Systems

Department Head: Karen A. Forcht
Location: Business 711
Phone: (435) 797-2342
FAX: (435) 797-2351
E-mail: karen.forcht@usu.edu
WWW: http://www.usu.edu/cob/bis/

Undergraduate Advisor: Peggy Buttars, Business 310, (435) 797-2352, peggy.buttars@usu.edu

Degrees offered: Associate of Applied Science (AAS) in Office Systems Support (two-year degree); Bachelor of Science (BS), Bachelor of Arts (BA), and Master of Science (MS) in Business Information Systems; BS and BA in Business Information Technology and Education; BS and BA in Marketing Education; Master of Education (MEd) in Secondary Education with specialization in Business Education; participates in the Interdepartmental Doctor of Philosophy (PhD) in Education and Doctor of Education (EdD) with a specialization in Business Information Systems

Undergraduate emphases: *Business Information Systems BS, BA*—Management Information Systems, Electronic Commerce, Office Systems Management; *Business Information Technology and Education BS, BA*—Business Teacher License, Training and Development; *Marketing Education BS, BA*—Marketing Teacher License, Training and Development

Graduate specializations: *Business Information Systems MS*—Business Education, Business Information Systems, Electronic Commerce, Management Information Systems, Marketing Education, and Training and Development

Distance Learning: The Bachelor of Science (BS) and Bachelor of Arts (BA) in Business Information Systems are offered throughout the State of Utah through the USU satellite Distance Learning Program. The MS in Business Information Systems is also offered through Distance Learning. For more information, contact the nearest USU Extension Center.

Undergraduate Programs

Objectives

The Department of Business Information Systems offers two major educational thrusts in undergraduate as well as graduate programs. The Business Information Systems major is designed to prepare individuals for positions as managers in business information systems, including information managers, information supervisors, network managers, worldwide web designers, electronic commerce developers, systems analysts, applications programmers, systems trainers, and office systems managers by pursuing a bachelor's degree program in Business Information Systems.

The second major thrust is designed to prepare individuals as teachers and supervisors of business and marketing subjects at the secondary and postsecondary grade levels in the educational system or as teacher-trainers in private industry. Students may earn a bachelor's degree in Business Information Technology and Education or Marketing Education.

A comprehensive two-year Associate of Applied Science Degree in office systems support subjects is also available. In addition, the department provides service courses for many other groups of students.

The department has a modern microcomputer laboratory in seven separate rooms with more than 200 microcomputers. Students take microcomputer classes as part of their College of Business requirements, Computer and Information Literacy (CIL) examination preparation, and elective programs.

Requirements

College of Business Requirements. All bachelor's degree students majoring in Business Information Systems programs must satisfy the College of Business entrance requirements provided on pages 101-102. Academic advising about these requirements is provided by the College of Business Career and Education Opportunities Center, Business 310A. Business Information Systems majors must also follow College of Business prebusiness course requirements for admission to a major, detailed on page 102.

Teacher Licensure. Persons planning to teach must also be admitted to the teacher licensure program in the College of Education and Human Services. A cumulative college grade point average of 2.75 is required to be admitted to the College of Education and Human Services, to student teach, and to graduate in Business Information Technology and Education or Marketing Education with a teaching license. Detailed information may be obtained from the Department of Secondary Education and/or the College of Education and Human Services.

Two-year Associate of Applied Science Degree. Students indicating an interest in the Office Systems Support Associate of Applied Science Degree can be accepted directly into the program upon admission to the University. Students who desire to transfer to a four-year program offered by the College of Business must meet the requirements specified for bachelor's degree programs.

Competency-based Placement Program. Students who have acquired knowledge and skills that are not represented on their collegiate transcripts of credit are allowed to demonstrate competency by challenging related courses. Placement in a skills-oriented sequence can be accomplished by discussion with an advisor. Challenge of courses is done by successfully completing an examination similar to a final course test.

Students with potential for demonstrating competence have two options, one of which must be chosen prior to examination. One option is to challenge for credit (*P/D+, D, F* option) according to University established procedures; results of the test are recorded on the student's transcript. A second option is to waive without credit required classes, if competence at the *B* level is demonstrated. Students will be assessed a fee for choosing one of these options.

Program Requirements

Bachelor's Degree in Business Information Systems. The Information Systems program at Utah State University offers a common core of courses through two departmental majors: **Business Information Systems** and **Computer Science**. The curricula of the individual departments differ *substantially* in emphasis.

The **Business Information Systems major, Management Information Systems (MIS) emphasis,** is offered in the Business Information Systems Department, College of Business. The Bachelor of Science or Bachelor of Arts program is designed for students interested in business careers as information specialists, systems analysts, network managers, applications programmers, and information systems managers in business and industry. BIS majors take required courses in analysis and design, Internet management, telecommunications, decision support systems, spreadsheet and database applications, and information systems projects. All graduates are required to complete a common core of business subjects. The College of Business is accredited by the American Assembly of Collegiate Schools of Business. The department also offers a Master of Science in Business Information Systems with an area of emphasis in Management Information Systems.

The **Computer Science major with an Information Systems emphasis** is located in the College of Science and is designed for students interested in a career as a Computer Scientist with a background in Information Sciences and Systems. Majors in this emphasis are trained in all phases of the analysis, design, and implementation of Information Systems. As part of this emphasis, students also receive training in the theory and application of information. Students select an application area such as Business, Accounting, or Economics. Other application areas can be developed by working closely with an advisor. This program of study leads to a Bachelor of Science, Bachelor of Arts, or Master of Science degree in Computer Science. See page 175 for additional details.

General requirements for *all* Business Information Systems majors are: ACCT 2010, 2020; BA 3400, 3500, 3700; BIS 1400 (or Computer and Information Literacy Examination), 2450, 2550; BUS 3250, 4250; ECON 1500, 2010, 3400; MHR 2990, 3110; MHR 4880 (or 4890); Math 1050, 1100; STAT 2300; PSY 1010 (or SOC 1010); and University Studies requirements.

Students must choose a management information systems emphasis, an electronic commerce emphasis, or an office systems management emphasis.

The **management information systems** emphasis provides knowledge and skills for business systems analysts, applications programmers, information managers, web masters, and other business information systems positions.

Required classes for the management information systems emphasis are: BIS 2300 (or 3100), 3330, 3500, 4330, 5100, 5110, 5300, 5400, 5800; BIS 5050 (or 5650 or 5700); CS 1700, 1710, 1720 (or 3410); plus 6 credits outside the College of Business related to the major. It is strongly recommended that students take BIS 5050, 5450, and 5650. See advisor for current checklist of requirements.

The **electronic commerce** emphasis provides knowledge and skills for students who wish to work in the electronic economy using high-speed Internet networks and applications, while providing competitive tools for all Internet-driven electronic commerce. This expertise includes business-to-business electronic commerce, as well as business-to-consumer electronic commerce. Students gain expertise in establishing and designing websites from the technical point of view, as well as expertise in electronic commerce from a strategic business point of view.

Required classes for the electronic commerce emphasis are: BIS 3330, 3500, 4330, 5050, 5100, 5110, 5300, 5450, 5650, 5700, 5800; CS 1700, 1710, 1720 (or 3410).

The **office systems management** emphasis provides knowledge and skills for office managers, administrative assistants, and other practitioners who assist with analysis, design, and use of computerized information from a user's perspective.

Required classes for the office systems management emphasis are: BIS 1420, 2300, 2400, 2520, 2600, 3100, 3450 (or 3500), 5450, and 5700, plus 13 credits of approved upper-division classes outside the College of Business related to the major. BIS 3330, 4350, 5300, and 5400 are strongly recommended. See advisor for current checklist of requirements.

Bachelor's Degree in Business Information Technology and Education. A composite major in Business Information Technology and Education is designed for students desiring to qualify for a license to teach business subjects in grades 7-12 or to teach in business and industry. Required courses include: ACCT 2010, 2020; BA 3500; BIS 1400 (or Computer and Information Literacy Examination); BIS 2300 (or 3100), 2400, 2450, 2520, 2550, 3140, 4550, 5400; BIS 5300 (or 5450 or 5700); BUS 2250; ECON 1500; ECON 2010 (or MHR 2990); MHR 3110; PSY 1010; MATH 1100; STAT 2300; and other University Studies courses required by the University. Required English classes are ENGL 1010 and 2010. Students must also complete at least one of the following emphases:

1. Business Teacher License Emphasis: BIS 3000, 3300, 3400, 4300, 4400, 5500, 5630; SCED 3100, 3210, 4200, 4210; and SPED 4000.

2. Training and Development Emphasis: BIS 3450, 4350, 5450; BUS 4250; and 15 additional credits chosen from the following: MHR 3710 4630, INST 5210, 5230, 5240, 5250, 5260, 5300, 5400, 5900.

Those who do not wish to receive a license to teach in the public schools may select an emphasis in Training and Development for business and industry.

Bachelor's Degree in Marketing Education. A composite major in marketing education is designed for students desiring to qualify for a license to teach marketing and distributive education subjects in the public secondary schools or in business and industry. Required courses for students wishing to receive a license to teach include: ACCT 2010, 2020; BA 3500, 4510; BA 4540 (or 4550); BIS 1400 (or Computer and Information Literacy Examination), 1420, 2300, 2400, 2450, 2550, 3140, 4550; BUS 2250; ECON 1500; ECON 2010 (or MHR 2990); MHR 3710; PSY 1010; MATH 1100; STAT 2300. Students must also complete at least one of the following emphases:

1. Marketing Teacher License Emphasis: BIS 3000, 3300, 3400, 4300, 4400, 5500, 5630; SCED 3100, 3210, 4200, 4210; and SPED 4000.

2. Training and Development Emphasis: BIS 3450, 4350, 5450; BUS 4250; and 15 additional credits chosen from the following: MHR 3710, 4630, INST 5210, 5230, 5240, 5250, 5260, 5300, 5400, 5900.

Those who do not wish to receive a license to teach in the public schools may select an emphasis in Training and Development for business and industry.

Students must also complete ENGL 1010 and 2010, as well as ECON 1500 and BIS 3140, which may be counted toward their University Studies requirements.

Graduation Requirements. To be recommended by the department for graduation with a bachelor's degree, BIS majors must have a minimum GPA of 2.67 in courses required for their major. Business Information Systems majors must have an overall GPA of 2.5. Business Information Technology and Education and Marketing Education majors must have an overall GPA of 2.75. This includes transfer credit. At least 50 percent of the business credits required for a business degree must be taken on the Utah State University campus or at a designated residence center.

Communications Literacy requirements are ENGL 1010 and 2010 plus two Communications Intensive courses.

Office Systems Support Associate of Applied Science Degree. This program is designed for students desiring two years (a minimum of 65 semester credits) of college to prepare for positions as office supervisors and other office and information systems support personnel. Emphasis is placed on job skills. Requirements are: ACCT 2010; BIS 1400, 1420, 1550, 2300, 2400, 2450, 2520, 2550, 2600; BUS 2250. In addition, students are required to complete a minimum of 9 credits in business-related areas as approved by their advisor.

A minimum of 18 credits of University Studies must be taken. Required University Studies classes are: 6 credits of communications literacy (ENGL 1010 and 2010), 3 credits of quantitative literacy (MATH 1050 or 1100), and 9 credits of breadth requirements.

Students who initially enroll for the two-year Associate of Applied Science degree may readily change to a four-year bachelor's degree program and complete the requirements for the business information systems major, business information technology and education major, or another major in the College of Business.

Minors. The Department of Business Information Systems is authorized to award teaching minors in Business Information Technology and Education, Marketing Education, and Business Computer and Information Systems. A minor in Business Information Systems and a minor in Electronic Commerce are also authorized.

Requirements for the *Business Information Technology and Education teaching minor* are ACCT 2010; BIS 1400 (or Computer and Information Literacy Examination), 1420, 2300, 2450, 3000, 3300 (or 4300), 3400, 4400, 5400; BIS 5300 (or 5450 or 5700); and ECON 1500.

A *teaching minor in Marketing Education* consists of the following courses: ACCT 2010; BA 3500; BIS 1400 (or Computer and Information Literacy Examination), 1420, 2300, 3000, 3300 (or 4300), 3400, 2400 (or 3550), 4400; ECON 1500; BA 4510 (or 4550).

Requirements for the *Business Computer and Information Systems teaching minor* are: BIS 1400 (or Computer and Information Literacy Examination), 1420, 2300, 2400, 2450, 3000, 3100, 3300 (or 4300), 3400, 3450 (or 3500), 5300, 5400.

The minors listed above are **teaching minors** and are available only to those working toward a teaching license.

Students wishing to *minor in Business Information Systems* must complete the following courses: BIS 2300, 2450, 3100, 3330, 3450 (or 3500); CS 1700 (or 3410 or 3510). In addition, they must choose one course from the following: ACCT 4500; BIS 4330, 5100/5110 (take both), 5150, 5300, 5400, 5700; CS 1700 (or 3410, if not taken in *required* section). The following courses are also required for nonbusiness majors: ACCT 2010, 2020; BIS 1400.

Requirements for the *Electronic Commerce minor* are: BIS 2400, 3330, 3450 (or 3500), 5100, 5110, 5300, 5700. Students whose majors are *not* in the College of Business must take the following courses, in addition to those listed above, in order to complete an Electronic Commerce minor: ACCT 2010, BIS 2450, and BA 3500.

Student Organizations

The Department of Business Information Systems sponsors or co-sponsors three student organizations. Each group provides unique experiences that can complement and enrich formal coursework. Leadership development and human relations skills are among the personal attributes enhanced by involvement in the various organization activities.

Association for Computing Machinery (ACM). ACM, a professional society for the information systems industry, sponsors a student chapter at USU. The goals of ACM are to: (1) provide leadership experiences for undergraduate and graduate business information systems majors; (2) help student members plan their careers and find employment by introducing them to practicing systems professionals; and (3) foster a professional attitude among business information systems majors so that they will contribute to their field.

Delta Epsilon Chi (DEX) is a cocurricular organization designed for marketing education and marketing majors. The major goal of DEX is to help students prepare for careers in marketing or marketing education. DEX provides students with opportunities to compete in marketing events at the state and national levels. Membership is open to all students interested in business and marketing.

Delta Pi Epsilon (DPE) is a national honorary fraternity for graduate students. Purposes of the organization include enhancement of research, scholarship, service, and cooperation in the profession. Election to membership requires review by members and faculty of the Department of Business Information Systems.

Graduate Programs

Master of Science

Students applying for admission to the Master of Science program in Business Information Systems must take the GMAT test. A score at the 40th percentile or better on the GMAT is required for admission. Undergraduate GPA should be 3.0 or above. Meeting minimum requirements does not guarantee admission.

The MS requires a minimum of 33 credits. A minimum of 24 credits of academic work must be in classes numbered 6000 and above. Twelve or more credits should be in the area of specialization. Students with bachelor's degrees outside of business may be required to complete additional coursework.

Students in the master's program pursue the *Plan C* option, where a research paper is completed in a special research class. Those who wish to pursue the *Plan A* thesis option must have permission from their committee to do so.

All MS degrees in the BIS Department require the following core: BIS 6150, 6440, 6810.

The specialization in **Management Information Systems (MIS)** is for students who wish to work as systems analysts, application programmers, network managers, information managers, information center managers, and trainers in business information systems.

Students are expected to have a background in business information systems. Required courses are BIS 6120, 6200, 6330, 6400 (or 6700), in addition to the departmental core. Students who choose the Plan A option must complete 6 credits of BIS 6970. Students may take credits in Business Information Systems, Computer Science, Instructional Technology, Business Administration, Accounting, Economics, or other approved electives to complete the 9 credits of electives required.

The specializations in **Business Education**, **Marketing Education**, and **Training and Development** are designed for those who are teaching in an area of business or who wish to work in training and development in business and industry. Required courses for the Business Education or Marketing Education specialization are BIS 6350, 6450, 6700, 6720, 6730, and 6770. Students must complete 15 credits of electives chosen from the following list (or select others with committee approval): BIS 6350, 6400, 6600, 6720, 6730, 6770; BUS 6250;

Required courses for the Training and Development specialization are BIS 6350, 6450; and BUS 6250. Students must complete 15 credits of electives chosen from the following list (or select others with committee approval): BIS 6120, 6330, 6410.

For a current checklist of requirements, students should contact their departmental graduate advisor.

The USU MS in Business Information Systems is the **only** master's program in Business Information Systems in the state of Utah. Graduates are placed in the West and throughout the nation.

Master of Education

Students desiring admission to the MEd program must also meet the requirements of the Secondary Education Department.

The MEd degree in secondary education with specialization in business education has a master's project requirement as part of the program. The program is devised specifically for the practicing secondary school teacher of business or marketing education. Students complete a core area in secondary education, as well as requirements in business education and subject-matter-oriented courses. The program is also designed to prepare people to teach in public secondary schools.

Doctor of Philosophy and Doctor of Education

Applicants for admission to the College of Education and Human Services PhD or EdD programs with a specialization in Business Information Systems must take the GRE. Scores on the verbal and quantitative test must be at or above the 40th percentile. No minimum score is required on the analytical section (required by the Educational Testing Service).

The Department of Business Information Systems cooperates with other departments in offering the interdepartmental Doctor of Philosophy (PhD) and Doctor of Education (EdD). Within the Business Information Systems specialization, emphases can be pursued in business education, marketing education, business information systems, and business communications. Other subject-matter emphases are also available. The PhD is a research-based degree. The EdD degree is a practitioner's degree. Both degrees require dissertations. Graduates secure positions teaching business subjects or business-teacher education in colleges and universities or in business and industry. Former graduates are currently in various positions in higher education, including higher education administration; in teacher education instruction; and in business and industry.

Additional Information

Specific details about each of the foregoing degree programs are outlined in policy and procedure documents available through the department. All requirements are subject to change; check with the department for current requirements.

The business and marketing teacher education programs, at the undergraduate and graduate levels, are ranked highly and respected throughout the nation, with faculty who are nationally and internationally recognized.

All students must meet admission requirements as specified by the School of Graduate Studies (see pages 90-91).

Research

Faculty in the Department of Business Information Systems are active in research and scholarly endeavors. Current and published research topics include business communications; international communications; improvement of instruction in teaching; business information systems as related to business and industry; curriculum for business schools; business reengineering; electronic commerce; group decision support systems; microcomputer applications; use of microcomputers in various subjects, including accounting and business communications; cooperative education; issues in higher education; and other areas related to business information systems, marketing education, and business education.

Financial Assistance and Assistantships

Funds for scholarships are provided through the School of Graduate Studies and administered in the department. Those interested in scholarships should contact the graduate director or the department head.

Each year several high-quality graduate teaching assistants are needed. These assistants generally teach classes in keyboarding, word processing, business communications, and microcomputer applications. Those who are interested in teaching assistantships must apply through the department head. They must have had teaching experience or be willing to take teaching methods classes, as well as the School of Graduate Studies-sponsored teaching assistant workshop, prior to receiving an assistantship.

Career Opportunities

Business Information Systems is one of the fastest growing fields in business and industry. Follow-up studies show that information systems positions pay excellent salaries, and the placement rate of students is almost 100 percent. Currently, there is also a great demand for business teachers in public education.

Business Information Systems Faculty

Professors

Karen A. Forcht, business information systems, business communication, data management

Dennis J. LaBonty, business information systems

James Calvert Scott, business education, business communications

John F. Vinsonhaler, business information systems

Professors Emeritus

Charles M. Lutz

H. Robert Stocker

William A. Stull

Associate Professors

Jeffrey J. Johnson, business information systems

David H. Olsen, business information systems

David J. Paper, business information systems

Assistant Professors

Karen Biers, clothing and textiles, home-based entrepreneurship, extension

Karina Hauser, lean manufacturing, artificial intelligence

Yong Seog Kim, data mining

Robert J. Mills, business information systems

Jean A. Pratt, business information systems

Zsolt Ugray, business information systems, electrical commerce and optimization

Principal Lecturers

Marianna Larsen, office systems support, business communications

Craig J. Peterson, business information systems

Dana H. Swensen, business information systems, business communications

Senior Lecturers

Susan M. Jones, business information systems, business communications

Ralph B. "Bernie" Lantz, computer technology, networks security, business information systems, computer literacy

Lecturer

Malia L. Young, marketing education, business communication, information systems

Course Descriptions

Business Information Systems (BIS), pages 354-357

Chemistry and Biochemistry

Department Head: Steve Scheiner
Location: Maeser Laboratory 140
Phone: (435) 797-1619
FAX: (435) 797-3390
E-mail: chemist@cc.usu.edu
WWW: http://www.chem.usu.edu

Undergraduate Advisors:

Faculty advisors in the Department of Chemistry and Biochemistry are as follows:

Ann E. Aust, Widtsoe 233, (435) 797-1629, aaust@cc.usu.edu

Stephen E. Bialkowski, Maeser Lab 359, (435) 797-1907, stephen.bialkowski@usu.edu

Scott A. Ensign, Widtsoe 239, (435) 797-3969, ensigns@cc.usu.edu

Rick C. Holz, Widtsoe 237, (435) 797-2609, rholz@cc.usu.edu

Steve Scheiner, Maeser Lab 140, (435) 797-7419, scheiner@cc.usu.edu

For faculty advisor assignment, contact Department of Chemistry and Biochemistry at (435) 797-1619 or chemist@cc.usu.edu.

Degrees Offered: Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), Doctor of Philosophy (PhD) in Chemistry; MS and PhD in Biochemistry; BS and BA in Chemistry Teaching; BS and BA in Composite Teaching—Physical Science (Chem)

Undergraduate emphases: *BS*—Professional Chemistry, Biochemistry, Environmental Chemistry, Chemical Education, Life Science

Graduate specializations: *Chemistry*—Analytical Chemistry, Inorganic Chemistry, Organic Chemistry, Physical Chemistry

Undergraduate Programs

Objectives

Chemistry is a subject that addresses the properties of materials and the transformations that they undergo. Especially important are aspects of energy and structure related to chemical reactivity. Consequently, students of many disciplines take courses in chemistry to learn about the behavior of the substances they will use or reference. The Department of Chemistry and Biochemistry offers a wide variety of courses for those whose majors and/or anticipated careers require a knowledge of chemistry. These areas of study include nutrition, engineering, biology, agriculture, natural resources, medicine, law, and education, to name a few. Many students also choose chemistry as an elective course to better prepare themselves as citizens in a technological world.

The **Bachelor of Science Degree** entails considerable specialization in chemistry and related areas. The BS emphases require a common core of courses, but allow for a different concentration of advanced work according to the interests and career objectives of the student. The **BS with Professional Chemistry Emphasis**, **BS with Environmental Chemistry Emphasis**, and **BS with Biochemistry Emphasis** degrees meet the requirements for certification by the American Chemical Society (ACS). The certified degree emphases provide excellent preparation for immediate entry into the job market or for graduate school in chemistry, biochemistry, chemical engineering, molecular biology, nutrition, food science, materials science, and a wide variety of other fields. ACS certification in **Chemical Education** is available to students who complete an ACS-certified program, together with the Professional Education program in secondary education. The **BS with Life Science Emphasis** degree is popular for students wishing to go on to medical or dental graduate programs. The life science emphasis is particularly appropriate for **premedical** and **predental** students who want a strong base for understanding the nature of chemical reactions in the body and the behavior of the drugs they will prescribe, or who want an attractive alternative should they decide ultimately not to pursue medical or dental school. The **Chemistry Teaching Major** or the **Composite Teaching Major in Physical Science** are available to those who want a career in secondary education. The BA degree is an excellent choice for students with an interest in studying **law** or **business** and who have an interest in science.

The core of the program utilizes year-long sequences of classes. The first-year sequence introduces the basic principles of chemistry, as well as most of the major concepts of the science. The second year explores in greater depth the characteristics of carbon-based compounds that serve as the backbone for the chemistry of life; for most drugs and medicines; for petroleum; for most fibers, paints, and plastics; and for many other commercial products. The third year examines in greater depth the models, theories, and mathematical interpretation of the structures, rates of change, energetics, and other properties of chemicals. In addition, one-semester courses examining the chemistry of life processes, the behavior of inorganic substances, and the analysis of the composition of substances are required. Many of the sequences have associated laboratory courses where students get hands-on practice. Here they synthesize compounds, measure physical properties, analyze samples, and determine structural features of compounds, using modern techniques and instrumentation. The requirements of the BS and BA degrees in chemistry, along with University and University Studies requirements, are summarized here. The specific requirements for the teaching major and for the composite teaching major in physical science are also included.

Students are also urged to study these requirements and to visit with their advisor on a regular basis about progress toward the completion of their degrees or for any questions regarding complementary courses and career goals.

General Requirements

Admission Requirements. First-year students admitted to USU in good standing qualify for admission to this major. Transfer students from other institutions need a 2.2 transfer GPA, and students transferring from other USU programs need a 2.0 total GPA for admission to this major in good standing.

Students interested in studying chemistry should take high school mathematics courses that will enable them to start calculus during their first semester at USU. High school coursework in chemistry and physics is also desirable. AP credit in chemistry may be counted toward the degree. For details, contact the departmental advising faculty.

No CHEM prefix course may be applied toward graduation with any major or minor in chemistry with an earned grade of less than *C*-. Except for CHEM 4800 and 4990, no CHEM prefix course may be taken on a *Pass/Fail* basis. No CHEM prefix course may be repeated more than one time to improve the grade to a *C*- or better. A student dropped from the chemistry program for failure to meet this standard may appeal to the departmental Curriculum Committee for readmission.

Chemistry Core Curriculum

In addition to the University Studies requirements for graduation, chemistry majors take a series of core courses spread across a traditional four-year period. The completion of the chemistry core also covers the College of Science requirements for graduation.

First Year: CHEM 1210, 1220, 1230, 1240; MATH 1210, 1220.

Second Year: CHEM 2310, 2320, 2330, 2340, 3510, 3520, 3600, 3610; PHYX 2210, 2220; MATH 2210.

Third Year: CHEM 3060, 3070, 3080, 3090, 5640, 5650, 5700; MATH 2250 *or* STAT 3000 (optional for Chemistry Teaching Major).

Fourth Year: CHEM 4990.

Chemistry Requirements

Professional Chemistry Emphasis (ACS Certified). In addition to the chemistry core, CHEM 5520, 5530; and 6 advanced electives, as approved by the department, are required.

Biochemistry Emphasis (ACS Certified). In addition to the chemistry core, CHEM 5710, 5720; BIOL 1210 and four advanced Biology elective courses, as approved by the department, are required.

Environmental Chemistry Emphasis (ACS Certified). In addition to the chemistry core, CHEM 5670, 5680; and 9 credits of approved environmental courses from outside the department are required.

Chemical Education Emphasis (ACS Certified). In addition to the chemistry core, teaching licensure courses as specified by the Department of Secondary Education (35 cr.); and teaching minor from outside the Department of Chemistry and Biochemistry (12-16 cr.) are required.

BS Degree with Honors. This option can be met by completing any ACS certified program and by meeting the following requirements: Minimum GPA of 3.50 in chemistry courses; overall GPA of 3.30; 13 credits of honors work as follows: 3-6 credits of CHEM 4800H (Research Problems), 3 credits chosen from CHEM 2320H, 3070H, 5640H, or 5700H, 1 credit of CHEM 4990H (Undergraduate Seminar), and 3-6 credits selected from Honors courses numbered 3000 or above in chemistry or related subjects, as appropriate. Three credits may be selected from chemistry courses numbered 6010 or above. Students must be admitted to Honors through the Honors Program Office.

BS in Chemistry, Life Science Emphasis. In addition to the chemistry core (with the exception of CHEM 5640, 5650), BIOL 1210; BIOL 1220 or 2000; BIOL 3200 or 3300; and CHEM 5710, 5720 are required.

BA in Chemistry: In addition to the chemistry core (with the exception of CHEM 5640, 5650), CHEM 5520 or 5640; and two years of foreign language are required.

Chemistry Teaching Major: In addition to the chemistry core (minus the MATH 2250 or STAT 3000 courses), SCI 4300, teacher licensure courses offered by Secondary Education (35 cr.), and a teaching minor from outside the Department of Chemistry and Biochemistry (12-16 cr) are required. An overall 2.75 GPA in a minimum of 60 semester credits of approved University coursework is required for admission into the Secondary Teacher Education Program (STEP). A minimum overall GPA of 2.75 is required for graduation. Specific for admission to this program, a student must have at least a 2.75 GPA in CHEM 1210, 1220, 1230, and 1240.

Composite Teaching Major in the Physical Sciences. This degree is available through the Chemistry and Biochemistry or Physics departments. Students with a Composite Teaching Major in Physical Sciences should plan their programs carefully in order to meet the upper-division requirement for graduation. An overall 2.75 GPA in a minimum of 60 semester credits of approved University coursework is required for admission into the Secondary Teacher Education Program (STEP). A minimum overall GPA of 2.75 is required for graduation.

Specific for admission to this program, a student must have at least a 2.75 GPA in the following chemistry and physics courses: CHEM 1210, 1220, 1230, 1240; PHYX 2110, 2120, *or* PHYX 2210, 2220 (preferred). *This program does not include many aspects of the Chemistry Core.*

Required Courses: CHEM 1210, 1220, 1230, 1240; CHEM 2300 or 2310; CHEM 2330; PHYX 1000; PHYX 1030 or 3030; PHYX 2110 and 2120, *or* PHYX 2210 and 2220; MATH 1210, 1220; STAT 3000; SCI 4300; BIOL 1010; GEOL 1150; BMET 2000; and teacher licensure courses from Secondary Education (35 cr.). A teaching minor is optional for the Composite Teaching Major in the Physical Sciences.

Chemistry Minor. In addition to CHEM 1210, 1220, 1230, and 1240, 10 additional credits in Chemistry prefix courses at the 2000 level or higher are required (either CHEM 2300 or 2310 may be included).

Chemistry Teaching Minor. In addition to CHEM 1210, 1220, 1230, 1240, CHEM 2300 or 2310, and CHEM 2330, 3 additional credits selected from the following are required: CHEM 2320 (if CHEM 2310 has been previously selected), CHEM 3060, *both* CHEM 3510 and 3520, CHEM 3600, CHEM 3650, or CHEM 3700.

Career Opportunities

Chemistry degree holders work in a wide variety of professions, from physicians, lawyers, and professors to research/development, sales, or production in the chemical, oil, pharmaceutical, metals, electronic, and biochemical industries. Government at all levels employs chemists, including the federal Departments of Defense, Health and Human Services, Agriculture, and Interior. A graduate with a bachelor's degree often begins work in chemical

analysis or sales or may assist senior chemists in research and development. A graduate with a teaching major or chemistry education emphasis may teach in public schools. A graduate degree is usually needed to direct research or teach at the university level. Degree holders from the Department of Chemistry and Biochemistry have had excellent success in obtaining support for graduate studies, often at very prestigious institutions, and in obtaining employment directly following graduation. For further information, students should contact their advisor.

Graduate Programs

Admissions Requirements

See the general admission requirements for the School of Graduate Studies (pages 90-91). All applicants should have a bachelor's degree or master's degree in chemistry or biochemistry from an accredited institution. Appropriate undergraduate preparation is expected; applicants not fully prepared may be admitted with the condition that appropriate undergraduate courses are taken as necessary.

Applications are especially encouraged during the spring semester for expected admission in the following fall semester. However, the Graduate Recruiting and Admissions Committee screens applications throughout the year. Detailed information about the graduate programs and faculty research activities can be found on the Internet at **http://www.chem.usu.edu**.

Degree Programs

Master of Science. To earn an MS in chemistry or biochemistry, a student must meet the general requirements of the School of Graduate Studies (see pages 94-95), conduct research under the direction of a major professor and write a thesis acceptable to a supervisory committee (Plan A) or write a review-of-literature paper (Plan B), and pass an oral examination that is principally a defense of the thesis or the Plan B paper.

Qualified undergraduate chemistry majors at USU may apply in the third year for admission to the MS program. Students may be admitted to this MS program if they have a *B* average in chemistry, physics, and mathematics courses, and have completed the one-year sequences in general, organic, and physical chemistry (including labs), two courses in analytical or inorganic chemistry, two semesters of physics, math through MATH 2210, and at least 15 credits of their University Studies requirements.

Students should consult with the chairman of the Graduate Recruiting and Admissions Committee to be certain of their eligibility for this program. The chairman will then submit an application to the department head and to the School of Graduate Studies for approval. Students must earn a satisfactory grade on the GRE exam before the completion of the MS degree. All requirements for the BS degree must be completed within two semesters of admission. The MS coursework cannot include coursework counted toward the BS degree.

Doctor of Philosophy. To earn the PhD in chemistry or biochemistry, a student must successfully complete a core curriculum of courses and other courses as approved by a supervisory committee. In addition, preliminary examinations (both oral and written) must be passed and research in a field of specialization must be conducted. The final requirement is the writing and defense of a dissertation before the student's supervisory committee.

Biochemistry Course Requirements. Every MS and PhD student in the biochemistry program must complete CHEM 6730, 6740, 6750, and 6760. In addition, all students must register for at least 2 credits of CHEM 6720 in the first semester of residence to participate in research training. Both MS and PhD students must complete a total of at least 15 credits in coursework, exclusive of seminar and research credit. The Program of Study is approved by the student's supervisory committee. A total of 30 credits is required for the MS degree, and a total of 90 credits is required for the PhD. Beginning students who already hold an MS degree need 60 credits to complete the PhD program.

Chemistry Course Requirements. Every MS and PhD student in the chemistry program must complete the courses required for their specialization: *Analytical*—CHEM 7600, 7610; *Inorganic*—CHEM 6500, 6510; *Organic*—CHEM 6300, 7300, 7310; or *Physical Chemistry*—CHEM 6010, 6020, 7020. Both MS and PhD students must complete a total of at least 15 credits in coursework, exclusive of seminar and research credit. The Program of Study is approved by the student's supervisory committee. A total of 30 credits is required for the MS degree and a total of 90 credits is required for the PhD. Beginning students who already hold an MS degree need 60 credits to complete the PhD program.

Financial Assistance

The department offers financial support to students in the form of teaching assistantships, research assistantships, and fellowships. All applications for admission to the School of Graduate Studies constitute an application for financial assistance; it is not necessary to file a separate request. Teaching assistantships are the principal means of support for first-year students. Inquiries about current support levels should be directed to the department main office. The department is responsible for the first nine months of stipend and tuition, with the remaining summer stipend and tuition usually being paid from faculty research funds. Teaching assistants devote no more than 12 contact hours per week directing undergraduate laboratories, leading recitation sections, and assisting students with questions during the regular fall and spring semesters. Research assistantships, funded from individual faculty research grants, support students conducting research related to the grant projects. Although first-year students are not normally supported as research assistants, well-prepared students may be eligible for research support at the discretion of their major professor.

Fellowships are awarded by the University to outstanding students solely on the basis of merit. The department encourages students with strong academic records to apply for the University fellowships and national awards, and will provide assistance in obtaining and submitting the appropriate forms. Additionally, several graduate awards are given each year to honor exemplary performance in research and teaching.

The College of Science recently established the Willard L. Eccles Foundation Science Fellowship. The $15,000 per year, three-year stipend is competitively awarded to highly qualified science applicants. Students applying to the graduate program will be considered for this fellowship, and will be sent the necessary information. Application deadline for this fellowship is March 1.

Chemistry and Biochemistry Faculty

Trustee Professor

Ann E. Aust, biochemistry

Professors

Steven D. Aust, biochemistry
Stephen E. Bialkowski, analytical chemistry
Scott A. Ensign, biochemistry
David Farrelly, physical chemistry
Richard C. Holz, bioinorganic chemistry
Vernon D. Parker, physical organic chemistry
Steve Scheiner, computational chemistry
Lance C. Seefeldt, biochemistry

Professors Emeritus

William M. Moore, physical chemistry
Richard K. Olsen, organic chemistry
Grant G. Smith, organic chemistry
Jack T. Spence, inorganic chemistry

Associate Professors

Alexander I. Boldyrev, physical chemistry
Robert S. Brown, analytical chemistry
Bradley S. Davidson, organic chemistry
Alvan C. Hengge, organic chemistry
John L. Hubbard, inorganic chemistry

Assistant Professors

Lisa M. Berreau, inorganic chemistry
Cheng-Wei Tom Chang, organic chemistry
Joan M. Hevel, biochemistry
Philip J. Silva, analytical chemistry

Research Assistant Professors

Tapas Kar, physical chemistry
Yun Lu, organic chemistry

Lecturer

Douglas G. Harris

Course Descriptions

Chemistry and Biochemistry (CHEM), pages 365-367

Civil and Environmental Engineering

Department Head: Loren R. Anderson
Location: Engineering Laboratory 211
Phone: (435) 797-2932
FAX: (435) 797-1185
E-mail: beckyjh@cc.usu.edu
WWW: http://www.engineering.usu.edu/cee

Undergraduate Advisors:

Civil Engineering: Kathleen E. Bayn, Engineering 310, (435) 797-2705, kathy.bayn@usu.edu

Environmental Engineering: Ronnie Green, Engineering 312, (435) 797-2790, ronnie@engineering.usu.edu

Undergraduate Division Heads:

Civil Engineering: William J. Rahmeyer, Engineering 222 *or* Utah Water Research Laboratory 207, (435) 797-3180, rahmeyer@cc.usu.edu

Environmental Engineering: R. Ryan Dupont, Utah Water Research Laboratory 319, (435) 797-3227, rdupo@cc.usu.edu

Graduate Program Division Heads:

Environmental Engineering: R. Ryan Dupont, Utah Water Research Laboratory 319, (435) 797-3227, rdupo@cc.usu.edu

Geotechnical Engineering: Joseph A. Caliendo, Engineering Laboratory 211, (435) 797-2896, joe@cc.usu.edu

Structural Engineering: Marvin W. Halling, Engineering Laboratory 264, (435) 797-3179, halling@cc.usu.edu

Water Engineering: Jagath J. Kaluarachchi, Utah Water Research Laboratory 248, (435) 797-3918, jkalu@cc.usu.edu

Transportation Systems Engineering: Anthony Chen, Engineering Laboratory 211F, (435) 797-7109, achen@cc.usu.edu

Degrees offered: Bachelor of Science (BS) in Civil Engineering; BS in Environmental Engineering; Master of Engineering (ME), Master of Science (MS), Civil Engineer (CE) and Doctor of Philosophy (PhD) in Civil and Environmental Engineering

Graduate specializations: Environmental Engineering, Fluid Mechanics and Hydraulic Engineering, Geotechnical Engineering, Hazardous Waste Management, Structural Engineering and Mechanics, Transportation Engineering, Water Engineering, Water Resources Engineering and Hydrology

Undergraduate Programs

Objectives

Civil and Environmental Engineering is concerned with planning, designing, constructing, and operating various physical works; developing and utilizing natural resources in an environmentally sound manner; providing the infrastructure which supports the highest quality of life in the history of the world; and protecting public health and renovating impacted terrestrial and aquatic systems from the mismanagement of toxic and hazardous wastes. The Department of Civil and Environmental Engineering offers Bachelor of Science degrees in Civil Engineering and in Environmental Engineering. Both degrees are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC/ABET).

The objectives of the undergraduate programs in Civil Engineering and Environmental Engineering are to graduate engineers who have a broad educational background and experiences in engineering, the sciences, and the humanities; who have passed the Fundamentals of Engineering examination; and who are prepared to enter graduate school, other professional training, or the workplace as effective professionals. These graduates will understand the significance of life-long learning and will be qualified to become professional engineers and contribute significantly to the engineering profession and society as a whole.

Outcomes

Graduates with a BS degree in Civil Engineering from Utah State University will have:

1. Proven themselves proficient in mathematics; the sciences; and the structures, geotechnical, hydraulics, and transportation areas of civil engineering.

2. Demonstrated the ability to solve engineering problems, utilizing fundamental engineering principles, as well as the latest technologies and engineering tools, in the process of engineering analysis and design. They will have done this as individuals and as members of multidisciplinary teams.

3. Shown a capacity for investigation and experimentation into physical (engineering) phenomena, along with the ability to analyze and interpret engineering data in at least two of the following areas of civil engineering: structures, geotechnical, hydraulics, and transportation.

4. Demonstrated the capability to communicate verbally, in writing, and through the use of engineering communication media. They will also have shown the capacity to present the outcomes of their problem solving and design projects for groups of engineers and lay persons.

5. Exhibited an understanding of the role civil engineering plays in our modern global society, that much is to be learned from the past and applied to the present, and that a responsible engineer is ethical and will continue to increase his or her knowledge throughout his or her lifetime.

Graduates with a BS degree in Environmental Engineering from Utah State University will have:

1. Knowledge of basic science and engineering principles fundamental to the practice of environmental engineering including: mathematics, biology, chemistry, soil science, physics, fluid and solid mechanics, hydrology, and engineering economics.

2. Knowledge of environmental engineering practice in the areas of water supply and treatment; environmental systems dynamics; environmental chemistry and analysis; wastewater, air quality, and solid and hazardous waste management; and public health and industrial hygiene.

3. Advanced knowledge of science and engineering principles in two of the following program emphasis areas: water, solids, natural systems, and public health.

4. Integration of advanced science and engineering principles in a multidisciplinary team environment for the solution of a comprehensive design problem in one of the program emphasis areas incorporating: applicable design standards; state-of-the-practice design tools; real-life economic, social, regulatory, political, ethical, and business design constraints; and applicable considerations for contemporary issues, such as product manufacturability, process sustainability, health and safety concerns, and system constructability.

5. Experience in written and oral communication using state-of-the-practice presentation methods throughout the course of their Professional Program in Environmental Engineering which include: laboratory reports and presentations, research paper presentations, design proposal and progress reports and presentations, and final design project presentations to both technical and lay audiences.

6. Experience in one of the environmental engineering practice areas in the design and conduct of experiments; collection, analysis, and interpretation of data; and modeling and representation of experimental results and presentation of experimental findings.

Assessment

The Civil and Environmental Engineering Department employs several methods to assess the quality of the two BS programs offered by the department. Assessments are made prior to graduation by measuring the performance of students in each class. In addition, the results of the FE exam, senior exit interviews, and faculty reviews of student portfolios are used. Postgraduate assessment of Civil and Environmental Engineering graduates is also conducted up to six years after graduation. Assistance from outside reviewers is also obtained in making the assessment.

Requirements

Admission Requirements. Admission requirements for the Department of Civil and Environmental Engineering are the same as those described for the University on pages 15-18. Students in good standing may apply for admission to the department. In addition, students must maintain the academic requirements outlined for the College of Engineering on pages 107-109.

Bachelor of Science Degrees. The Department of Civil and Environmental Engineering offers two Bachelor of Science degrees: one in Civil Engineering and one in Environmental Engineering. The four-year programs leading to these two degrees are listed below. During the first two years, students are in a pre-engineering program. Students must successfully complete the pre-engineering program or, in the case of transfer students, substantially equivalent coursework at another institution before they are accepted into the professional program. Transfer students may apply for permission to take upper-division courses in cases where postponement of these courses will prolong the student's time to graduate.

Design is a cornerstone of engineering that requires creative thinking, technical knowledge, the ability to organize and solve complex problems, and teamwork. Engineering design activities begin during the first two years and progress in-depth as each student's proficiency increases. These design activities culminate in a major senior design course, which integrates past engineering coursework into a focused, realistic design project. An important feature of the senior design experience is that students work in teams to complete the project.

The student who is majoring in or planning to major in Civil Engineering or Environmental Engineering needs to be aware of the College of Engineering requirements concerning admission to the college, pre-engineering program, admission to professional engineering programs, University Studies, and other academic requirements. Additional information concerning these items is given in the College of Engineering write-up on pages 107-109. It is the responsibility of the student to be aware of these rules and regulations. **Passing the Fundamentals of Engineering Exam is required for graduation**.

The Civil and Environmental Engineering Department strongly recommends that students have a high-end calculator, such as an HP calculator, that has the capabilities to do units, matrices, and programs in BASIC. Although not a requirement at this time, CEE students are strongly encouraged to have a modern desktop or laptop personal computer. Since computer technology is changing rapidly, students should seek advice from a knowledgeable professional on hardware and software requirements before purchasing a computer.

Students in the Civil Engineering program must establish proficiency in at least four areas of Civil Engineering. Proficiency is established through a combination of material covered in required courses, as well as by establishing depth through the selection of technical electives. Proficiency must be established in four of the following areas: Environmental Engineering, Fluid Mechanics/ Hydraulics, Geotechnical, Structures, Transportation, or Water Resources. The courses must be selected from the approved Technical Elective courses.

Undergraduate Course Requirements for Civil Engineering

Preengineering Program (freshmen and sophomore years): CEE 1880, 2240, 2870; ENGR 2000, 2020, 2040, 2200, 2210; ITE 2270; BIOL 1010; CHEM 1210, 1230; ENGL 1010, 2010; GEOL 1150; MATH 1210, 1220, 2250; PHYX 2200 (or High School AP Physics with passing score), 2220.

Professional Engineering Program (junior and senior years): CEE 3010, 3020, 3030, 3080, 3210, 3430, 3500, 3510, 3610, 3640, 3870, 4200, 4300; Civil Engineering Design Elective, one course chosen from: CEE 3780, 5070, 5230, 5350, 5460, 5540, 5470; one course chosen from CEE 5190, 5220, 5230, 5240, 5350, 5380, 5450, 5460, 5470; Design project consisting of CEE 3880, 4870, and 4880; Technical electives (15 credits) chosen from: CEE 3670, 3780, 5010, 5050, 5070, 5080, 5100, 5190, 5220, 5230, 5240, 5350, 5380, 5430, 5450, 5460, 5470, 5500, 5540, 5550, 5690, 5700, 5860, 5870, 5880, 5900, MAE 2060, 2400; University Studies courses (see College of Engineering University Studies requirements).

Undergraduate Course Requirements for Environmental Engineering

Preengineering Program (freshman and sophomore years): CEE 1880, 2240, 2890; ENGR 2000, 2020, 2040, 2200; ITE 2270; MAE 2400; BIOL 1210, 3300; CHEM 1210, 1230, 2300; ENGL 2010; MATH 1210, 1220, 2250; PHYX 2200 (or High School AP Physics), 2220.

Professional Engineering Program (junior and senior years): CEE 3030, 3430, 3500, 3510, 3640, 3670, 3780, 3870, 3890, 4200, 5610, 5860; PUBH 3310; Environmental Engineering Design Elective, one class chosen from: CEE 5690, 5740, 5810, 5880; Design project consisting of CEE 3890, 4790, 4890. Technical Electives (5 credits), with one course chosen from Area 1, 2, or 3, and one course chosen from Area 4 or 5: *1—Solids:* CEE 5670, 5680, 5730, 5830, 5870, 5880; *2—Water:* CEE 5430, 5620, 5730, 5810; *3—Air:* BMET 4300, CEE 5710, 5750, 5790, 5870; *4—Natural Systems:* AWER 4500, 4530, CEE 5690, 5700, 5740; *5—Occupational Safety and Health:* PUBH 5310, 5320, 5330, CEE 5670, 5710, 5790. University Studies courses (see College of Engineering University Studies requirements).

Additional Information

For more information about Bachelor of Science requirements and the sequence in which courses should be taken, see major requirement sheet, available from the Civil and Environmental Engineering Department.

Departmental honors can be earned by completing 20 credits of upper-division honors engineering courses. Students should work with the department in selecting appropriate courses.

Concurrent BS/Master's Program

The concurrent BS/Master's program allows engineering students to begin taking graduate-level classes during their senior year. This permits them to complete requirements for *both* the BS degree *and* the master's degree concurrently during two years. Students in this program have a greater selection of graduate courses, since many graduate courses are taught during alternate years. In addition, the student's senior design project could be a start for a graduate design project or thesis. After completing their BS degree, students in the program can earn a master's degree in only one additional year. Both the BS and the master's degree can generally be earned with 150 total credits, although students should note that a Plan C MS requires 3 extra credits. Finally, students with a master's degree can expect a much higher starting salary following graduation. (For more information, see *College of Engineering* section of this catalog, page 109.)

Graduate Programs

The ME degree emphasizes professional practice and coursework. A minimum of 30 credits of technical and scientific coursework is required. The MS degree emphasizes research and the preparation of a significant publication. A minimum of 30 credits, 6 to 9 of which shall be thesis research, is required for an MS. In special cases, as decided by the student's supervisory committee, a second MS is available with a Plan B option, which requires 30 credits, including 3 credits of CEE 6970, Thesis Research. The CE degree, which prepares students for professional engineering careers, requires 60 credits beyond the bachelor's degree, or 30 credits beyond the master's degree, including a technical engineering report. The PhD degree represents high scholarly achievement demonstrated by independent research and competence in a area of specialization approved by the student's supervisory committee.

Admission Requirements

See general admission requirements, pages 90-91. Admission committees consider GRE scores and experience, undergraduate record and curriculum, and formal recommendations. A student without an undergraduate civil and environmental engineering background may be required to complete selected undergraduate courses prior to admission as a fully matriculated graduate student.

Graduate Program Divisions

The graduate program in the Department of Civil and Environmental Engineering is administered through five academic divisions, as described below.

Structural Engineering. The structural engineer is involved in the design, construction, repair, and retrofit of all types of structures: buildings, bridges, dams, and many others. The safety of the structures we occupy and utilize every day is the responsibility of structural engineers. They must be able to evaluate the loads placed on a structure, determine their effects on the structure, and select the appropriate materials and structural elements, or repair strategy, to withstand these loads. Today's structural engineer is using new space materials in the design of new structures or the retrofit of older structures.

Mathematics, physics, and materials science constitute a foundation for structural engineering. Structural analysis and design are added to this foundation and become the focus of the structural engineering program. Graduate students in the structures program also engage in structural mechanics, numerical methods, structural dynamics, geotechnical engineering, and the study of new structural materials. Current research in the structures area is focusing on the dynamic characteristics of structures, their potential response to earthquakes, and new seismic retrofit measures, using advanced composite materials, for older structures. Materials research is focusing on cementious materials and constitutive modeling.

Geotechnical Engineering. Engineering studies of soils are concerned with the physical and engineering properties of soils and how these are related to engineering projects.

Traditional geotechnical engineering includes the application of engineering principles to the analysis and/or design of building foundations, earth embankments, retaining walls, drainage sys-

tems, earthquake motion, buried structures, and other systems involving soil and rock. Engineers and architects cannot ignore the problems of investigating properties of soils in connection with engineering construction. Undergraduate and graduate courses offered by the department provide the basic knowledge necessary for the design of foundations and various types of earth structures. Fundamental concepts and their application are emphasized so that the student will be properly trained for his or her initial job, as well as being prepared to understand future development in this field.

The Geotechnical Engineering Division, in cooperation with the Environmental Engineering Division, is offering a new program in Geoenvironmental Engineering. This new program uses the strengths of both divisions to provide a program involving the geotechnical aspects of hazardous waste management, the investigation of hazardous waste sites, and the design of hazardous waste containment systems.

The geotechnical division has a strong research program. Current research projects in this division include studies on liquefaction, seismic slope stability, pile foundations, landslides, mechanically stabilized embankments, risk analysis of dams, finite element analysis of soil-structure systems, and the long-term properties of clay soils used in hazardous waste containment systems.

Water Engineering. The water engineering program is a multidisciplinary graduate program in the College of Engineering and is intended to enable engineers and scientists interested in water to obtain graduate degrees in the areas of fluid mechanics and hydraulics, hydrology, groundwater, and water resources engineering. Core courses and departmental offerings cover these fundamental areas, as well as essential numerical and statistical methods. The water engineering faculty are committed to a strong academic program. The curriculum offered is one of the most comprehensive offered in the U.S. Elements of ongoing research projects are routinely and effectively incorporated into the classes. The program combines training, research, and experience to understand the water issues and water resources management challenges in the United States and internationally. Graduate students can supplement departmental offerings by selecting courses in Mathematics and Statistics; Computer Science; Aquatic, Watershed, and Earth Resources; Environment and Society; Forest, Range, and Wildlife Sciences; Economics; Political Science; Geology; Biological and Irrigation Engineering; Mechanical and Aerospace Engineering; Plants, Soils, and Biometeorology; Biology; Chemistry and Biochemistry; and Physics. This ensures that graduates are well-grounded in the fundamentals, but have a breadth of training and are prepared to contribute professionally to the solution of multidisciplinary local, national, and international water problems. Graduate students in the water program have the opportunity for research support through the Utah Water Research Laboratory (UWRL) while working on theses or dissertations. Excellent laboratory and computing facilities are available. Strong, continuous state and federal research funding keeps the research topics and facilities current. Specialty areas within the program comprise fluid mechanics and hydraulics, hydrology, groundwater, and water resources engineering.

Fluid mechanics and hydraulic engineering covers both fundamental principles and theory and their applications in a variety of engineering fields. Elementary fluid mechanics, based on fundamental principles of conservation of mass, energy, and momentum, is the logical core for all water-related engineering programs. Consequently, other specialties in water engineering study fluid mechanics. Students specializing in fluid mechanics and hydraulics emphasize theoretical fluid mechanics, hydraulic design, numerical methods, and laboratory hydraulic techniques. A good variety and balance of courses supporting research in theoretical fluid mechanics, open channel hydraulics, hydraulic design, transients, sedimentation, municipal water system design, and cavitation are available at the graduate level. Graduates in fluid mechanics and hydraulics find employment in a broad range of professional engineering fields, including consulting, university teaching and research, and state and federal government agencies.

Hydrology is a branch of geoscience concerned with the origin, distribution, movement, and properties of waters of the earth. The hydrologic cycle encompasses the atmosphere, the land surface, lakes and oceans, and the subsurface. Complex, interacting processes at varied time and space scales describe the hydrologic cycle. The concepts and practice of hydrology derive from an integration of field observations, laboratory investigations, and conceptual, mathematical, chemical, statistical, and probabilistic models.

The hydrology program at USU has strength in both theoretical and applied aspects of modern hydrology. Past and present research focuses on a broad spectrum of hydrologic problems. These range from climate modeling, rainfall processes, floods, droughts, terminal lake analyses, soil erosion, and stream water quality models to groundwater contamination characterization and remediation and watershed analyses. A particular emphasis of the program is on an understanding of the global water and energy cycles at nested scales from the hemisphere to the continent to the watershed from a holistic perspective that recognizes the two-way linkages between water reservoirs and fluxes through oceans, atmosphere, land surface and subsurface, and biota.

Groundwater engineering is concerned with the transport of fluids in the subsurface environment. It encompasses the theory of flow in porous media; groundwater hydrology and hydraulics; fate and transport of contaminants in subsurface; and analytical, numerical, and stochastic modeling of such processes. Emphasis is placed on the quantitative analysis of physical and chemical principles governing these processes and on the application of these principles to practical field problems, with all their difficulties related to the complex structure of subsurface formations. Examples of such problems include groundwater supply and management, subsurface cleanup technologies, and analysis and remediation of groundwater contamination. These problems are of a multidisciplinary nature, and their solutions require a multidisciplinary approach, involving, among others, soil and water chemistry, chemical engineering, and economics. The groundwater professional is an important team player in solving such problems.

The groundwater emphasis has a strong research component. Current research activities cover a well-balanced variety of topics, from theoretical (e.g., stochastic analysis of transport of contaminants in groundwater) to practical problems (e.g., design of cleanup technologies for gasoline-contaminated sites).

Water Resources Engineering prepares engineers to be lead members in water resources planning teams, often charged with coordinating the information and concepts supplied from other disciplines. This need for breadth requires considerable flexibility in the training and arrangement of degree programs.

Water resources engineers draw principles from hydrology, fluid mechanics, hydraulics, environmental engineering, economics, ecology, political science, and other disciplines in the design

and operation of projects and nonstructural methods for water resources planning and management. They need a sound understanding of how water storage, delivery, and other management systems function; of criteria used in evaluating and selecting among alternatives; of the techniques of operations research that can be used in systems design; and of the institutional aspects of decision-making in the public sector. A focus area of the program is to develop decision support systems for sustainable water quantity and quality management in the United States and in developing regions of the world. Evolving information sources and tools, such as spatial data sets encoded in geographical information systems, climate forecasts, and cognitive models of the human decision process and societal group dynamics, are being integrated in representative institutional contexts.

An internationally-recognized specialized program has been developed in dam safety risk assessment. Students take classes in dam engineering; hydrology and hydraulics; geotechnical engineering; geology; decision analysis; risk assessment; probability and statistics; and natural resources economics, planning, and management. Students work on practical applications, as well as research projects, for improving the state-of-the art.

Environmental Engineering. The Division of Environmental Engineering is a multidisciplinary graduate program in the College of Engineering and provides coursework and research experience to enable engineers and scientists interested in the environment to obtain graduate degrees relating to potable water and waste treatment, toxic and hazardous wastes management, air quality management, natural systems engineering, and environmental impact assessment. The program provides an interdisciplinary educational approach to fundamental principles that can be applied to environmental phenomena. Research and training projects are a part of the program and provide the student with appropriate research experience leading to a thesis or dissertation.

Hazardous Waste Management. This specialization has been developed within the broader scope of the environmental engineering program to provide an integrated approach for students with a BS in engineering or natural sciences to deal with the complex issues of toxic and hazardous waste. Aspects of toxic/hazardous waste management, including characterization, treatment, disposal, control, monitoring, and environmental impacts, are dealt with in this program.

Natural Systems Engineering is the study of the interaction of engineered systems with nature, emphasizing impacts to aquatic ecosystems. Techniques include assessment of aquatic habitat through computer simulation and model verification, quantification of aquatic habitat using remote sensing systems, and data analysis and display through integrated statistical and GIS approaches. These tools are used to evaluate impacts on threatened and endangered species, habitat enhancement, instream flow assessments, fish habitat, stream sediment, and hydraulic features.

A *bioprocess engineering* program has been developed as a cooperative effort between the Division of Environmental Engineering and the Biological and Irrigation Engineering Department. This program provides students with specialized coursework and research experience in areas of bioreactor processing of environmental materials and engineering scale-up of biologically-based environmental reactions. Areas of specialization include waste to energy, fermentation, composting, and industrial waste (agricultural and chemical) reuse, recycling, and technologies based on biological processes, as well as engineering optimization of aquatic habitats.

Transportation Systems Engineering. The graduate program in Transportation Systems Engineering offers education and research opportunities in transportation systems planning, design, and management. It is designed to enable aspiring planners, engineers, and managers to obtain advanced degrees while specializing in infrastructure management, traffic network analysis, facility design, traffic operations, transportation economics and finance, and project appraisal. Up-to-date computer and laboratory facilities, as well as the Transportation Division's close links with local and state transportation agencies, enable students to gain hands-on experience and practical perspectives.

Past and present research undertaken by the Transportation Division faculty and researchers ranges from microscopic traffic flow simulation, dynamic route assignment, and network reliability to traffic accident modeling, pavement management, video image processing, and intelligent transportation systems. The focus remains on efficient and effective solutions to transportation problems.

Transportation Division course offerings expose students to the theoretical and practical aspects of goods and passenger transportation. State-of-the-art analytical tools and new research findings are introduced into the courses through periodic revision of notes, examples, problem sets, and computer software. Students are encouraged to design their own programs of study according to their personal and professional goals. Due to the multi-disciplinary nature of transportation, students are encouraged to include in their program of study course offerings from other programs in CEE, as well as from Mathematics and Statistics, Environment and Society, Economics, Business Administration, and Sociology.

Financial Assistance

Both departmental and formal grant support are available to graduate students and are awarded on a competitive basis. Students requesting financial support should apply to the department by March 15 for the coming academic year.

A number of fellowships are available through the University and the department. Teaching assistantships are available through the department and research assistantships are available through the Utah Water Research Laboratory and departmental faculty members who have ongoing projects or who hold special research grants from the University, private companies, or state and federal agencies.

Acceptance to pursue graduate studies in the Civil and Environmental Engineering Department does not guarantee the student financial assistance. Inasmuch as funds are limited, the assistantships are awarded by the department to cover specific teaching assignments and by the faculty members to provide for research as funds are available.

Civil and Environmental Engineering Faculty

Professors

Loren R. Anderson, geotechnical engineering

A. Bruce Bishop, engineering systems and planning

David S. Bowles, risk assessment, hydrology, water resources engineering

William J. Doucette, environmental analytical chemistry

R. Ryan Dupont, hazardous waste management, bioremediation

William J. Grenney, Advanced Center for Transportation Studies
Christine E. Hailey, Associate Dean of College of Engineering, fluid and thermal sciences, engineering education
Thomas B. Hardy, ecological system modeling, statistical analysis
Daniel H. Hoggan, hydrologic and hydraulic modeling
Jagath J. Kaluarachchi, surface and groundwater, flow and contaminant transport
Marian W. Kemblowski, subsurface hydrology and transport processes
Mac McKee, water resources planning and analysis
William J. Rahmeyer, hydraulics, hydraulic structures, scour and erosion
Ronald C. Sims, hazardous waste management
David K. Stevens, treatment process analysis
David G. Tarboton, hydrology and water resources
Kevin C. Womack, structural mechanics
Muzz Yener, structural engineering and mechanics

Research Professor
Darwin L. Sorensen, aquatic microbiology

Professors Emeriti
Jay M. Bagley, hydrology, water resources
W. O. Carter, structures
Calvin G. Clyde, fluid mechanics and groundwater
Irving S. Dunn, geotechnical engineering
Gordon H. Flammer, hydraulics
Trevor C. Hughes, water resources systems analysis
C. Earl Israelsen, hydrology, hydraulics, water resources, erosion control
Roland W. Jeppson, numerical modeling
Fred W. Kiefer, Jr., geotechnical engineering
Elliot Rich, structural engineering
J. Paul Riley, water resources systems, hydrology
J. Paul Tullis, hydraulics, hydraulic structures, and hydromachinery
Reynold K. Watkins, geotechnical engineering

Adjunct Professors
Lloyd H. Austin, water resources
George G. Goble, deep foundations and structural dynamics
Jeffrey R. Keaton, geotechnical engineering, engineering geology
Upmanu Lall, climate modeling, statistical hydrology, water resource systems
Neil Parrett, performance and safety of dams
Norman E. Stauffer, Jr., engineering hydrology and computer modeling
Daniel A. Stone, environmental chemistry

Associate Professors
Joseph A. Caliendo, geotechnical engineering
Marvin W. Halling, structural dynamics, earthquake engineering
Sonia S. Manuel-Dupont, technical writing
Randal S. Martin, environmental engineering (air pollution)
Michael J. McFarland, environmental engineering
Gilberto E. Urroz-Aguire, hydraulics, hydraulic structures

Research Associate Professors
Joan E. McLean, fate and behavior of metals in subsurfaces
Judith L. Sims, fate and behavior of organic chemicals

Adjunct Associate Professors
Danny Marks, snow hydrology
Eva C. Nieminski, water quality
Mufeed M. Odeh, physical and mathematical modeling of hydraulic systems
Anthony Turhollow, transportation

Associate Professor Emeritus
J. Derle Thorpe, engineering materials, measurements

Assistant Professors
Paul J. Barr, reinforced concrete, bridge design
Luis Bastidas, hydrology
James A. Bay, geotechnical engineering
Anthony Chen, network analysis and logistics, transportation planning
Henry X. Liu, traffic modeling and simulation, artificial intelligence, telematics
Laurie S. McNeill, environmental engineering (drinking water)
Blake P. Tullis, hydraulics, hydraulics structures, and hydromachinery

Research Assistant Professors
Daniel P. Ames, watershed decision support systems
Sanjay Chauhan, dam safety, risk assessment, hydrologic modeling
Michael C. Johnson, hydraulics
Robert T. Pack, geomatics and engineering geology

Adjunct Assistant Professors
Steve Barfuss, hydraulics
Arnfinn J. Emdal, geotechnical
Charles H. Luce, forest hydrology

Affiliate Faculty
Robert W. Hill, professor, Biological and Irrigation Engineering
John E. Keith, professor, Economics
Jack Keller, professor emeritus, Biological and Irrigation Engineering
Wynn R. Walker, professor, Biological and Irrigation Engineering

Course Descriptions

Civil and Environmental Engineering (CEE), pages 358-365

Communicative Disorders and Deaf Education

Department Head: James C. Blair
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Phone: (435) 797-1388
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WWW: http://www.coe.usu.edu/comd

Assistant Department Head and Advisor for Speech-Language Pathology and Audiology:
Dee R. Child, Lillywhite 105, (435) 797-2318, deec@cc.usu.edu

Advisor for Deaf Education: Mindy Bergeson, Lillywhite 107, (435) 797-0645, bergeson@cc.usu.edu

Degrees offered: Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), Master of Arts (MA), Master of Education (MEd), and Educational Specialist (EdS) in Communicative Disorders and Deaf Education; Doctorate of Audiology (AuD)

Undergraduate areas of focus: *BS, BA*—Clinical and Educational Audiology, Education of the Deaf and Hard of Hearing, Speech-Language Pathology. The focus in Education of the Deaf and Hard of Hearing includes an area of focus in Elementary Education.

Graduate specializations: *MS, MA, MEd*—Audiology, Early Childhood Communicative Disorders, Speech-Language Pathology; *MEd*—Education of the Deaf and Hard of Hearing; *EdS*—Audiology

Undergraduate Programs

Objectives

Three main objectives of the Department of Communicative Disorders and Deaf Education are (1) to train competent speech-language pathologists, educators of the deaf and hard of hearing, and clinical-educational audiologists capable of receiving state and national licensure; (2) to provide clinical services to individuals with speech-language deficits or hearing loss in the University population or in the community; and (3) to provide research opportunities for students relating to communicative problems of individuals. The programs in both Speech-Language Pathology and Clinical-Educational Audiology are fully accredited by the Council on Academic Accreditation of the American Speech-Language-Hearing Association (ASHA). The program in Education of the Deaf and Hard of Hearing is accredited by the Council on Education of the Deaf. All department programs hold Utah State Office of Education approval and NCATE accreditation.

Requirements

Departmental Admissions Requirements. Any accepted student at Utah State University may major in Communicative Disorders and Deaf Education (COMD-DE) during the freshman and/or sophomore years. However, during the first semester of the junior year, the student must formally apply for admission into the COMD-DE undergraduate professional preparation program. Application forms for admission into COMD-DE will be disseminated in class during the first semester of the junior year. As part of the application process, each student will complete the College of Education Writing Examination. The student will be accepted if cumulative grade point average is 3.0 or higher, University Studies credits are within 15 credits of completion, College of Education Writing Exam has been taken and passed, and all COM-DE courses taken to this point have grades higher than *C+*. Students who are accepted into the undergraduate program must maintain the acceptance standards each semester in order to continue in the major.

Transfer Students or students applying for admission into the program subsequent to the fall semester of their junior year must receive approval from the department head before beginning their matriculation in major classes.

Admission into the College of Education and Human Services teacher education program is necessary before the student may take licensure courses taught in the departments of Elementary Education, Special Education and Rehabilitation, and Secondary Education, which are supportive of the major. Admission into the teacher education program is also required prior to taking the Communicative Disorders clinical practicum coursework. Application to the teacher education program typically takes place at the beginning of the graduate program.

Bachelor's degree in Communicative Disorders and Deaf Education. There are two tracks available within the department: (1) **communicative disorders**, which includes emphases in *audiology* and *speech-language pathology*, and (2) **education of the deaf and hard of hearing**. Though the BS or BA is available in both tracks, the student should be aware that there is no professional employment licensure in either communicative disorders or education of the deaf and hard of hearing at the bachelor's level. Majors in the **communicative disorders** track need to complete a core curriculum consisting of COMD 2400, 2910, 3100, 3120, 3400, 3500, 3650, 3700, 3910, 4100, 4400, 5070, 5100, 5200, and 5330. Majors in the **education of the deaf and hard of hearing** track need to complete a core curriculum consisting of an elementary, secondary, early childhood, or special education major, including professional breadth requirements, and deaf education requirements consisting of COMD 2500, 2910, 3910, 4630, 4750, 4760, 4770, 4780, 4790, 4910, 5620, and 6430. The undergraduate major for communicative disorders and deaf education consists of 44 semester credits of courses specified by the department, plus 4-8 semester credits of extra departmental coursework. Current national board and state educational agency licensure requirements demand more coursework than the minimum numbers required for University graduation. Students desiring supportive

courses for majors in special education, elementary or secondary education, family life, psychology, or other related departments are advised to seek counsel from the departmental advisor in determining an effective minor core.

Education of the Deaf and Hard of Hearing. Students wishing to obtain licensure to teach the deaf and hard of hearing will need to complete the majority of the requirements for a teaching license in early childhood education, elementary education, secondary education, or special education. In conjunction with meeting the majority of requirements for licensure, the student must complete coursework leading to a bachelor's degree in Communicative Disorders and Deaf Education, with a focus in Education of the Deaf and Hard of Hearing. The department has an undergraduate advisor for this program.

Course Requirements

Each student in audiology and speech-language pathology must complete a component of professional training, which includes departmental and extra-departmental coursework. This professional training component includes the following courses: COMD 2400, 2500, 2910, 3100, 3120, 3400, 3500, 3650, 3700, 5070, 5100, 5200, 5330; ENGL 1010, 2010; SPCH 2600; BIOL 1010, 2000; CS 1010 or BIS 1400; MATH 1010, 1050; PSY 1010, 1400; STAT 1040; and SPED 4000.

Additional Information

For more information concerning graduation requirements and course sequencing, see the major requirement sheet, available from the Department of Communicative Disorders and Deaf Education, or visit the departmental website:
http://www.coe.usu.edu/comd.

Because many of the undergraduate COMD-DE courses are taught in sequence, students should meet with a departmental advisor prior to beginning classes in the COMD-DE major to assure that the most efficient and effective schedule is followed. Students should also confer with a departmental advisor for information about changes in requirements or scheduling.

Graduate Programs

Admission Requirements

A bachelor's degree in Communicative Disorders or equivalent requirements must be completed before the student enters the graduate program. The time required to complete the master of science degree is determined during the first semester of study by a temporary department committee consisting of professors from the student's direct field of study.

Students seeking the MEd with a specialization in education of the deaf and hard of hearing must have an undergraduate degree in early childhood, elementary, secondary, or special education. Students coming into the master's degree with a degree other than deaf education will need to plan on a two-year MEd program, while those coming directly through the USU curriculum will need to plan on a one-year master's degree program.

Applications will be considered once a year between March 1 and March 15. However, students must have completed the application process to the School of Graduate Studies by February 15. No application will be considered until all the required information is submitted to the School of Graduate Studies.

Doctorate of Audiology

The Department of Communicative Disorders and Deaf Education at Utah State University offers a clinical Doctorate of Audiology (AuD). The program provides students with a broad yet in-depth academic and practicum-based curriculum to prepare them for applied audiology in a variety of settings. Graduates will be skilled to function at a high level of expertise in such environments as clinics, hospitals, private practice, research laboratories, hearing conservation programs, schools, the military, etc.

The program is a four-year post-baccalaureate residency program, the first of its kind in the Intermountain West and Pacific states. Utah State University is the birthplace of educational audiology. In addition, USU is in the forefront of research in telehealth applications in audiology. The AuD will enable graduates to enter the field at a professional level and begin a rewarding career of service in this evolving allied healthcare discipline.

Master's Degrees

Generally, all students will complete the requirements as specified below. In some instances students will have had some of the coursework required in the graduate curriculum as part of the undergraduate training at another institution. In those cases, the program will be individualized to meet national licensure through the American Speech-Language-Hearing Association (ASHA) and state educational licensure from the State of Utah. In no instance will students amass fewer than 36 graduate credits.

At the end of their programs, all graduate students, except for those in education of the deaf and hard of hearing, must take the NTE examination in their area of specialty. This must be done before a letter of completion will be sent to the School of Graduate Studies. Students are required to list USU as a recipient of NTE test scores.

Speech-Language Pathology. The program in speech-language pathology is accredited by the Council on Academic Accreditation of the American Speech-Language-Hearing Association (ASHA). The Utah State Office of Education has also approved the program. Students completing the master's curriculum are eligible for licensure from ASHA and the State of Utah Board of Education and additionally have met the academic and practicum requirements for licensure from the State of Utah. As a consequence of preparation and licensure, students are prepared for employment in any setting where the services of a qualified provider of speech and language services are provided. The following courses are required for all students seeking the MS degree in speech-language pathology: COMD 6020, 6030, 6040, 6050, 6100, 6120, 6130, 6140, 6200, 6210, 6220, 6230, 6300, 6370, 6810, and 6970.

Education of the Deaf and Hard of Hearing. The program in Education of the Deaf and Hard of Hearing is accredited by the Council on Education of the Deaf (CED) and is also approved by the Utah State Office of Education. Students completing this program may be licensed by the Utah State Board of Education as teachers of the deaf and hard of hearing and they also meet the requirements for licensure by CED. Students who complete the curriculum are prepared to provide services as teachers of the deaf and hard of hearing in any setting in which such services are furnished. The following courses or their equivalent are required for

all students seeking the MEd in education of the deaf and hard of hearing: COMD 2500, 2910, 3050, 3080, 3910, 4630, 4750, 4760, 4770, 4780, 4790, 4910, 4920, 5610, 5620, 6430, 6640, 6650, 6700, 6800, 6820, 6830, and 6850.

Educational Specialist Degree

The department offers an Educational Specialist (EdS) program that can be individualized to suit a candidate's need within a basic structure of educational audiology and with foci on research, supervision, and evaluation. The program is designed for those individuals who have completed the master's degree and who are practicing in educational settings. The degree requires a minimum of 30 credits beyond the master's degree and may be completed in part through coursework in the summer and extension study and research in conjunction with the individual's workplace.

Course Requirements

Graduate Courses in Speech-Language Pathology: *Year One—First Semester:* COMD 6020, 6030, 6040, 6050, 6100, 6130; *Second Semester:* COMD 6040, 6100, 6140, 6220, 6810; *Summer:* COMD 6370, EDUC 6550; *Year Two—First Semester:* COMD 6050, 6120, 6200, 6210; *Second Semester:* COMD 6300.

Graduate Courses in Audiology: *Year One—Fall Semester:* COMD 7200, 7310, 7380, 7390, 7820; *Spring Semester:* COMD 5330 or EDUC 6570, COMD 7200, 7320, 7340, 7490; *Summer Semester*: EDUC 6570; *Year Two—Fall Semester:* COMD 7300, 7420, 7430, EDUC 6600; *Spring Semester:* COMD 6370, 7300, 7460, 7530, 7820; *Summer Semester*: COMD 7300 (optional).

Graduate Courses in Education of the Deaf and Hard of Hearing: Students entering the program in Education of the Deaf and Hard of Hearing may choose one of three tracks. **Track one** is followed by students who have obtained their bachelor's degree in Communicative Disorders and Deaf Education with a focus in Education of the Deaf and Hard of Hearing; **track two** is followed by those who come into the program without the required background in Education of the Deaf; and **track three** will follow the program outlined for those who wish to focus on Early Childhood Deaf Education only. *Track 1—Fall Semester:* ELED 5150, 5250, COMD 6430, 6640, 6650, 6700, 6920; *Spring Semester:* COMD 6800, 6820, 6830, 6850; *Track 2—Fall Semester (Year 1):* COMD 2500, 5620, 5740/6740, 6430, 6760, 6790; *Spring Semester (Year 1):* COMD 5610, 6630, 6750, 6770, 6780; *Fall Semester (Year 2):* COMD 6640, 6650, 6700, 6920; *Spring Semester (Year 2):* COMD 6800, 6820, 6830, 6850; *Track 3—Fall Semester:* COMD 6760, 6770, 6780, 6910.

Clinical Doctorate Program in Audiology

The Doctorate of Audiology (AuD) program at Utah State University meets the mandate of the American Speech-Language-Hearing Association (ASHA) to have audiology students move from master's-level to doctoral-level training as the entry-level requirement within the profession of audiology. Specifically, the AuD requires three years of coursework, one year of intensive clinical practicum, and a doctoral-level clinically-related project to meet the requirements currently recommended for the AuD by ASHA and the American Academy of Audiology (AAA). Students at USU will participate in didactic and experiential learning in clinical, educational, telehealth, and rehabilitative audiology.

Course Requirements. All requirements for the undergraduate major in Communicative Disorders and Deaf Education must be taken in addition to the following graduate courses:
Year 1—Fall Semester: Com D 7400, 7410, 7470, 7480; *Spring Semester*: COMD 6780, 7400, 7860, 7870; *Year 2—Fall Semester*: COMD 7800 and 7850); *Spring Semester*: COMD 7800 and 7850; *Summer Semester*: COMD 7800 (optional).

Research Requirements

Several options are available for graduate students to complete the research or special project required for the MS or MEd. These options are specified in the list of requirements available in the department office, and include for the MS the traditional Plan A experimental thesis option, as well as the Plan B integrative review option or creative project option. Declaration of an option must be made at the time the student files an Application for Candidacy form with the School of Graduate Studies. Changes in the option will necessitate a complete revision and review of the Application for Candidacy by the student's supervisory committee.

Licensure. Each undergraduate and graduate is advised on which classes will meet Utah State Office of Education and American Speech-Language-Hearing Association licensure requirements, as well as Utah State Professional Licensure requirements. State Office of Education licensure credentials within Utah include approval for audiology, speech-language pathology, and education of the deaf and hard of hearing. Graduation from any of these programs ensures the student may be licensed in Utah. Such licensure facilitates meeting other requirements for other states because of reciprocal agreements that exist among some state educational agencies throughout the country.

Practicum Opportunities

Practicum experience at the graduate level is available in a variety of settings. The department maintains a Speech-Language-Hearing Center offering a full range of diagnostic and remedial services to individuals with speech-language or hearing disabilities. Additionally, students are assigned to off-campus practicum sites such as hospitals, schools for the deaf, long-term and rehabilitation care centers, clinics, physician's offices, and public schools. Placement in out-of-state practicum sites is available for those students who request it. Students may also be placed at the Center for Persons with Disabilities for experience in birth to three services. **Students must be enrolled in clinical practicum each semester of their graduate program.**

Financial Assistance

Limited departmental and federal grant support is available to graduate students and is awarded on a competitive basis. The application form for financial support must be submitted to the department no later than March 1 for consideration for the coming year.

Career Opportunities

Audiology graduates are prepared to work as clinical, educational, and rehabilitative audiologists. Speech-Language- Pathology graduates are prepared to work in a variety of medical and school settings. Graduates in the area of Education of the Deaf are trained to work in total communication, bilingual/bicultural, and auditory-aural settings.

Additional Information

Specific details about each of the foregoing degree programs are outlined in policy and procedure documents available through the department. All requirements are subject to change; check with the department for current requirements. Additional information may be obtained by contacting the Department of Communicative Disorders and Deaf Education.

Communicative Disorders and Deaf Education Faculty

Trustee Professor

Carol J. Strong, language development, language assessment and intervention, language disorders in school-age students, research methodology in communicative disorders, narrative assessment and literature-based language intervention

Professors

James C. Blair, educational audiology, education of the deaf and hard of hearing

J. Freeman King, American Sign Language, linguistics, teacher preparation

Adjunct Clinical Professors

Bryan R. Larsen, MD, gastroenterologist

Gordon S. Wood, MD, otolaryngologist

Associate Professors

Kim Corbin-Lewis, diagnosis and management of voice disorders, laryngeal imaging, disorders of motor speech, dysphagia, anatomy and physiology of speech and swallow

Beth E. Foley, neuropathologies of speech and language, augmentative/alternative communication, language and literacy

Sonia S. Manuel-Dupont, nondiscriminatory educational assessment of non-English-language background children, Native American language assessment, emergent literacy, ethnic literacy, developmental phonology, syntax, professional and scientific discourse analysis

John E. Ribera, medical audiology, amplification, hearing science, telemedicine

Carmel Yarger, American Sign Language, curriculum for students who are deaf and hard of hearing, deaf education

Adjunct Associate Professor

Douglas W. Laws, clinical audiology

Assistant Professors

Donald G. Barringer, early interventions, sensory impairments, head-start research and training

Mark Krumm, pediatric audiology, telemedicine, aural rehabilitation

Shirley V. Leew, early childhood and prelinguistic development

Jaclyn Littledike, orofacial anomalies, professional practice issues, and clinical supervision

Vicki Simonsmeier, pediatric neurogenic disorders, oral-motor/dysphagia, early intervention programs, audiology, auditory processing, clinical supervision

Susan Watkins, early intervention programs, sensory impaired infants and toddlers

Clinical Assistant Professor

Kenneth M. Curtis, electronystagmography, aural rehabilitation, hearing aids, noise and hearing conservation, clinical supervision

Clinical Instructors

Chad Bingham, pediatric brain injury, limited English proficiency, augmentative/assistive technology, clinical supervision

Dee R. Child, disorders of phonation, articulation, fluency

Anne Elsweiler, fluency, preschool language and articulation, clinical supervision

Kathryn S. Gantz, speech-language pathology

Jan Kelley-King, American Sign Language, deaf education

Elizabeth Parker, education of the deaf and hard of hearing

Heather Jo Jensen, clinical supervision, amplification, medical audiology

Susie Yoakum, speech-language pathology, clinical supervision

Advisor

Mindy Bergeson, deaf education

Course Descriptions

Communicative Disorders and Deaf Education (COMD), pages 368-372

Computer Science

Department Head: Donald H. Cooley
Location: Main 414
Phone: (435) 797-2451
FAX: (435) 797-3265
E-mail: usucs@cs.usu.edu
WWW: http://www.cs.usu.edu/

Associate Head and Coordinator for Graduate Programs in Computer Science: Gregory W. Jones, Main 420, (435) 797-3267, greg.jones@usu.edu

Undergraduate Advisor: Myra Cook, Main 424, (435) 797-8019, myra.cook@usu.edu

Degrees offered: Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), and Doctor of Philosophy (PhD) in Computer Science; Master of Computer Science (MCS)

Undergraduate emphases: *BS, BA*—Science, Digital Systems, Information Systems, Bioinformatics, Information Technology

Graduate specializations: *MS*—Artificial Intelligence, Parallel Systems, Software Engineering

Accreditation: The Computer Science undergraduate program is accredited by the Computing Accreditation Commission of ABET, 111 Market Place, Suite 1050, Baltimore, MD 21202-4012; telephone (410) 347-7700.

Undergraduate Programs

Objectives

The core objective of the department is to fulfill its mission, as defined in its mission statement. A detailed description of all department objectives is given under the department's web site: **http://www.cs.usu.edu/**. The outcome objectives for undergraduates are as follows:

Undergraduate Outcomes

All students graduating with a Bachelor of Science in Computer Science from Utah State University will be expected to show mastery as follows:

1. Graduates will be proficient in programming in at least two programming languages which have significance in industry.

2. Graduates will master the core curriculum in:

   a. Data Structures and Algorithms
   b. Computer Architecture and Organization
   c. Programming Languages
   d. Operating Systems
   e. Software Engineering

3. Graduates will understand the practices and dynamics required to develop software, whether it be a single program or a major software product developed in a team environment.

4. Graduates will gain proficiency in the use of mathematical tools, including calculus, elementary statistics, and probability.

5. Graduates will have sufficient mastery of fundamental knowledge to be lifelong learners in computer science.

6. Graduates will understand the social and ethical issues which face computer scientists, and thus be able to contribute in a positive and productive manner to society.

7. Graduates will be able to communicate information effectively, both in writing and orally.

The course of study offered by the Department of Computer Science is directed primarily toward developing the problem solving skills of its students. This, in conjunction with the understanding of computers and computer systems provided by coursework, will enable a graduate of the program to apply his or her knowledge to finding solutions to problems that arise in the science, business, industry, government, and education sectors.

Students who have the ability to think analytically and creatively will find a challenging and exciting future in computer science.

Opportunities for practical applications of computer science skills are available with members of the computer science faculty who are engaged in research and consultation work both on and off campus.

Computer Science

Computer Science deals with information structures and processes as they are represented and implemented in modern high-speed digital computers, and with information processing systems designed to implement useful applications of computing.

The program in computer science attempts to provide a solid foundation of knowledge about computers and to teach a mode of thinking which will permit continuing growth on the part of graduates. Prospective students should have an aptitude for mathematics and logic and an interest in analysis and deduction.

Computer science is one of the fastest growing fields of study in our society. Excellent employment opportunities are available to computer science graduates. All of the major corporations hire computer science graduates. Graduates in Computer Science work for numerous Utah-based corporations, as well as Microsoft, IBM, Hewlett-Packard, etc.

The Computer Science bachelor's degree is a four-year degree with areas of emphasis in Science, Digital Systems, Information Systems, Bioinformatics, and Information Technology. In addition, by working with a departmental advisor, students may develop a plan of study tailored to their own unique career objectives.

Science Emphasis

The Science Emphasis is designed for those who plan to pursue scientific or technical careers, research, or graduate education in computer science. Students choosing the science emphasis will take courses in programming languages, advanced algorithms, and math courses in calculus, linear analysis, and multi-variable calculus. Additional courses include a variety of upper-division computer science courses, chosen in consultation with an advisor.

Digital Systems Emphasis

The Digital Systems Emphasis is available for those interested in both the hardware and software aspects of computer systems. In addition to computer science and mathematics courses, students in this emphasis will take electrical engineering courses in electronics, circuits, digital fundamentals, microcomputer systems, and digital system design. The curriculum for students in this emphasis is similar to that for students in the computer engineering major in the Electrical and Computer Engineering Department.

Information Systems Emphasis

The Information Systems program at Utah State University offers a common core of courses through two department majors: (1) **Computer Science** and (2) **Business Information Systems**. The curricula of the individual departments differ substantially in emphasis.

The Computer Science major with an Information Systems emphasis is designed for students interested in a career as a Computer Scientist with a background in Information Sciences and Systems. Majors in this emphasis are trained in all phases of the analysis, design, and implementation of information systems. As part of this emphasis, students also receive training in the theory and application of information. Students select an application area such as business, accounting, or economics. Other application areas can be developed by working closely with an advisor. This program of study, offered within the College of Science, leads to a Bachelor of Science, Bachelor of Arts, or Master of Science degree in Computer Science.

The Business Information Systems major, Management Information Systems emphasis, is offered in the Business Information Systems Department, College of Business (see page 156). The Bachelor of Science or Bachelor of Arts program is designed for students interested in business careers as information specialists, systems analysts, network managers, application programmers, and information systems managers in business and industry. BIS majors take required courses in analysis and design, Internet management, telecommunications, decision support systems, spreadsheet and database applications, and information systems projects. All graduates are required to complete a common core of business subjects. The College of Business is accredited by the American Assembly of Collegiate Schools of Business. The department also offers a Master of Science in Business Information Systems with a specialization in Management Information Systems. See page 158 for additional details.

Bioinformatics Emphasis

The Bioinformatics Emphasis is designed for students who wish to pursue careers in the computer science aspects of bioinformatics. Students in this emphasis gain a strong background in core computer science areas, such as programming, theory of computing, and software development. In addition, they follow a course of study in biology, chemistry, and statistics. Through this background and course of study, students are provided with the computational skills and the scientific understanding necessary for work in bioinformatics.

Information Technology Emphasis

The Information Technology Emphasis trains students in all phases of analysis, design, and implementation of information technology. It also gives students expertise in the theory and application of information technology. At the same time, this emphasis provides students with a strong background in business principles, including accounting, finance, marketing, and human resource management. Students in the Information Technology emphasis are prepared for careers which straddle information technology and business, in both the private and public sectors.

Department and General College of Science Requirements

To fulfill the University Studies requirements, majors in computer science must complete a total of at least 30 semester credits in writing, languages, humanities, arts, and/or social sciences. Courses taken to meet the University Studies requirements, if applicable, may also be counted to meet this departmental requirement. Students must work closely with their advisor to meet both these requirements.

Bachelor of Science Core Requirements. Students working toward the Bachelor of Science degree in Computer Science must complete the following:

1. One year of calculus, including MATH 1210 and 1220. *Students in the Information Technology Emphasis must substitute MATH 1100.*

2. MATH 3310 (Discrete Mathematics). *Not required for students in the Information Technology Emphasis.*

3. One of the following year-long science sequences: (1) BIOL 1210, 1220 (required for Bioinformatics Emphasis); (2) CHEM 1210, 1220, 1230, 1240; (3) PHYX 2210, 2220; (4) PHYX 2110, 2120 (available for Information Technology Emphasis only); or (5) GEOL 1150, 3200. The sequence chosen must be outside the student's department.

Except for students enrolled in the Information Technology Emphasis, all Computer Science majors must complete at least 12 science credits.

Requirements

Summary of Departmental Admission and Retention Requirements

Admission requirements of the Department of Computer Science for freshmen are the same as those described for the University on pages 15-18. Transfer students with a 2.5 GPA may apply for admission to the department.

Before a student can register for a Computer Science course, he or she must earn a grade of *C-* or better in all prerequisite courses. All required classes for the major must be completed with a grade of *C-* or better. Required courses, regardless of department, may not be taken pass-fail, and a Computer Science major must have advanced standing or written permission to register for a Computer Science course at the 3000-level or above.

For a more complete statement of requirements, please contact the department directly. Requirements may change from time to time.

Bachelor of Science Degree

The department offers a degree program with emphases in Science, Digital Systems, Information Systems, Bioinformatics, and Information Technology. The objectives are to train computer scientists who can relate to science, computer design, or information-based business disciplines. Other areas of emphasis will be considered on an individual basis.

COMPUTER SCIENCE REQUIRED COURSES

Science Emphasis

CS 1700, 1710, 1720, 2200, 2370, 2550, 3000, 3100, 3550, 4700, 5050; STAT 3000 or MATH 5710; MATH 1210, 1220, 2210, 2250, 3310; MATH 4630 or 5610; PHIL 2400 or 2500 or 3520 or 4530 or 4540; SPCH 1050; at least 13 credits of advisor-approved computer science classes numbered 5000 or above. In addition, students must complete 6 credits at the 3000 level or higher, appropriate to the degree.

Digital Systems Emphasis

CS 1700, 1710, 1720, 2200, 2370, 3000, 3100, 4700, 5050; STAT 3000; MATH 1210, 1220, 2250, 3310; ECE 2410, 2420, 2530, 2540, 3710, 3720; PHIL 2400 or 2500 or 3520 or 4530 or 4540; SPCH 1050; at least 13 credits of advisor-approved computer science classes numbered 5000 and above. In addition, students must complete 3 credits at the 3000 level or higher, appropriate to the degree.

Information Systems Emphasis

CS 1700, 1710, 1720, 2200, 2370, 2550, 3000, 3100, 3550, 4700, 5050; STAT 2300; MATH 1210, 1220, 3310; ACCT 2010, 2020; ECON 1500; MHR 3110; BA 3080; PHIL 2400 or 2500 or 3520 or 4530 or 4540; SPCH 1050; at least 13 credits of advisor-approved computer science classes numbered 5000 and above. In addition, students must complete 6 credits at the 3000 level or higher, appropriate to the degree.

Bioinformatics Emphasis

CS 1700, 1710, 1720, 2200, 2370, 2550, 3000, 3100, 3550, 4700, 5050, 5620, 5630, 5800; STAT 3000; MATH 1210, 1220, 2250 or 2270, 3310; BIOL 3100, 3200; CHEM 1110 or 1210; SPCH 1050; PHIL 2400 or 2500 or 3520 or 4530 or 4540; Statistical Methods in Bioinformatics course (currently being developed); at least 3 credits of advisor-approved computer science classes numbered 5000 or above. In addition, students must take 12-13 credits of advisor-approved electives. Students are strongly encouraged to take BIOL 5730 and its prerequisites to fill this elective requirement.

Information Technology Emphasis

CS 1010, 1700, 1710, 1720, 2200, 2370, 2550, 3000, 3010, 3100, 3550, 4700, 4720, 5050, 5800, 5850; MATH 1100; STAT 2300; ACCT 2010, 2020; BIS 3100; BA 3080, 3400, 3500; ECON 1500; MHR 3110, 3710; PHIL 2400 or 2500 or 3520 or 4530 or 4540; at least 10 credits of advisor-approved computer science classes numbered 5000 or above. In addition, students must take 1-2 credits of advisor-approved electives.

Minor

Requirements for a minor in computer science are listed below. Before beginning any minor, a student must meet with a departmental advisor and file an approved minor application form with the Computer Science Department.

Computer Science Minor

CS 1700, 1710, 1720, 2200; two additional CS classes selected from the following list: CS 2370, 2550, 3100, 3550, 4700, or any CS class numbered 5000 or above.

Graduate Programs

Computer science deals with the programming, use, management, and organization of computers. Graduate students specialize in many different areas, several of which have strong ties to other disciplines such as mathematics, computer engineering, statistics, accounting, and business administration.

Admission Requirements

Applicants for admission to the graduate program should have a bachelor's degree in computer science **or** extensive experience in computing. Normally, a score of at least 640 on the quantitative test of the general GRE is required for admission to the MS, and a score of at least 700 is required for admission to the PhD or MCS. For scores less than these, applicants must show other strengths in their backgrounds to be considered for admission. The GRE computer science subject exam is not required for admission. Those who do take the GRE computer science subject exam will have preference in consideration for the award of financial aid. Decisions on financial aid are made on or near March 15 for the following fall semester.

Course Requirements

In addition to the specific departmental admission and degree requirements described in this section, students are advised that they must also meet all Graduate School requirements as described in the Graduate School section of this catalog. Please note that departmental requirements change from time to time, so students should work closely with their advisor in designing their graduate program. Graduate-level courses outside the department *may* be acceptable for the graduate degree. In all cases, approval of the candidate's graduate committee should be obtained *before* registering for such courses.

Graduate students who have not taken or passed at the 50th percentile the computer science GRE subject exam are required to meet departmental placement requirements before completion of their first year. Students who have not met this requirement after the first year, as a minimum, will not be eligible for department-funded financial aid and cannot submit their program of study. In some circumstances, students will be terminated in the program. The department placement requirement is met in one or a combination of the following three ways:

1. Pass three of six placement exams: Computer Architecture and Organization, Algorithms and Data Structures, Operating Systems, Automata, Programming Languages/Compilers, and Software Engineering.

2. Complete with a grade of at least *B*- three of the following departmental placement courses: CS 3550 or ECE 5750 (architecture); CS 2200 (algorithms and data structures); CS 3100 or 5200 (operating systems); CS 4700 or 5300 (programming languages); and CS 2370, 5370, or 6370 (software engineering).

3. Show on an official transcript from an accredited college or university the completion of three courses deemed by the department to be equivalent to its placement courses. These must be semester-based courses of at least 3 credits, and the corresponding grade must be at least a *B*-.

Master of Science (MS). Whether Plan A, Plan B, or Plan C (see School of Graduate Studies general requirements), all MS/CS students must meet the following general requirements:

1. Complete four Computer Science courses numbered between 6000 and 6950. CS 6250 and 6900 are *not accepted* for these four courses. CS 6950 can count as *only one* of these four courses, and in that case must be taken for at least 3 credits in a single semester.

2. Complete 1 credit of CS 6900.

No more than 3 total credits in *both* CS 5950 and 6950 and 1 credit of CS 6900 may be used to satisfy the MS degree requirements. CS 6250 cannot be used to meet MS coursework requirements. A maximum of 15 credits of committee-approved coursework below the 6000-level may be used for the MS degree.

Students completing a **Plan A MS degree** must fulfill the following requirements:

1. Complete at least 24 credits of graduate coursework. The total GPA must be at least 3.0, and no more than two class grades below *B*- and none below *C* may be included.

2. Successfully meet the departmental placement requirement.

3. Successfully complete and submit a graduate thesis proposal.

4. Successfully complete and defend a graduate thesis, based on original work (CS 6970, 6 credits).

Students completing a **Plan B MS degree** must fulfill the following requirements:

1. Complete at least 32 credits of graduate coursework. The total GPA must be at least 3.0, and no more than two class grades below *B*- and none below *C* may be included.

2. Successfully meet the departmental placement requirement.

3. Successfully complete and submit a graduate report proposal.

4. Successfully complete and defend a graduate report (CS 6970, 2 credits).

Students completing a **Plan C MS degree** must fulfill the following requirements:

1. Complete at least 37 credits of graduate coursework. The total GPA must be at least 3.0, and no more than two class grades below *B*- and none below *C* may be included.

2. Successfully meet the departmental placement requirement.

3. In addition to the four 6000-level courses required of all MS/CS students, successfully complete one pair of courses representing a sequence offered by the department: CS 5200 and 6200; CS 5300 and 6300; CS 5600 and 6600; CS 5650 and 6650; CS 5700 and 6700.

Master of Computer Science (MCS). The Master of Computer Science (MCS) is a terminal degree with coursework requirements similar to the PhD, but lacking the PhD's requirement for original research. Students completing an MCS degree must fulfill the following requirements:

1. Complete at least 60 credits of graduate coursework beyond the BS/CS or 30 credits of graduate coursework beyond the MS/CS with a minimum class grade of *B*- and a minimum cumulative GPA of 3.2.

2. No more than 15 credits of coursework numbered below 6000 may be used for the MCS.

3. Complete at least 12 credits of 7000-level computer science coursework.

4. Successfully meet the departmental placement requirement.

5. Successfully complete and submit a research report proposal.

6. Successfully complete and defend a research report, based on original work (CS 7970, 6 credits).

7. Complete 1 credit of CS 6900.

Doctor of Philosophy (PhD). The Doctor of Philosophy in Computer Science is, above all else, a degree of quality. Simply completing a number of graduate courses or years of study is not sufficient to receive the degree. The successful candidate must demonstrate a breadth of understanding in computer science, as well as a depth of understanding in his or her chosen area(s) of emphasis. Also, students must show an ability to do creative research. This research should be carried out over a significant period of time (i.e., at least one year or three semesters). Thus, each successful PhD candidate will produce a significant piece of original research, presented in a written dissertation and defended in an oral examination. This work should be of such quality that one or more journal or conference articles can be derived from it.

Students completing a PhD/CS must fulfill the following requirements:

1. Complete at least 90 credits of graduate coursework (including at least 27 credits of dissertation/research) beyond a BS/CS or at least 60 credits beyond an MS/CS with a minimum class grade of *B* and a minimum cumulative GPA of 3.5.

2. Successfully meet the departmental placement requirement.

3. If an MS/CS is completed first, then no more than 15 credits of the 60 credits required for the PhD may be taken in coursework numbered below the 6000 level. If an MS/CS is not completed first, then no more than 21 credits of the 90 credits required for the PhD may be taken in coursework numbered below the 6000 level.

4. Complete at least 12 credits of 7000-level computer science coursework.

5. Complete 2 credits of PhD Seminar (CS 7900).

6. Complete 9 credits of department-approved business administration or business management courses.

7. Pass a set of comprehensive written examinations and an oral examination showing depth and breadth of knowledge in computer science and the student's area(s) of emphasis.

8. Successfully complete and defend a research proposal.

9. Successfully complete and defend a dissertation (CS 7970, for at least 27 credits).

10. Complete 1 credit of CS 6900.

Financial Assistance

Applicants for admission will automatically be considered for financial aid, with no need for additional application procedures. Continuing students will be requested to apply for aid during the spring semester. Acceptance into the program does not guarantee financial assistance.

Computer Science Faculty

Professors

Scott R. Cannon, parallel processing, real-time systems, biomedical applications

Heng-Da Cheng, image processing, artificial intelligence, parallel processing, computer vision, fuzzy logic, VLSI algorithms and architectures, neural networks

Donald H. Cooley, fuzzy logic, evolutionary algorithms, neural networks, multimedia systems

Professors Emeritus

Rex L. Hurst, statistical computation, information systems

Wendell L. Pope, data structures, automatic software generation, programming languages

Associate Professors

Stephen J. Allan, parallel processing, parallel programming, recognition of parallelism, program optimization

Vicki H. Allan, instruction-level parallelism, register allocation, software pipelining, program optimization

Stephen W. Clyde, software engineering, object orientation, distributed systems, database theory, multimedia systems

Hugo de Garis, artificial intelligence, neural networks, genetic algorithms

Nelson T. Dinerstein, analysis and construction of information systems, database management systems, applications of small computers

Nicholas S. Flann, machine learning, artificial intelligence

Gregory W. Jones, computability, GUIs, software engineering

Daniel W. Watson, parallel and heterogeneous computing, interconnection networks

Associate Professor Emeritus

Larre N. Egbert, scientific computing, computer graphics

Assistant Professors

Robert F. Erbacher, computer graphics, visualization, computer security, bioinformatics, GUIs, systems

Vladimir Kulyukin, cognitive robotics, speech and language processing

Seungjin Lim, data mining, semi-structured databases, bioinformatics

Xiaojun Qi, image processing, data mining

Lecturers

Kendra S. Dinerstein, introductory programming

Linda Duhadway, computer science education

Mary Veronica Kolesar, introductory computing

Temporary Lecturer

Dean Mathias, computer graphics

Course Descriptions

Computer Science (CS), pages 372-375

Ecology

Director: Martyn M. Caldwell
Location: Natural Resources 314
Phone: (435) 797-2555
FAX: (435) 797-3872
E-mail: mmc@cc.usu.edu
WWW http://www.usu.edu/ecology/

Assistant Director for Administrative Affairs:
Marvin C. Bennett, Natural Resources 314B, (435) 797-2090, marvb@cc.usu.edu

Degrees offered: Master of Science (MS) and Doctor of Philosophy (PhD) in the following departments: Aquatic, Watershed, and Earth Resources; Biology; Forest, Range, and Wildlife Sciences; and Plants, Soils, and Biometeorology

Graduate Program

The ecology program at Utah State University is administered by the interdepartmental Ecology Center. Its goals are to promote research and graduate education in the science of ecology and to provide expert, professional information and advice for decision makers considering actions that affect the environment. The research carried out by the center's associates covers the full spectrum of ecology on several continents, but most of it is centered in the montane and desert regions of the western United States.

Students earn their degrees in ecology while maintaining residence in one of the participating departments; the center itself does not grant degrees. The candidate selects and is assigned a major professor from the department appropriate to his or her interests.

Degree Requirements

Requirements for graduate degrees in ecology include the University and departmental degree requirements, as well as the Ecology Center requirements outlined below, which are formulated by the Ecology Center Faculty Advisory Committee. This committee is comprised of faculty representatives, designated by the respective department heads, from the departments of Aquatic, Watershed, and Earth Resources; Biology; Environment and Society; Forest, Range, and Wildlife Sciences; Geology; and Plants, Soils, and Biometeorology. The Ecology Center director chairs the committee.

The ecology MS and PhD are research degrees requiring a research thesis or dissertation. The following course requirements for each of these degrees fall into two categories. The first is a general science category. Students receiving graduate degrees in ecology are expected to have some breadth and sophistication in modern science. The second category includes ecology course requirements. These are for the most part general requirements, with the specific courses taken by each student selected by his or her graduate committee and tailored to his or her needs and professional goals.

Ecology MS and PhD Degrees General Science Requirements

(For further details, see the USU Ecology Center website: **http://www.usu.edu/ecology/.)**

Mathematics, Chemistry, Physics, and Computer Science

By its very nature, ecology must draw upon knowledge from most branches of science. As a result, at least a reasonable facility with fundamental mathematics and physical sciences must be attained by students, since these concepts have expression throughout the sciences. In order to assure a minimal comprehension in these areas, students receiving graduate degrees in ecology are required to have had the following at some point in their university careers:

1. Equivalent of mathematics through one semester of calculus.
2. Equivalent of at least a one-semester overview course in physics.
3. Chemistry through organic.
4. One year of introductory statistics and one graduate-level statistics course.

These courses are the minimum requirements for the MS and PhD degrees. The committee strongly recommends developing greater facility by taking at least a full year of calculus; one or more courses from the set of three including linear algebra, differential equations, and multi-variable calculus; and a full year of professional-level physics.

Biology

The following are required of all ecology graduate students, and must be taken at some point during their university career:

1. Genetics or evolution, one course.
2. One course in animal physiology for students emphasizing animal ecology.
3. One course each in plant physiology and soils for students emphasizing plant ecology.

Ecology Course Requirements

Master of Science

1. Attendance in Ecology Seminar (AWER/BIOL/ENVS/FRWS 6870) is required each semester in residence.
2. A one-semester course in Graduate General Ecology (AWER/BIOL/ENVS/FRWS 6960) is also required.
3. One course must be taken in each of two functional (core) blocks. The three available blocks are shown on the following page.

Doctor of Philosophy

1. Attendance in Ecology Seminar (AWER/BIOL/ENVS/FRWS 6870) is required each semester in residence.

2. A one-semester course in Graduate General Ecology (AWER/BIOL/ENVS/FRWS 6960) is also required.

3. One course must be taken from each functional (core) block. Students continuing from the MS to the PhD degree can apply block courses taken for the MS degree to the PhD requirement. The three available blocks are shown below.

Functional (Core) Blocks

1. **Biophysical and Physiological Ecology**
   (AWER/GEOL 6150, AWER/BMET/GEOL 6680, BMET 6500, 6800, BIOL 7750 (Topics in Biology: Comparative Animal Physiology), FRWS/SOIL 6350, FRWS 7200, SOIL 6130)
2. **Organismic, Population, and Evolutionary Ecology**
   (AWER 6230/7230, BIOL 6170, 6260, 6270, 6280, FRWS 6400, 6720/7720, 7400)
3. **Community, Ecosystem, and Landscape Ecology**
   (AWER 6120/7120, 6820/7820, BIOL/FRWS/SOIL 6200, BIOL 6010, 6590, FRWS 6610, 6710/7710, 6770)

Economics

Department Head: Keith R. Criddle
Location: Business 615
Phone: (435) 797-2310
FAX: (435) 797-2701
E-mail: econinfo@econ.usu.edu
WWW: http://www.econ.usu.edu

Undergraduate Advisor: Tyler J. Bowles, Business 602, (435) 797-2378, tbowles@econ.usu.edu

Graduate Program Director: Paul M. Jakus, Business 508, (435) 797-2309, pjakus@econ.usu.edu

Degrees offered: Bachelor of Science (BS) in Agribusiness; Bachelor of Arts (BA) in International Agribusiness; BS in Agricultural Economics; Master of Science (MS) in Applied Economics; BS, BA, MS, Master of Arts (MA), and Doctor of Philosophy (PhD) in Economics; participates in Master of Business Administration (MBA); participates in International MBA in Food and Agribusiness (offered through the Royal Agricultural College in Cirencester, England). The Agribusiness and Economics majors are structured to facilitate a dual major with companion majors within or outside the College of Business.

Undergraduate emphases: *BS in Agribusiness*—Business, Agricultural Systems; *BS, BA in Economics*—Economic Theory, Managerial Economics, Prelaw Economics

Graduate specializations: *MS in Applied Economics*—Agricultural Economics, Natural Resource Economics, and Regional Economic Development

The Department of Economics is jointly administered by the College of Agriculture and the College of Business. Programs in both the College of Agriculture and the College of Business are offered.

Undergraduate Programs

Objectives

Undergraduate economics provides students with the basic intellectual framework to understand and analyze economic problems and to make informed decisions. A basic understanding of economics is essential to becoming a well-informed citizen, as well as a successful business or public leader.

Admission Requirements

Freshmen who meet the admission requirements and are accepted in good standing by the University are eligible for admission to the College of Agriculture, the College of Business, and the Department of Economics. All transfer students, whether transferring from within Utah State University or from other colleges and universities, must have an overall minimum GPA of 2.2 to be accepted as majors in the department. Additional requirements may apply for students who seek to be admitted to a dual major.

New students wishing to major in the Department of Economics may do so by listing one of the departmental majors on their application when they apply for admission to USU. Students enrolled at USU may change to a departmental major by applying directly to the College of Agriculture, the College of Business, or the Department of Economics.

Graduation Requirements

To receive a bachelor's degree in Agribusiness, Agricultural Economics, Economics, or International Agribusiness, students must complete all University requirements and the college and departmental requirements for their specific major as noted below.

Agribusiness Major

The Agribusiness major provides a foundation for employment in the agricultural sectors and rural regions and in businesses serving agriculture and rural regions, such as banks and financial institutions, production, marketing and buying cooperatives, value-added food producers, real estate and land management, agricultural chemical production and sales, and farms and ranches. Graduates of this program are employed in a variety of agribusiness operations throughout the United States. Agribusiness graduates have achieved prominence in positions in wholesale and retail sales and service, stock and commodity brokerage, real estate appraisal, banking and farm credit, insurance, and in farm and ranch operations. Classwork provides training in basic business and economics, as well as the specific management tools required for agricultural enterprises.

To graduate with a bachelor's degree in Agribusiness, a student must have a major GPA of 2.5 or higher, as well as a grade of *C* or better in each course required for the major. A *C* grade or better in ECON 1500, MATH 1100, STAT 2300, and PSY 1010 or SOC 1010 and an overall GPA of 2.67 or higher is required for admission into some required BA and MHR courses. Agribusiness majors with a dual major must satisfy the admission and graduation requirements of both majors. All required courses must be taken for a letter grade. ECON 3900, 4950, 4990, and 5950 cannot be used to meet economics elective requirements.

Agribusiness Major: ECON 1500, 1550 (or 2010), 3030, 3050, 4010, 4030, 5030, 5050, 5350; ACCT 2010, 2020; MATH 1050, 1100; MHR 2990; STAT 2300; ASTE 3090 (or BIS 2450), 3050 (or BIS 2550); and 12 credits of College of Agriculture electives. These 12 credits must be from courses offered by departments in the College of Agriculture other than the Department of Economics. Six of the 12 credits must be upper division.

Agribusiness Major (Business Emphasis): ECON 3030, 3050, 4010, 4030, 5030, 5050, 5350; MHR 4880 (or 4890); Complete the Business Core: ACCT 2010, 2020; BA 3400, 3500, 3700; BIS 2450, 2550; ECON 1500, 2010, 3400; MATH 1050, 1100; MHR 2990, 3110; STAT 2300. Students who complete the core requirements with a 2.67 or higher GPA may earn a dual major in Business in addition to a major in Agribusiness.

Agribusiness Major (Agricultural Systems Emphasis): ASTE 1010, 2200, 3050, 3090, 3600, 5260; ECON 1500, 1550 (or 2010), 3030, 3050, 4010, 4030, 5030, 5050, 5350; ACCT 2010, 2020; MATH 1050, 1100; MHR 2990; STAT 2300.

Agricultural Economics Major

The Agricultural Economics major emphasizes the development of quantitative skills in and a deeper understanding of economic theory. While this program provides a solid base for individuals desirous of careers in agricultural businesses, it is also an excellent preparation for graduate studies in economics, agricultural economics, natural resources, business, or law. The Agricultural Economics degree provides an excellent background for work in federal, state, and local government, as well as in the private sector. Graduates of this program are now working in positions involving the analysis of prices and markets, preparation of economic feasibility studies, and preparing economic forecasts.

To graduate with a bachelor's degree in Agricultural Economics, a student must have a major GPA of 2.5 or higher, as well as a grade of *C* or better in each course required for the major. All required courses must be taken for a letter grade. ECON 3900, 4950, 4990, and 5950 cannot be used to meet economics elective requirements.

Agricultural Economics Major: ECON 1500, 2010, 3030, 3050, 3400, 4030, 5000, 5010, 5030, 5310, 5330, and three of the following: ECON 5020, 5050, 5350, 5560, 5950; ACCT 2010, 2020; ASTE 3050 (or BIS 2550) 3090 (or BIS 2450); MATH 1050, 1100; STAT 2300.

International Agribusiness Major

The International Agribusiness major combines training in business, language skills, and economics courses that emphasize the role of the trade and development issues that are critical to operating in the increasingly internationalized agribusiness sector. The program provides a foundation for employment in agricultural and agribusiness sectors and in banks and financial institutions, production, marketing and buying cooperatives, value-added food producers, agricultural chemical production and sales, and farms and ranches in domestic and international settings. Classwork provides training in basic business and economics, as well as the specific management tools required for agricultural enterprises.

To graduate with a bachelor's degree in International Agribusiness, a student must have a major GPA of 2.5 or higher, as well as a grade of *C* or better in each course required for the major. All required courses must be taken for a letter grade. ECON 3900, 4950, 4990, 5950, and 5950 cannot be used to meet economics elective requirements.

International Agribusiness Major: ECON 1500, 2010, 3030, 3050, 3400, 4010, 4020, 4030, 5030, 5050 (or 5950), 5120, 5350, 5400; ACCT 2010; ASTE 6140; BIS 2450; MATH 1050, 1100; NFS 5510; PLSC 4300; STAT 2300; and a score of 3 or better on the Federal FSI Test or completion of a language minor.

Economics Major

Because the Economics major provides a strong grounding in economic theory, it helps open career opportunities that involve policy analysis. The Economics major has been a very popular dual major for Finance and Accounting majors because of the added theoretical and analytical dimension that advanced studies in economics can contribute to Finance and Accounting majors. This combination is excellent preparation for students interested in advanced studies in Accounting or Finance.

The Economics major also provides students in the humanities, and social and natural sciences with an opportunity to learn policy analysis tools. Whether the students are directly interested in policy or simply interested in the impact of policy within their chosen primary major, economics introduces a robust and empirically verified paradigm for explaining the behavior of social systems and their interaction with cultural, biological, and physical resources.

To graduate with a bachelor's degree in Economics, a student must have a minimum GPA of 2.5 in courses required for the major and a grade of *C* or better in each course required for the major. A *C* grade or better in ECON 1500, MATH 1100, STAT 2300, and PSY 1010 or SOC 1010 and an overall GPA of 2.67 or higher is required for admission into some BA and MHR courses required for the managerial emphasis. Economics majors with a dual major must satisfy the admission and graduation requirements of both majors. All required courses must be taken for a letter grade. ECON 3900, 4950, 4990, and 5950 cannot be used to meet economics elective requirements.

Economics Major: ECON 1500, 2010, 3400, 4010 (or 5010), 4020 (or 5000); MATH 1050, 1100; STAT 2300; and 6 credits of upper-division ECON electives.

The **Economic Theory Emphasis** is designed for students who are interested in preparing for graduate studies in economics or agricultural economics and for students who are preparing for a career that requires training in quantitative economic analysis. Graduates have employment opportunities in business and government, as well as opportunities for continuing their education in graduate economics programs or in professional schools. Economists are often involved in policy analysis for government agencies and nongovernmental organizations.

Economics Major (Economic Theory Emphasis): ECON 1500, 2010, 3400, 5000, 5010, 5100, 5310, 5330, 5950; ACCT 2010, 2020; MATH 1050, 1100; STAT 2300; and 12 credits of upper-division ECON electives.

The **Managerial Economics Emphasis** is for students who are planning for careers in business. The program can serve as a terminal program for those planning to enter the job market on graduation or as excellent preparation for students who intend to pursue an MBA or MPA.

Economics Major (Managerial Economics Emphasis): ECON 1500, 2010, 3400, 4010, 4020, 5310, 5330, 5950; ACCT 2010, 2020; BA 3400, 3500, 3700; BIS 2450, 2550; BUS 1000; MATH 1050, 1100; MHR 2990, 3110; PSY 1010 (or SOC 1010); STAT 2300; and 6 credits of upper-division ECON electives.

The **Prelaw Economics Emphasis** is for students who plan to attend law school or pursue a career related to political science, and who want to obtain a strong foundation in economics. The large number of elective credits included in this emphasis area provides enough flexibility for students to custom design their program of study to meet individual interests and educational goals. Several students have taken advantage of this flexibility to design a dual major with Economics and Political Science.

Economics Major (Prelaw Economics Emphasis): ECON 1500, 2010, 3170 (or POLS 3170), 3400, 4010 (or 5010), 4020 (or 5000), 5950; MATH 1050, 1100; POLS 1100; STAT 2300; 6 credits of upper-division ECON electives; and 3 credits of upper-division POLS electives.

Minor Requirements

Economics Minor: ECON 1500, 2010 (or 1550), 4010 (or 5010), and 6 credits of upper-division ECON electives. ECON 3900 cannot be used to meet economics elective requirements.

Economics Teaching Minor: ECON 1500, 2010 (or 1550), 3400 (or 5400), 5100, 5110; BIS 3000, 3300 (or 4300), 4400.

Agribusiness Management Minor: ECON 1550, 3030, 3050, 4030; ACCT 2010.

Agricultural Economics Minor: ECON 1500, 2010 (or 1550), 4010 (or 5010), 4030, 5030.

Additional Information

For more information about bachelor's degree requirements, see the major requirement sheets available from the Department of Economics.

Financial Support

The Department of Economics, the College of Agriculture, and the College of Business award scholarships in addition to those available through the University Financial Aid Office. Information and application forms may be obtained from the college or departmental offices.

Graduate Programs

The MA, MS, and PhD in Economics, along with the MS in Applied Economics, are offered jointly through the College of Agriculture and College of Business. The MBA is offered through the College of Business. The International MBA in Food and Agribusiness is offered through the Royal Agricultural College (RAC), Cirencester, England.

Objectives

Economics graduate training emphasizes economic theory, critical thinking, and quantitative analysis. This foundation is a means to an end, not an end in itself: theory and quantitative methods are tools used in applied courses, in theses and dissertations, and in other research and extension activities carried out in the department.

The **Master of Science and Master of Arts in Economics** are intended to prepare students for doctoral studies in economics. Consequently, students are required to take the same first-year core theory and econometrics courses as the PhD students, with specialization courses in the second year. The **MS in Applied Economics** is a terminal degree that prepares students for positions in industry; private consulting firms; local, regional, and national policy-making agencies; private not-for-profit organizations; and community/regional economic planning and development agencies. The **Doctor of Philosophy in Economics** is intended to prepare students for faculty and research positions with dual fields in Trade and Development and Natural Resource and Environmental Economics. All PhD students are required to complete these "field" sequences. Students interested in other specialties are discouraged from applying.

Admission Requirements

Applicants must have earned a bachelor's degree from an accredited college or university, maintained a grade point average of at least 3.0 for the last 60 semester credits earned, and score in at least the 40th percentile on either the Graduate Record Exam (GRE) or Graduate Management Admission Test (GMAT). In addition, international applicants from non-English-speaking countries must score at least 550 on the Test of English as a Foreign Language (TOEFL). Satisfaction of these minimum admission requirements does not guarantee admission. Applications for graduate study from students trained in disciplines other than economics are welcomed. However, all applicants are expected to have: (1) an understanding of intermediate microeconomic and macroeconomic theory, (2) preparation in mathematical economics, and (3) preparation in probability and statistics. In addition, applicants are expected to have strong written and oral communications skills.

Degree Requirements

Doctor of Philosophy in Economics. PhD students are required to: (1) complete the first-year core (ECON 7060, 7130, 7140, 7230, 7240, 7310, 7350, 7360); (2) perform successfully on a written qualifying examination based on the first-year core; (3) complete the advanced core (ECON 7150, 7250, 7320, 7330); (4) complete the International Trade and Development and Natural Resource and Environmental Economics field sequences (ECON 7400, 7500, 7510, 7800); (5) complete a research dissertation and give an oral defense of the dissertation; and (6) meet University requirements for dissertation research and total credit hours.

Master of Science in Applied Economics. To complete an MS degree in Applied Economics, students are required to: (1) complete the applied core (ECON 6000, 6060, 6100, 6300, 6330); (2) complete a specialization in: (a) agricultural economics (ECON 6030 and 6040), (b) natural resource economics (ECON 6500 and 6510), or (c) regional economic development (ECON 6700 and 6710); (3) submit and orally defend a thesis (Plan A) or research report (Plan B); and (4) complete elective class or thesis research credits to meet Plan A, B, or C graduation requirements. Plan A requires at least 30 credits and must include at least 6 thesis research credits. Plan B requires at least 30 credits and must include 2 to 3 thesis research credits. Plan C has no research component and requires at least 33 credits. (No more than 6 undergraduate credits may be used in meeting degree requirements.)

Master of Science and Master of Arts in Economics. Students are required to complete the first-year core (ECON 6000, 6060, 7130, 7140, 7240, 7310, 7350, 7360) and to submit and orally defend a thesis (Plan A) or research report (Plan B). The department also accepts Plan C, which has no research component. MA students must satisfy the foreign language requirement. Plan A requires at least 30 credits and must include at least 6 thesis research credits. Plan B requires at least 30 credits and must include 2 to 3 thesis research credits. Plan C requires at least 33 credits. (No more than 6 undergraduate credits may be used in meeting degree requirements.)

Master of Business Administration (Agribusiness Management, International Economics, or Quantitative Economic Analysis Specialization). A student may receive a College of Business Master of Business Administration degree with a specialization in Agribusiness Management, International Economics, or Quantitative Economic Analysis by completing the MBA advanced core (see the MBA program description on pages 153-154) and 12 specialization credits. ECON 6330 should be taken to satisfy the quantitative methods requirement. The **Agribusiness Management** specialization requires: ECON 6030, 6040, 6300; and either ECON 6500 or 6700. The **International Economics** specialization requires ECON 5150, 5400, 6000; and POLS 6220. The **Quantitative Economic Analysis** specialization requires ECON 5310, 6300, 6330; and STAT 5100.

International MBA in Food and Agribusiness. The Department of Economics participates with the Royal Agricultural College (RAC) in Cirencester, England to offer this degree. The degree is awarded by the RAC. Students study at USU during fall semester, and then study spring semester at the RAC. Students complete a team project and a thesis. The degree is designed to prepare students to be agribusiness managers in an international environment. Applicants for admission to the International MBA are expected to have completed a common body of knowledge core at an AACSB accredited program. The common body of knowledge includes: ACCT 2010, 2020; BA 3400, 3500, and 3080 or 3700; BIS 2450; ECON 1500, 2010; MATH 1100; STAT 2300; and MHR 2990 and 3110. Alternatively, students may choose to gain the necessary competencies by attending the 18-credit Accelerated Business Core (BUS 6160), which is offered during summer semester. Required courses to be completed at USU include: ACCT 6350; ECON 5030 or 6030, ECON 6040; BA 6520 or 4590; and MHR 6500. During spring semester, courses in finance, marketing and advertising, human resource management, macroeconomics, and business strategy are taught at the RAC. Participating students pay USU tuition and are expected to complete the program in 12-15 months.

Research

The department maintains an active and productive research program. The results of this research are published in professional journals, books, and technical reports. Financial support for the departmental research program is provided by the Utah Agricultural Experiment Station, the colleges of Agriculture and Business, the Office of the Vice President for Research, and by a combination of public and private extramural sources. The Economics Research Institute provides support and coordination for some of the department's research activities. Graduate students are an integral part of departmental research programs.

Financial Assistance and Assistantships

The department offers teaching and research assistantships to qualified graduate students. These are awarded on a competitive basis, and all accepted students are considered eligible. However, while the department makes every effort to assist students in obtaining financial assistance, acceptance into department programs does not guarantee financial assistance.

Financial assistance is not provided to PhD students who fail to pass the written qualifying exam nor to graduate students who fail to make satisfactory progress toward completion of their degrees.

Economics Faculty

Professors

DeeVon Bailey, agricultural economics

Basudeb Biswas, international trade and economic development

Keith R. Criddle, resource economics and quantitative methods

Christopher Fawson, public finance and econometrics, Vice Provost for Academic and International Affairs

Terrence F. Glover, production economics and policy

E. Bruce Godfrey, agricultural and resource economics

L. Dwight Israelsen, comparative systems and economic history

Paul M. Jakus, natural resource and environmenal economics, nonmarket valuation

John E. Keith, agricultural and resource economics

W. Cris Lewis, regional-urban and managerial economics

Kenneth S. Lyon, economic theory

H. Craig Petersen, regulation and antitrust and managerial economics; Director of Analysis, Assessment, and Accreditation

Donald L. Snyder, agricultural and resource economics, Associate Dean for Academic Programs

Professors Emeriti

Roice H. Anderson

Larry K. Bond

Rondo A. Christensen

Lynn H. Davis

Reed R. Durtschi

Herbert H. Fullerton

Gary B. Hansen

Allen D. LeBaron

Darwin B. Nielsen

Morris D. Whitaker

Associate Professors

Tyler J. Bowles, econometrics and international economics

Steven S. Vickner, agribusiness, food marketing

Associate Professor Emeritus

Glenn F. Marston

Assistant Professors

Arthur J. Caplan, environmental economics and applied microeconomic theory

David L. Dickinson, labor and experimental economics

John P. Gilbert, international trade theory and policy, applied general equilibrium modeling, development economics

Rimma Shiptsova, international trade, food safety, econometrics

Ruby A. Ward, agribusiness management and operations research

Human Resources Specialist

Marion T. Bentley, manpower economics

Course Descriptions

Economics (ECON), pages 379-382

Education (EdD, PhD)

Chairman: Gerard R. Giordano, Dean of College of Education and Human Services
Location: Emma Eccles Jones Education 109
Phone: (435) 797-1437
FAX: (435) 797-3939
E-mail: idphelp@usu.edu
WWW: http://www.coe.usu.edu/coe/idp/index.htm

Faculty: Faculty are listed with participating departments.

Degrees offered: Doctorate of Education (EdD) and Doctorate of Philosophy (PhD)

Graduate specializations: *PhD*—Business Information Systems, Curriculum and Instruction, and Research and Evaluation; *EdD*—Special Education

Admission Requirements

For admission information, contact: Dean, School of Graduate Studies, Utah State University, 0900 Old Main Hill, Logan UT 84322-0900; telephone (435) 797-1189; FAX (435) 797-1192; gradsch@cc.usu.edu.

To be evaluated against established criteria, students must submit to the School of Graduate Studies at Utah State University an **Application for Admission** along with the following:

1. Two official transcripts of both undergraduate and graduate credits from all colleges or universities attended. An average grade of *B* (3.0) or better is required during the last two years of undergraduate work and for all graduate work.
2. Three letters of recommendation (required). At least two of these letters should come from individuals who can evaluate the student's academic abilities. All letters should address the student's potential for successful graduate study.
3. Documentation of a master's degree or equivalent coursework related to an area of specialization, or a statement of why admission is sought without a master's degree.
4. An official report of the Graduate Record Examination (GRE), including both the Verbal and the Quantitative subtests.
5. Evidence of writing competency as determined by the department of specialization.
6. A statement of specific reasons for wanting to enroll in the doctoral program in education, including the area of specialization student desires to pursue.

Applicants to the Curriculum and Instruction specialization of the PhD and EdD degrees must have appropriate teaching experience.

General Information

Students may select from one of three specializations within the Interdepartmental Doctoral Program: Business and Information Systems (BIS), Curriculum and Instruction (C & I), and Research and Evaluation (R & E).

Both the **Doctorate of Education (EdD)** and the **Doctorate of Philosophy (PhD)** degrees are offered through the Interdepartmental Doctoral Program (IDP) in the College of Education and Human Services (CEHS). The IDP is an interdepartmental faculty effort.

The EdD degree program is intended for students who wish to be better prepared to (1) understand and deal effectively with curricular and instructional problems as administrators, supervisors, and curriculum specialists in public or private educational institutions and settings; and (2) teach in community colleges, four-year colleges, and universities. The PhD degree program is intended for students who wish to be better prepared to (1) fulfill roles in teaching and research in colleges, universities, and education-related fields; and (2) conduct and direct research and development activities in public and private educational settings or in the corporate sector.

Specializations

Business Information Systems. The BIS specialization prepares graduates for careers as teachers or educational leaders in the public schools and/or faculty members in higher education. Areas of emphasis include business information systems, communication, business and/or marketing education, and training and development.

Curriculum and Instruction. The C & I specialization prepares graduates to serve as curriculum specialists and instructional leaders in school districts and state educational agencies, professors in colleges of education, and subject area instructors in four-year or community colleges. Areas of emphasis include early childhood; engineering and technology education; instructional leadership; reading/writing; schooling, culture, and society; and teaching and learning in higher education.

Research and Evaluation. The R & E specialization prepares graduates to evaluate the quality of educational programs, including the comparison of strengths and weaknesses of alternative programs; the revision, updating, and/or redirection of existing programs; and the analysis of related educational issues.

Planned Program

To complete a doctorate degree, a minimum of 60 total credits are required for students with a master's degree, and a minimum of 90 total credits are required for students without a master's degree. A student must:

1. Complete a Unifying Program of Studies Core (6 semester credits) and a Research and Statistics Core (12 semester credits), required of all doctoral students.
2. Complete a planned program of supporting electives, as designated by the specialization or by a department and approved by the student's supervisory committee.
3. Pass a written comprehensive examination. This exam must be satisfactorily completed before the student advances to candidacy. Advancement to candidacy also requires an approved dissertation proposal.
4. Present at a professional conference.

5. Submit for publication an approved manuscript.
6. Complete and satisfactorily defend a doctoral research study directed and judged by a supervisory committee of faculty.
7. Complete all final requirements, as specified by an area of specialization, the College of Education and Human Services, and the School of Graduate Studies.

Resident Coursework

The **Doctorate of Philosophy degree (PhD)** requires three semesters of full-time registration in residency with a minimum of two semesters of consecutive residency. Completion of 33 credits in residence on the Logan campus is required.

The **Doctorate of Education degree (EdD)** requires at least three semesters in full-time residency, but they need not be consecutive. At least two semesters must be spent on campus prior to registering for dissertation credit. Completion of 39 credits must be completed in residence.

It is strongly recommended that the applicant enroll on campus the first semester after admission, so that appropriate program planning can be completed.

Research

Each student must complete a significant research study; present at a professional conference; and prepare an article for publication in an appropriate journal, based on the completed research and/or program of study.

Financial Assistance

Students should contact department heads for all inquiries regarding assistantships and tuition waivers. Applications for University assistantships, fellowships, and all financial aid go through department offices. For a listing of fellowships and scholarships, see the *Graduate Financial Assistance* section of this catalog (pages 89-90).

Career Opportunities

The doctoral specialization prepares educational leaders for positions as college and university researchers and teachers in education and education-related fields. Recipients of the doctorate degree are also prepared to conduct and direct research and development activities in public or private educational agencies or in the corporate section; teach in community colleges, four-year colleges, and universities; serve as supervisors and curriculum specialists in public or private educational institutions and settings; and serve in a variety of other careers.

Administrative/Supervisory Certificate Program

A doctorate in education is separate from the Administrative/Supervisory Certificate (A/SC) Program; however, a student may obtain the A/SC while pursuing the doctorate degree. Completion of the A/SC program qualifies a person for the certificate required of administrators and/or supervisors at any level in the public school systems of Utah. Students desiring an Administrative/Supervisory Certificate may need to take courses in addition to those required for the PhD and EdD degree.

College of Education and Human Services Courses

Education courses are listed under the EDUC prefix on pages 382-383.

Electrical and Computer Engineering

Department Head: Tamal Bose
Location: Engineering Laboratory 149
Phone: (435) 797-2840
FAX: (435) 797-3054
E-mail: info@ece.usu.edu
WWW: http://www.ece.usu.edu

Undergraduate Advisor: Kathleen E. Bayn, Engineering 310, (435) 797-2705, kathy.bayn@usu.edu

Graduate Program Coordinator: Scott E. Budge, Engineering Laboratory 113, (435) 797-3433, scott.budge@ece.usu.edu

Degrees offered: Bachelor of Science (BS), Master of Engineering (ME), Master of Science (MS), Electrical Engineer (EE), and Doctor of Philosophy (PhD) in Electrical Engineering; BS in Computer Engineering

Graduate specializations: Communications, Microelectronics (VLSI), Microwaves, and Signal Processing

Undergraduate Programs

Department Mission Statement

The mission of the Electrical and Computer Engineering (ECE) Department is to develop students into outstanding electrical and computer engineers. The department is dedicated to superb teaching, research, and service.

Program Descriptions

The ECE Department offers a balanced curriculum of classwork, laboratory work, and design experiences to prepare students for careers as practicing engineers. The Bachelor of Science programs in Electrical Engineering and Computer Engineering are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC/ABET). The research program of the department, which includes undergraduates as well as graduate students, is internationally acclaimed in the fields of aerospace instrumentation and measurements, image compression, communications, electromagnetics, controls, and robotics.

Electrical Engineering

The Electrical Engineering program is dedicated to producing engineers who: (1) contribute to engineering practice, advance engineering knowledge, and contribute to the good of society; (2) are advancing their education in engineering and other professions; and (3) take a leadership role in engineering and society.

Each student is given a solid foundation in electricity, electronics, signals, and systems, with individual practical experience. Upon this basic foundation the students then build expertise in advanced areas, stressing actual design practice, to prepare them for productive engineering careers. The specialty areas can be categorized into the following: analog and digital electronics, controls, signal processing, communications, and microwave engineering.

Computer Engineering

The Computer Engineering program is dedicated to producing engineers who: (1) apply fundamental principles to solve practical engineering problems; (2) are continually engaged in professional, personal, and community development; (3) are implementing well-planned, top-down designs of complex systems; and (4) function well as team members and interact well with other professionals and nonengineers.

Building on a solid curriculum in computing hardware and software, the program begins with a strong foundation in electricity, digital logic design, and computer science, then leads into advanced software engineering and microcomputer systems. Advanced courses provide experience in formal design methods, high-performance architectures, data communications, concurrent programming, and real-time and embedded systems. Students are also required to complete advanced course sequences in computer science.

Students in the BS programs in both electrical engineering and computer engineering are permitted and encouraged to take courses in the other program. Many courses, such as controls, digital signal processing, and robotics, draw heavily on skills in both areas.

Assessment

In addition to the regular national accreditation, the ECE Department employs a number of means to assess the quality of departmental programs. The primary indicator is the success of ECE graduates in obtaining professional employment. At several intervals following graduation, the department keeps track of student placement. Other major tools include annual quantitative assessment of program objectives, semi-annual reviews of the curriculum and facilities by the ECE Industrial Advisory Board, interviews of undergraduate and graduate students upon completion of their programs, regular monitoring of faculty members by peers, and periodic surveys of ECE graduates working in industry.

Requirements

Prior to entry into the upper-division classes, the student must meet the standards for entry into the Professional Engineering Program. Additional information concerning these items is given in the College of Engineering write-up (pages 107-109). It is the responsibility of students to be aware of these rules and procedures; however, advisor assistance is available.

Admission to Pre-Professional Program. Admission requirements for students desiring to major in Electrical Engineering or Computer Engineering are the same as those governing admission to the College of Engineering (see pages 107-109), *except* that students must also be "calculus ready." That is, they must: (1) achieve a score of 27 or higher on the math ACT test; (2) complete MATH 1050 and 1060 *or* MATH 1210; or (3) achieve an AP score of at least 3 on the AB Calculus or BC Calculus test.

Bachelor of Science in Electrical Engineering. The program leading to a Bachelor of Science degree in electrical engineering is nominally a four-year program. The required program consists of a basic foundation of mathematics, science, computer science, engineering fundamentals, and laboratory and design experiences. Elective courses providing for one or more areas of technical specialization, communication skills, and University Studies complete the program and prepare students for productive and rewarding careers in the electrical engineering profession.

Bachelor of Science in Computer Engineering. The program leading to a Bachelor of Science in computer engineering is nominally a four-year program. The required program consists of a basic foundation of mathematics, science, computer science, engineering fundamentals, and laboratory and design experiences. Elective courses providing for one or more areas of technical specialization, communication skills, and University Studies complete the program and prepare students for productive and rewarding careers in the computer engineering profession.

Required Courses are shown in the accompanying paragraphs; however, because of differences in high school or transfer student preparation, it is strongly recommended that students meet with the college academic advisor to plan a detailed semester-by-semester schedule for completing the preprofessional requirements. Particular attention must be paid to course prerequisites, requiring some students to take longer than four semesters to complete the preprofessional program. Students transferring into the department should consult with the college academic advisor for transfer credit evaluation and proper placement in the curriculum.

AP and CLEP credit may be used to meet some of the required technical and University Studies courses. Details concerning courses acceptable as electives are available from the Electrical and Computer Engineering Department.

Electrical Engineering

Preprofessional Program

MATH 1210, 1220, 2210, 2250; CS 1700, 1720; ECE 1010, 2410, 2420, 2530, 2540; PHYX 2210, 2220; ENGL 2010.

Professional Program

MATH 5710; ECE 3410, 3420, 3620, 3640, 3710, 3820, 3870, 4310, 4840, 4850, 5530; Math/Science Elective; University Studies Breadth; Electrical Engineering Electives; Technical Electives; University Studies Depth

Computer Engineering

Preprofessional Program

MATH 1210, 1220, 2250, 3310; CS 1700, 1720, 2200, 2370; ECE 1010, 2410, 2420, 2530, 2540; PHYX 2210, 2220; ENGL 2010.

Professional Program

MATH 5710; CS 3100; ECE 3410, 3620, 3640, 3710, 3720, 3820, 3860, 4740, 4840, 4850, 5530; Math/Science Elective; University Studies Breadth; Computer Engineering Electives; Computer Science Electives; Technical Electives; University Studies Depth

Student Research Opportunities

Undergraduate students are extensively involved with research activities in the department. Electrical engineering majors and computer engineering majors have presented papers at research conferences and have won prizes. They have also designed satellites for deployment from the space shuttle. Electrical and Computer Engineering faculty members are dedicated to helping students and providing a challenging and interesting learning atmosphere. For additional information, see the *Research* section under *Graduate Programs* (page 189).

Financial Support

Scholarships, assistantships, grants-in-aid, and work-study programs are available through the University. In addition, the department employs undergraduate and graduate students to assist in engineering research and development.

Concurrent BS/Master's Program

The concurrent BS/Master's program allows engineering students to begin taking graduate-level classes during their senior year. This permits them to complete requirements for *both* the BS degree *and* the master's degree concurrently during two years. Students in this program have a greater selection of graduate courses, since many graduate courses are taught during alternate years. In addition, the student's senior design project could be a start for a graduate design project or thesis. After completing their BS degree, students in the program can earn a master's degree in only one additional year. Both the BS and the master's degree can generally be earned with 150 total credits, although students should note that a Plan C MS requires 3 extra credits. Finally, students with a master's degree can expect a much higher starting salary following graduation. (For more information, see *College of Engineering* section of this catalog, page 109.)

Graduate Programs

Admission Requirements

See general admission requirements on pages 90-91. Applicants with a bachelor's degree in Electrical or Computer Engineering from an ABET accredited program and having a 3.25 GPA or better can generally be admitted without restriction. Additional coursework in electrical and computer engineering fundamentals may be required in individual cases. Students must take the general GRE exam; however, the subject GRE is not required. All graduate students are expected to have a working knowledge of a computer language (preferably C).

Applications will be considered throughout the year. However, students desiring financial aid should submit application materials by December 15 to be considered for the following fall semester.

No applications will be considered until all required information arrives in the office of the School of Graduate Studies.

Degree Requirements

Specific requirements for the ME, MS, EE, and PhD degrees are outlined below; these are in addition to the general requirements of the School of Graduate Studies. All graduate degree programs in the ECE Department require a grade of *B-* or better in all courses applied toward the requirements listed below.

Master of Engineering (ME) and Master of Science (MS). The ME degree is based on coursework and is designed to give graduates a strong practical foundation. The MS degree requires substantial thesis or project work in a specific area and prepares students for advanced study or advanced work in that area. The MS degree has two options. Under Plan A, the student completes a thesis. Under Plan B, the student prepares an engineering project report.

If a student chooses an MS degree, changing to the ME degree is only possible by approval of the major professor, ECE graduate committee, and the department head.

The MS and ME degrees require successful completion of 30 credits of 5000-level or above coursework in a program approved by the student's supervisory committee, with the following stipulations:

Master of Science

1. At least 12 credits of ECE coursework must be completed at or above the 6000 level.
2. MS Plan A students must complete 6 credits of Thesis Research (ECE 6970).
3. MS Plan B students must complete 3 credits of Thesis Research (ECE 6970) and 3 credits of Design Project (ECE 6950).
4. MS students must have a one- to two-page, double-spaced thesis or project proposal approved by their committee when a project has been identified.

Master of Engineering

1. At least 18 credits of ECE coursework must be completed at or above the 6000 level.
2. At least two ECE courses with substantial lab components must be completed at or above the 5000 level.

All Master's Students

1. At least 3 credits of ECE coursework must be completed at the 7000 level.
2. One credit of ECE 6800 (Electrical Engineering Colloquium) must be completed as soon as possible.
3. Each master's student must form a committee and have a program of study approved by the end of his or her first semester.
4. No more than 10 credits of 5000-level coursework may be applied toward a master's degree.
5. Any exceptions to the master's requirements must be approved by the student's committee and the ECE Graduate Committee.

A course in technical and professional writing, or equivalent writing experience, is required for MS students prior to beginning the thesis. MS students may, at the discretion of their supervisors, be required to hire an editor to bring the thesis or paper into acceptable form.

Electrical Engineer. The Electrical Engineer degree is awarded for the successful completion of an advanced program of 60 credits of academic work beyond the BS, or 30 credits beyond the MS, and a comprehensive engineering report earning an additional 10 credits. The degree requirements are the same as those for the PhD listed below, except that the comprehensive examination need not be taken and the engineering report is given in lieu of the original research dissertation, reducing the total credits required for the PhD. The degree differs from the PhD by preparing the student for professional engineering work, rather than for research.

Doctor of Philosophy. The PhD is awarded for the successful completion of an advanced program of academic work and original research. A flexible program is planned individually by each candidate in consultation with his or her faculty supervisory committee.

The PhD program is expected to include 60 credits of coursework beyond the BS degree or 30 credits of coursework beyond the MS degree, plus 30 credits of dissertation research. The coursework generally represents two years of study beyond the MS degree, with up to 20 credits being taken outside the Electrical and Computer Engineering Department.

Once the student has completed at least 45 and not more than 60 graduate credits, he or she must pass a comprehensive examination based on graduate-level courses. Near the end of the program, the results of the original (publishable) research work will be presented and publicly defended as a dissertation.

Research

The department conducts extensive research through the following centers:

1. Center for Self-Organizing Intelligent Systems (CSOIS)
2. National Center for the Design of Molecular Function (NCDMF)
3. Space Dynamics Laboratory (SDL)
4. Anderson Center for Wireless Teaching and Research
5. Center for High-Speed Information Processing (CHIP)
6. Center for Advanced Imaging LADAR (CAIL)

Research activities include: robotics, control systems, digital system design, computer networks, concurrent systems, antennas, space systems, image processing, digital signal processing, wireless communications, acoustics, electromagnetic compatibility, and LADAR systems.

Financial Assistance

All applicants who are accepted academically are automatically considered for financial aid. Virtually all successful graduate students in the department do receive some level of financial aid during their degree program.

Electrical and Computer Engineering Faculty

Professors

Doran J. Baker, electromagnetics, infrared measurements, engineering systems in space

Tamal Bose, digital signal processing, communications

Joe R. Doupnik, communications, computers

H. Scott Hinton, photonic switching, Dean of College of Engineering

Todd K. Moon, communications and signal processing

Kevin L. Moore, controls

Linda S. Powers, biophysics, molecular engineering

Gardiner S. "Dyke" Stiles, concurrent systems

Adjunct Professor

Heng-Da Cheng, pattern recognition, image processing

Trustee Professor Emeritus

Kay D. Baker, electronics, space science

Professors Emeritus

Robert W. Gunderson, control systems, pattern recognition, robotics

Ronney D. Harris, microwaves, transmission line circuits, atmospheric modeling

William L. Jones, integrated circuits

Alan W. Shaw, electromagnetics, controls, microcomputers

Allan J. Steed, electro-optics, aerospace measurement systems

Ronald L. Thurgood, computers, database systems

Clair L. Wyatt, infrared, electro-optical systems

Associate Professors

Scott E. Budge, signal processing, image processing

Charles M. Swenson, space science and space engineering

Paul A. Wheeler, microprocessors, acoustics

Research Associate Professor

Paul D. Israelsen, integrative services, digital systems design

Adjunct Associate Professors

John C. Kemp, robotics, electro-optics

Tsung-Cheng Shen, physics

Gene A. Ware, computer systems

Associate Professor Emeritus

Duane G. Chadwick, remote sensors, instrumentation

Assistant Professors

Matthew D. Berkemeier, computers, robotics, controls

Annette Bunker, computer engineering

Yangquan Chen, control systems

Jacob H. Gunther, communications and signal processing

Randy J. Jost, electromagnetics, microwave engineering, solid state electronics

George K. Liang, electromagnetics

Michael W. Tompkins, space engineering

Research Assistant Professor

Hui Fang Dou, precision instruments, mechatronics

Adjunct Research Assistant Professor

Steven R. Wassom, controls

Adjunct Assistant Professor

Charles R. Tolle, controls

Course Descriptions

Electrical and Computer Engineering (ECE), pages 375-379

Elementary Education

Department Head: Bernard L. Hayes
Location: Emma Eccles Jones Education 385A
Phone: (435) 797-0385
FAX: (435) 797-0372
E-mail: elemeduc@cc.usu.edu
WWW: http://www.coe.usu.edu/eled/

Student Teaching Director: Katy Johnson,
Education 371, (435) 797-0371, katy.johnson@usu.edu

Undergraduate Advisors:
Sheri N. Noble, Education 383, (435) 797-0383,
sheri.noble@usu.edu
Susie Maughan, Education 375, (435) 797-0375,
susie.maughan@usu.edu
Sylvia Robinson, Education 377, (435) 797-0377,
sylvia.robinson@usu.edu

Degrees offered: Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), Master of Arts (MA), and Master of Education (MEd) in Elementary Education; BS and BA in Early Childhood Education; the Elementary Education Department participates in the Interdepartmental Doctoral Program in Education, including Doctor of Education (EdD) and Doctor of Philosophy (PhD) with Curriculum and Instruction Specialization

Graduate specializations: *MA, MS, MEd*—Early Childhood Education; Educational Leadership; ESL Education; Gifted and Talented Education; Math and Science Education; Middle Education; Reading, Writing, and Language Arts; and Social Studies Education

Undergraduate Programs

Objectives

The purposes of the Department of Elementary Education are:

1. To develop professional educators;

2. To advance knowledge in the field of education.

These purposes are realized through teaching, scholarly activities, and service. The department provides leadership in the preparation of teachers, supervisors, curriculum specialists, and other professional personnel for careers in elementary education, early childhood education, and middle education.

The Department of Elementary Education at Utah State University offers three programs leading to licensure as a teacher: (1) *Elementary Education:* Offers licensure to teach in grades one through eight in the public schools; (2) *Early Childhood Education:* Offers licensure to teach prekindergarten, kindergarten, and grades one through three in the elementary school; and (3) *Middle Education:* Offers an endorsement to teach in grades five through eight.

Requirements

Provisional Admission Process and Requirements. Since more students major in Elementary Education at USU than in any other major, competition for admission into the program is very keen. Due to increased demands for admission coupled with limited resources, a ceiling of 175 students has been placed on admissions each year. Thus, admission to USU does not necessarily guarantee admission into the Elementary Education program.

Provisional admission to the Elementary and Early Childhood Teacher Education Program is determined by (1) the student's GPA in a set of core courses, (2) ACT scores and Writing Diagnostic Test **or** PPST test results, (3) the number of credits a student has taken, (4) successful completion of a group assessment interview, and (5) a speech and hearing test. (Additional factors to be weighted may be gender and/or minority status consistent with applicable law.) Applications are accepted each semester. Because there are typically more applicants than there is space available, the number accepted is limited. **Students who are not accepted may reapply.** Provisional admission requires formal action by the Office of the Dean of the College of Education and Human Services, as well as by the student's department.

Admission to the Teacher Education Program is a prerequisite for enrollment in the major, starting with Level II. A student desiring admission to the Teacher Education Program should file an application in the Elementary Education Office, located in room 373 of the Emma Eccles Jones Education Building.

Elementary Education SODIA Program. The acronym SODIA represents the elementary teacher education program. The name is derived from the initial letter of descriptive words (Self, Others, Discipline, Implementation, and Application) which represent emphasis placed at each level of the program.

The elementary education SODIA program is performance-based and field-centered. It utilizes public schools as partners in each phase of the teacher education program. SODIA is an interdisciplinary and interdepartmental program utilizing staff members from the Departments of Psychology; Special Education and Rehabilitation; Family, Consumer, and Human Development; Health, Physical Education and Recreation; Music; Art; Theatre Arts; and Instructional Technology who work in conjunction with the Department of Elementary Education. These University faculty members work with teachers and principals of cooperating public schools and the Edith Bowen Laboratory School on the USU campus in an integrated program.

Level I, Self, is represented by the "S" in the acronym SODIA. This is the first-level course (ELED 1000) introducing the field of education and emphasizing the student's self-assessment in relation to ability and desire to teach. A minimum of 15 hours are spent observing in an elementary or middle school classroom, completing volunteer service in other community settings, and viewing a variety of selected professional videos. In addition, a human growth and development course is required. The two courses in Level I are prerequisites to applying to the Teacher Education Program.

Level II, Others, is represented by the "O" in the acronym SODIA. This stands for the many "others" who make up the education community. In this bloc, each student receives 15 credits

and is assigned as a teacher assistant in one of the public schools. The remainder of the time is spent in seminars and classwork offered on the USU campus. The classwork is interdisciplinary and interrelated, including courses in elementary education, psychology, special education, and technology. Entrance to Level II requires prior admission to the Teacher Education Program.

Level III, Disciplines, is represented by the "D" in the acronym SODIA. Students in this bloc complete 15 credits of methods coursework and practica at the Edith Bowen Laboratory School or public schools. The "methods" courses in reading, social studies, language arts, mathematics, and science are included in this bloc. A preliminary course in reading is required as a transition from Level II to Level III.

Level IV, Implementation, is represented by the "I" in the acronym SODIA. This is the student teaching or internship phase of the program. Student teaching constitutes full days of actual teaching experience for the entire semester. Internships are for the entire academic year.

Level V, Application, is represented by the "A" in the acronym SODIA. At this level, graduates of the program make a transition into the profession of teaching.

National INTASC Standards also receive major emphasis through SODIA's levels of progression. These standards are: Content Pedagogy, Student Development, Diverse Learners, Critical Thinking, Motivation and Management, Communication, Planning, Assessment, Professional Development, and School/Community Development. A student performance portfolio process (based around the INTASC Standards) is also included.

Continuing Status Requirements. A minimum GPA of 2.75 is required to remain in good standing and to graduate from the program.

All students majoring in elementary education must be registered in the College of Education and Human Services. An advisor will be assigned from the Department of Elementary Education. Programs of professional education courses, as well as teaching support courses and an area of emphasis, have been developed by the Department of Elementary Education and approved by the Council on Teacher Education and the Utah State Office of Education. For a complete description of the program and requirements for graduation and licensure, students should obtain a copy of the *Department of Elementary Education, Student Program Planning Guidebook*, available from the Department of Elementary Education. This information is also available on the Elementary Education Department website:
http://www.coe.usu.edu/eled/.

Each student completes a professional semester of student teaching or a year of internship. An application for student teaching/internship must be made at least one semester in advance, and credentials are reevaluated at that time. Not all student teachers/interns can be accommodated by the schools located within Cache Valley. Students should be financially prepared to spend that time off campus in the event such an arrangement is necessary. Students must be responsible for their own transportation.

Students who carefully select their elective courses may also qualify for a special endorsement to the basic professional teaching license. All students complete an area of emphasis in a subject matter field, in addition to the teaching support courses. Dual licensure programs exist in deaf education, early childhood education, special education, and middle education. Information concerning special endorsements and additional areas of specialization may be obtained from the Department of Elementary Education.

Students who have teaching licenses in areas other than elementary education may obtain the elementary license by meeting the same or equivalent requirements for licensure expected of an elementary education major. Those desiring to acquire a dual license should work with an advisor from the Department of Elementary Education.

All courses listed as major subject courses must be taken on an *A-B-C-D-F* basis and the grade point average for these courses must be 2.75 or better. Major subject courses passed with less than a *C* grade must be repeated.

Endorsements

The USU Elementary Education Department and Secondary Education Department jointly offer a K-12 English as a Second Language (ESL) Endorsement, as well as a Middle-Level Endorsement. Graduate endorsements are also available in Early Childhood Education, ESL, Reading, Gifted and Talented, and Middle-Level Education.

Additional Information

For more information concerning requirements for University graduation and for basic professional teaching licensure in elementary education, early childhood education, and middle education, see major requirement sheets available from the Elementary Education Department Advisement Center, Emma Eccles Jones Education Building, Room 373.

Financial Support

The following scholarships are available to junior and senior students: Ballam, Blair, Bowen, DeHart, Frye, Hales, Jackson, Kurzhals, McEvoy, Stewart, Taylor, Vest, and Young. To be eligible, students must have completed Level II of the Elementary Education Program and have a cumulative GPA of 3.5 or higher. Applications are available from the Elementary Education Department and are due by February 1.

Graduate Programs

Admission Requirements

Students applying for admission to master's programs must have GRE scores at or above the 40th percentile. This same percentile is the minimum required on the MAT. For the doctorate degree, GRE scores at or above the 40th percentile are also required on the verbal and quantitative tests. Admission committees also consider experience, undergraduate record, curricula completed, and formal recommendations. One year of successful elementary school teaching experience is required for the master's program. Two years of teaching experience or the equivalent is required for admission to the doctoral program. Students with deficient oral or written English skills will be required to complete additional coursework to improve their skills.

Admission to graduate programs is contingent upon (1) completion of an application to graduate school and (2) recommendation by the department screening committee for the master's program or the management admissions committee for the doctoral program. In addition to the requirements of the School of Graduate Studies (see pages 90-91), letters of recommendation must be received from three professionals in education.

Degree Programs—On Campus

Three avenues exist for on-campus students wishing to pursue a master's degree in the Department of Elementary Education at Utah State University. They are as follows:

Master of Arts/Master of Science—Plan A. Students planning to pursue a future doctoral degree or wishing to follow a traditional master's degree should complete a Master of Arts or Master of Science (Plan A) degree. This is a 36-credit program, including 6 credits for the thesis. EDUC 6570 is required as a research course (rather than EDUC 6550). A copy of the Program of Study form listing other required core and professional option courses is available from the department office. A committee chair and two committee members will work with students pursuing the Plan A master's degree. Plan A students should submit an Appointment for Examination form to their major professor, committee, and the Graduate School at least five working days before the final examination is to be held.

Requirements for the Master of Arts degree include two years of an acceptable foreign language or the equivalent, as determined by testing arranged by the supervisory committee and approved by the department and the graduate dean. One year each, or the equivalent, of two languages is acceptable if approved by the student's committee.

Master of Education—Plan B. Students wishing to include a creative project as part of their master's degree program should enroll in the Master of Education (Plan B) program. Three credits will be given for ELED 6960, Master's Creative Project. All MEd students will complete EDUC 6550 (Research for Classroom Teachers, 3 credits) and other courses listed on the current Program of Study form. A committee chair and two committee members will work with students completing the creative project; however, the chairperson will have major responsibility in approving the proposal and primarily work as the program advisor, with the committee members being involved more directly in the presentation of the creative project.

Master of Education—Plan C. In order to provide another option for prospective elementary education master's degree students, the Department of Elementary Education conducts a Plan C option within its Master of Education Degree. The basic elements of a Plan C option include completion of 40 credits of prior approved graduate courses, completion of an exit paper, and an oral review.

The exit paper should be a pre-planned scholarly activity. It could be a paper discussing coursework applicability to the student's teaching assignment, or a written plan for changing curriculum and/or instruction drawing on coursework and the student's role, etc. The intent is that the exit paper be an integral part of the planned course of study.

A notice of intent to complete the degree must be filed with the School of Graduate Studies *at the beginning of the last semester of coursework*. A letter of completion should be filed by the department chairperson upon successful completion of all requirements.

Degree Programs—Off Campus

Two avenues exist for students wishing to pursue a master's degree in the Department of Elementary Education at Utah State University primarily through offerings at USU Continuing Education centers. They are as follows.

Master of Education—Plan B. Off-campus students wishing to include a creative project as part of their master's degree program should enroll in the Master of Education Program. Three credits will be given for ELED 6960 (Master's Creative Project). All MEd students will complete the required core and other courses listed on the current Program of Study form. A committee chair and two committee members will work with students completing the creative project; however, the chairperson will have major responsibility in approving the proposal and primarily work as the program advisor, with the committee members being involved more directly in the presentation of the creative project (oral exam).

Master of Education—Plan C. In order to provide another option for prospective off-campus elementary education master's degree students, the Department of Elementary Education conducts a Plan C option within its Master of Education Degree. The basic elements of a Plan C option include completion of 40 credits or prior approved graduate courses, completion of an exit paper, and an oral review.

The exit paper should be a pre-planned scholarly activity. It could be a paper discussing coursework applicability to the student's teaching assignment, or a written plan for changing curriculum and/or instruction drawing on coursework and the student's role, etc. The intent is that the exit paper be an integral part of the planned course of study.

A notice of intent to complete the program should be filed by the student with the department and the School of Graduate Studies *at the beginning of the semester the candidate is to finish the degree*. A letter of completion should be filed by the committee chairperson upon successful completion of all requirements.

Doctoral Programs (PhD and EdD)

The department participates in the Interdepartmental Doctoral Program in Education, which includes the Doctor of Philosophy (PhD) and the Doctor of Education (EdD). For information about areas of specialization, emphasis of study, research sponsored, admission requirements, procedures to follow, and other information, see pages 185-186 of this catalog.

Additional Information

All students completing master's degrees in Elementary Education must enroll for a minimum of 10 credits *on the USU campus*, except for students completing their degrees at the following USU continuing education centers: Uintah Basin Campus (Vernal and Roosevelt), Moab Center, Price Center, and Blanding Center.

The Program of Study form for the appropriate degree and plan described above should be approved by the committee and submitted to the School of Graduate Studies *at least two months prior to the oral exam, oral review, or presentation appropriate to that degree*.

After matriculation into the program, a master's degree must be completed within a six-year time period. Pass/fail grades will be accepted only for seminars, special problems, interdisciplinary workshops, thesis or dissertation research, and continuing graduate advisement. A maximum of 8 workshop credits may be included. Transfer credit accepted toward a degree is normally limited to 6 credits; however, with prior approval, 12 transfer credits may be accepted. A maximum of 15 credits taken during one summer may be counted toward the degree. A maximum of

12 credits taken before admission to the program may be counted toward the degree. All coursework in a student's area of specialization must be taken at the 6000 level or above, in order to be applied toward a graduate degree in the Department of Elementary Education. Coursework goes out-of-date after eight years.

Admission deadlines for students applying to graduate programs are: June 15 for fall semester, October 15 for spring semester, and March 15 for summer semester.

Research

Cooperation with other departments and research centers at the University, as well as with public school and State Office of Education collaborators, permits strong graduate programs in all phases of elementary education. Research opportunities are available with the Edith Bowen Laboratory School, cooperating school districts in Utah and surrounding states, the Utah State Office of Education, and the United States Department of Education.

Financial Assistance

Both departmental and School of Graduate Studies support are available for the regular academic program and are awarded on a competitive basis. Students requesting financial support should apply to the department by March 15. To be eligible for financial assistance, a student must attend USU full-time. No financial assistance is available for summer semester.

Assistantships. Teaching assistantships are available through the department. Some research assistantships are available through faculty members who have ongoing projects with off-campus funding agencies.

Students are not eligible for assistantships or any form of financial assistance from the University until all application procedures are completed and the student is formally admitted to a program of studies.

Acceptance to pursue graduate study does not guarantee the student financial assistance. Inasmuch as funds are limited, the assistantships are awarded by the department to cover specific teaching assignments and by the faculty to provide for research.

Doctoral students desiring information about financial assistance should write to: Coordinator, Doctoral Degrees, College of Education and Human Services, 2800 Old Main Hill, Utah State University, Logan UT 84322-2800.

Career Opportunities

Positions in Higher Education—Master Teachers. Many school districts support and encourage teachers to further their education and expertise by obtaining a master's degree. Added financial remuneration generally accompanies the completion of such a degree. Supervisors, curriculum specialists, and other professional careers are enhanced by completion of a master's degree.

Completion of a doctorate degree qualifies the graduate for a wide variety of careers, including positions in higher education, curriculum specialist positions in school districts and state offices of education, positions in educational agencies of the United States government, and educational specialist positions in business and industry.

Elementary Education Faculty

Emma Eccles Jones Distinguished Professor

D. Ray Reutzel, reading

Professors

Deborah A. Byrnes, social studies education, early childhood education

Bernard L. Hayes, reading education

Associate Professors

James J. Barta, mathematics, early childhood education

Gary L. Carlston, instructional leadership

Martha T. Dever, foundations, early childhood education

James T. Dorward, mathematics, program evaluation, middle level education

Parker C. Fawson, reading

Scott L. Hunsaker, gifted/talented education, foundations

Francine Fukui Johnson, foundations, gifted/talented education, supervision

Rebecca M. Monhardt, science education

John A. Smith, reading education, research methods

Assistant Professors

Tricia M. Gallagher-Geurtsen, social studies, multicultural/multilingual education

Leigh C. Monhardt, science education

Lisa Pray, bilingual/English-as-a-second-language education

Sylvia Read, language arts education

Martha L. Whitaker, foundations

Temporary Lecturers

Lorilynn B. Brandt, reading education

Judy Greene, language arts/foundations

Course Descriptions

Elementary Education (ELED), pages 383-387

English

Department Head: Jeffrey Smitten
Location: Ray B. West 201
Phone: (435) 797-2733
FAX: (435) 797-3797
E-mail: info@english.usu.edu
WWW: http://websites.usu.edu/english/

Associate Department Head: Patricia M. Gantt, Ray B. West 205, (435) 797-2718, pgantt@english.usu.edu

Director, Graduate Studies: Keith A. Grant-Davie, Ray B. West 310, (435) 797-3547, kgrant-davie@english.usu.edu

Director, Undergraduate Studies: Kathryn R. Fitzgerald, Ray B. West 204F, (435) 797-0235, kfitzgerald@english.usu.edu

Director, Undergraduate American Studies Program and American Studies Graduate Advisor: Jan E. Roush, Ray B. West 312G, (435) 797-2729, jan.roush@usu.edu

English Undergraduate Advisor and American Studies Undergraduate Advisor: Jana Kay Lunstad, Ray B. West 204E, (435) 797-3856, jlunstad@english.usu.edu

Director, Folklore Program: Jeannie B. Thomas, Ray B. West 302B, (435) 797-2736, jthomas@english.usu.edu

Director, Writing Program: Lynn L. Meeks, Ray B. West 207, (435) 797-2723, lmeeks@english.usu.edu

Degrees offered: Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), and Master of Arts (MA) in English; BS, BA, MS, and MA in American Studies

Undergraduate emphases: *BS, BA in English*—Literary Studies, Professional and Technical Writing, and English Teaching

Graduate specializations: *MS, MA in English*—Literature and Writing, Technical Writing; *MS, MA in American Studies*—Folklore, Public Sector Folklore

Undergraduate Programs

General Objectives

The undergraduate programs in English encourage students to gain an appreciation of language and literature through reading, analysis, and writing as a means of enriching their lives as individuals, citizens and professionals. Through a variety of courses in literature, writing, and linguistics, students develop an awareness of these subjects in their personal and cultural contexts, a heightened sensitivity to human experience, and a capacity to adapt to a world of continually changing values and centers of conflict. Students majoring in English thus acquire communicative, analytical, and interpretive skills that help prepare them for a wide range of careers.

After completing a set of core requirements, students in English fulfill the requirements in one of three emphases: (1) the **Literary Studies** emphasis, which gives students a knowledge of the texts and writers of American, British, and world literature and their cultural contexts; (2) the **Professional and Technical Writing** emphasis, which prepares students for various writing careers in professional organizations; and (3) the **English Teaching** emphasis, which prepares students for teaching secondary-level English in the public school system. The English Department also offers a major in American Studies.

The English Department offers a Folklore minor and an interdisciplinary American Studies major and minor. It also offers an English Teaching Minor, an English Minor (Standard Nonteaching), and a minor in British and Commonwealth Studies.

The English Department also offers specific courses supporting other fields of specialization, courses fulfilling University Studies requirements, and enriching educational experiences through opportunities for creativity and expression enhancing lifetime activities.

Admission and Graduation Requirements

The requirements for admission and graduation are commensurate with those described on pages 15-18 and 50-52 of this catalog. To remain in good standing and to obtain approval for graduation as English majors or minors, students must maintain a minimum grade point average of 2.75 in their major and minor courses. All courses listed as major or minor subject courses must be taken on an *A-B-C-D-F* basis, and major or minor subject courses passed with less than a *C* grade must be repeated. Transfer students are required to complete at least 15 semester credits of major subject courses and 10 semester credits of minor subject courses in residence at USU.

Students in the English Teaching major and minor may also apply to the Secondary Teacher Education Program (STEP). See pages 306-307 for procedures and requirements pertaining to teacher licensure and admission requirements. See also the current edition of the *Guide to the Undergraduate Program in Secondary Education at USU*, available at the USU Bookstore.

Course Requirements

Core and Survey Requirements. All English majors are required to complete the following courses as soon as possible before enrolling in upper-division courses: ENGL 1110 (an orientation course); and three of the 2000-level literature survey courses. Exceptions are noted below under emphasis requirements.

Literary Studies Emphasis. This 49-credit emphasis is devoted to the study of literature. Its fundamental premise is that literature is a field of diverse representations that gives shape and meaning to human experience.

Students first complete three of the 2000-level survey courses, ENGL 2140, 2150, 2160, and 2170, that provide a traditional overview of the major periods, authors, and genres of American

and British literature. At the same time, students take an introductory course on literary theory, ENGL 2100, which, in addition to introducing them to the methodologies of literary criticism, challenges received notions about the canon and literary history.

At the 3000 and 4000 levels, students closely examine the conventions and principles forming the more traditional survey courses. Students select 9 credits from ENGL 3300, 3310, and 3320; complete ENGL 4300 (Shakespeare); select 3 credits from ENGL 4310, 4320, and 4330; and select 6 credits from ENGL 4340, 4350, 4360, and 4370. Focusing on specific literary periods, authors, and genres, these courses invite students to think critically about how literature is constructed and organized as a field of knowledge. They also take a linguistics course (ENGL 4200 or 4210), in which they study the structure and history of the English language.

At the 5000 level, students pursue advanced study of literature in relation to issues of gender and sexuality, regional and national boundaries, and cultural differences. These courses provide the advanced theoretical tools necessary to analyze the relationship between literature and culture (6 credits from ENGL 5300, 5320, and 5340). These courses insist that literary texts both exist within and depend upon a complex network of other cultural representations. Students also select one elective course in authors or genres from ENGL courses numbered 4300 through 4370.

The final course, a senior capstone seminar (ENGL 5350), encourages graduating students to both synthesize and critique their differing educational experiences within the program.

Professional and Technical Writing Emphasis. This 49-credit emphasis prepares students for career opportunities in various writing-related careers in professional organizations. The emphasis consists of: (1) a theoretical foundation in rhetoric and linguistics, enabling students to assess any writing situation and adapt their writing to the context as audience-aware writers; and (2) writing practice in a variety of contexts using the most up-to-date tools of technology, so that students know how to write and why they are writing, thus preparing them for the ever-changing job markets of the twenty-first century.

Students begin their studies by completing one literature survey course (ENGL 2140, 2150, 2160, or 2170) and two introductory professional writing courses (ENGL 3400 and 3410) introducing students to the profession of writing and the current technologies used in all levels of text production. At the same time, students also take two courses (chosen from ENGL 3450, 3460, and 5490) addressing rhetorical issues and strategies in the perception, reading, and writing of texts, and two courses in linguistics (chosen from ENGL 4200, 4210, 4230, and 5210) acquainting students with the structure and diversity of the English language.

In addition, all Professional and Technical Writing students must take ENGL 1120, Elements of Grammar, or pass the challenge exam offered by the Writing Center. Prerequisites for applications courses and internships must be passed with a grade of *B-* or higher.

Students then take courses in professional editing (ENGL 4400), document design and graphics (ENGL 4410), interactive media (ENGL 5410), and publication production and management (ENGL 5420). Along with these, students may also take courses in creative writing (ENGL 3420, 3430, and 3440), as well as those with more specific forms of writing, such as proposals, newsletters, and computer documentation (ENGL 5400). Internships (ENGL 4900) provide students with an opportunity to learn through hands-on experiences in a variety of organizations. Students complete the program by taking a capstone course (ENGL 5430), in which they prepare portfolios, explore professional opportunities, and prepare to begin their careers.

English Teaching Emphasis. This 52-credit emphasis, leading to professional licensure in the teaching of secondary-level English, prepares prospective English teachers to participate actively in the many communities related to the profession. Students become well-versed in their academic subject matter (language, writing, literature, and multimedia), skilled in the methods of teaching the various components of the English curriculum and in classroom management techniques, and committed to the achievement of students regardless of gender, race, ethnic, religious, or socioeconomic background.

Students first complete 9 credits of literature survey courses selected from ENGL 2140, 2150, 2160, and 2170; and 3 credits of literary theory (ENGL 2100) to acquire a broad understanding of the traditional literary canon and the current theoretical foundations of English studies. They must also take ENGL 1120, Elements of Grammar, or pass the challenge exam offered by the Writing Center. They then take 12 credits in upper-division literature and then ENGL 3520, 4200, and 4220, which address the current understandings of the diversity of American language and culture as they impact the English classroom. Students take courses in young adult literature (ENGL 3510), Shakespeare (ENGL 4300), and 15 more credits of upper-division literature and writing courses to become familiar with the spectrum of theoretical, ideological, and scholarly issues at stake in English studies today. To become familiar with the art of teaching the many components of the English curriculum, students take two pedagogical courses (ENGL 4500 and 4510), which approach reading and writing as interdependent aspects of communication. If students wish to obtain professional licensure at graduation, they must also fulfill the requirements of the 35-credit Secondary Teacher Education Program (STEP) prescribed by the Department of Secondary Education.

American Studies Major and Minor. Many important issues associated with the origin, evolution, and manifestation of American culture transcend the boundaries of traditional subject areas, and are best explored from a variety of perspectives or disciplines. The American Studies major and minor provide students with the opportunity to integrate studies in various fields into a broader understanding of American culture and its antecedents. Although housed in the Department of English, the American Studies Program permits students to choose relevant courses for their cognate areas from a variety of participating departments throughout the University.

For admission and graduation, students must have and maintain a minimum grade point average of 2.75. All courses used to fulfill either the major or minor requirements must be taken on an *A-B-C-D-F* basis, and major or minor courses passed with less than a *C* grade must be repeated. However, up to 3 credits of internship credit, which is recorded as *P/F*, may be used to partially fulfill the major requirements. Transfer students are required to take at least 15 credits of major subject courses and 10 credits of minor subject courses in residence at USU.

Major. To obtain a degree in American Studies, students must complete a total of 49 credits, including 10 credits of core requirements that introduce foundations of American literature, region, and culture; 6 credits chosen from the 3000 level that expose students to the diversity of American culture; and 9 credits of upper-division work (4000 level) that allow students to approach American literature and culture through various genres.

In addition to completing the required English classes, students must complete 21 credits from two of the following cognate areas: folklore, history, nature and environment, and political science. Students will be required to meet with either the director or the undergraduate advisor to determine appropriate courses for the cognate areas.

The final course, a senior capstone, encourages graduating students to reflect on their overall coursework, synthesizing the perspectives they have gained about American culture in an extended research project reflecting their interdisciplinary academic experience.

Minor. For an American Studies minor, students must select 6 credits from the core courses. Also, a minimum of 12 credits must be selected in one of the four cognate areas.

Core Requirements (10 credits). ENGL 1110, 2160, 2170, 4610.

Cultural Diversity Required Courses (select a minimum of 6 credits). ENGL 3070, 3300, 3520, 3620.

Genre Required Courses (select a minimum of 9 credits). ENGL 4310, 4340, 4350, 4360, 4370, 4630, 4900.

Capstone (3 credits). ENGL 4690.

English Teaching Minor. English Teaching minor students must meet and maintain a 2.75 GPA for admission and graduation and complete the following 27-credit requirement: ENGL 2140 or 2150; ENGL 2160 or 2170; ENGL 3510, 3520, 4200, 4220, 4300, 4500, 4510. Any deviation from this plan must have the approval of the English Department's Director of Undergraduate Studies (Ray B. West 204F).

English Minor (Standard Nonteaching). The standard nonteaching minor consists of 18 credits of various courses, 12 of which must be in upper-division coursework. Nine of the 18 credits must be earned in residence at USU. Advanced Placement and CLEP credit and credit from ENGL 1010 and 2010 may **not** be counted toward this minor. The program must be approved by the Director of Undergraduate Studies at least one year prior to graduation.

British and Commonwealth Studies Minor. The 18-credit minor in British and Commonwealth Studies is an interdisciplinary program sponsored by the departments of English and History. Students must complete ENGL/HIST 2040, then select four appropriate courses from an approved list, and conclude with ENGL 5920 or HIST 4930, in which they complete an individual project concerning Britain and/or the Commonwealth. The program selected must be approved by the chair of the British and Commonwealth Studies Program at least one year prior to graduation. **Note:** Courses used to fulfill requirements for the English or History majors may ***not*** be used for this minor. For further information, contact either the English Department or the History Department.

Folklore Minor. The 18-credit minor in folklore is an interdisciplinary program sponsored by the English Department and the History Department. The coursework for the minor must be approved by the Director of the Folklore Program (Ray B. West 302B) at least one year prior to graduation. Folklore minor students must maintain a 2.75 GPA admissions and graduation standard.

Additional Information and Updates

English programs are constantly being updated. Students should therefore confer with the Director of Undergraduate Studies (Ray B. West 204F) or undergradutate advisor (Ray B. West 204E), or the American Studies advisor (Ray B. West 204E) for information about changes in requirements, scheduling, and sequencing of courses. Current requirement sheets are also available from the English Department (Ray B. West 201) and in the Science/HASS Advising Center (Student Center 302). Degree program information is also available at the department's website.

Financial Support and Scholarships

Scholarships, assistantships, grants-in-aid, and work-study programs are available through the University. In addition, the English Department employs a few students as tutors in The Writing Center and oversees various cooperative education and internship opportunities for students. Departmental scholarships are available on a competitive basis to juniors and seniors, as well as to some sophomores. Applications are accepted in January and February and are available in the college dean's office, Main 338.

Graduate Programs

Admission Requirements

In addition to the requirements specified on pages 90-91 (Admission Procedures), applicants for admission to the English Department graduate programs should have a BS or BA degree with an undergraduate major in a subject area relevant to the graduate program they desire to enter. The English Department accepts the Miller Analogies Test in place of the GRE general test, but encourages applicants to take the GRE. The department also requires a 5-10 page writing sample appropriate to the program the applicant desires to enter. The Technical Writing specialization has additional requirements; see the following website: **http://english.usu.edu/techcomm/**.

International applicants from non-English-speaking countries who desire an MS or MA degree in English should have a BS or BA degree in English from an accredited, English-speaking university. Students whose command of written English is not adequate to the demands of writing a graduate thesis in English may be required to take courses in Intensive English or may be counseled to obtain a second bachelor's degree at USU (30 credits minimum).

The annual application deadline is January 15 for those who wish to be considered for a graduate instructor position, a Moyle Q. Rice Scholarship, or other form of financial aid. The final annual deadline is June 1 for all other applicants who wish to begin their course of study fall semester.

Anyone who has not been accepted into a graduate program in the English Department must have permission from the department's Director of Graduate Studies to enroll in English graduate courses.

Degree Programs

The Department of English offers courses of study leading to the MS and MA degrees in English and in American Studies. Applicants seeking the English degree may be admitted into the Literature and Writing specialization or the Technical Writing specialization. Applicants seeking the interdisciplinary American Studies degree may draw from almost any combination of courses

dealing with American culture: literature, history, art, government, etc. Folklore is one of the specializations in American Studies, with courses in all aspects of folklore study, including public sector folklore.

For a more complete description of the Department of English graduate programs, see the department's website: **http://websites.usu.edu/english/.**

English Program Requirements

Applicants will be admitted to the English degree for one of two specializations: Literature and Writing (30-33 credits) or Technical Writing (33 credits).

Literature and Writing. This specialization results from a merger of two previous specializations within the English degree: *Literary Studies* and *Theory and Practice of Writing*. The Literature and Writing specialization is designed to help secondary-level English teachers advance their careers, to prepare students to teach English at two-year colleges, and to prepare students to pursue doctoral studies in English. Students plan their program of study with their advisor, selecting courses primarily from the ENGL 6330 to 6360 range and the ENGL 6820 to 6890 range. Students are encouraged, but not required, to take ENGL 6320 and/or ENGL 6810. In addition, ENGL 6820 is required for all students working as Graduate Instructors. With the approval of the student's advisor, a program of study may also include courses from one of the department's other specializations and one course from another department.

As part of a commitment to exploring the relationship between technology and the humanities, and to accommodate students living beyond commuting distance, the department offers at least one online graduate seminar per semester appropriate for students in the Literature and Writing specialization. There may also be an appropriate online course offered during the summer. These online courses are also open to on-campus students. Students can complete the degree entirely online. However, if they take only online courses, they should expect a limited selection of courses, and they should expect to take longer than two years to graduate.

Students in Literature and Writing may pursue *either* the MS *or* the MA degree, but the department recommends the MA for those planning to continue study at the doctoral level. Literature and Writing students are encouraged to choose *either* Plan A *or* Plan B, both of which require an extended project, which is completed under the supervision of the student's Supervisory Committee and culminates in an oral defense. Plan A consists of 24 credits of coursework and 6 credits of ENGL 6970 (Thesis), leading to a thesis of 60 pages or more; Plan B consists of 27 credits of coursework and 3 credits of ENGL 6970, leading to a mini-thesis. Both Plan A and Plan B projects require the student to meet on campus at least twice with his or her Supervisory Committee. During the first meeting, the student defends a written thesis proposal. During the second meeting, the completed thesis is defended. With the approval of the Creative Writing Committee, a Plan A or Plan B project may consist of a piece of creative writing and an accompanying critical essay. Plan C, which consists of additional coursework (33 credits as opposed to 30 credits for Plan A or B) and no extended project or defense, is also available. Plan C does not require the student to come to campus for defense meetings with the Supervisory Committee, so it is geared especially to students living beyond commuting distance who are taking all or most of their courses online. Students enrolled in all three plans write a Comprehensive Exam.

Technical Writing (online). Technical Writing is designed for students who already have some training and/or experience as practitioners of technical writing. The program is entirely online, via the Internet. The program's mission is to prepare students to enter or reenter nonacademic workplaces, not just as practitioners, but also as developers and managers of technical documents. When they finish the program, students will be qualified to determine and defend writing policy and practices in their workplaces.

To prepare students for these leadership roles, the program provides them with a strong theoretical understanding of their profession. In their online graduate seminars, students will read widely in research and theory relating to workplace writing practices. They will critically examine both the theories and the practices, and they will explore ways in which each can enhance the other. They will also learn how to manage teams of writers, and they will explore ethical issues in the profession. The program will balance the theoretical training with opportunities for students to improve their own practical skills as technical writers, learning how to apply theory and current technology to the production of a variety of technical documents. This practical training will include multimedia presentations and graphic design.

The program is designed primarily for nontraditional students—working professional writers who want to enhance their credentials and build a strong theoretical understanding of their profession. However, it may also accept some traditional students who have just finished their undergraduate studies.

Students in Technical Writing must complete 33 credits under the Plan C option. Courses may be taken in any sequence. Students in this program pursue the MS degree.

American Studies Program Requirements

Those applicants who have been admitted to the American Studies degree will work out a program of study with either the American Studies advisor or the Folklore advisor. Generally, students develop their programs with an emphasis in American literature, folklore, or history. Interdisciplinary connections with many other departments at USU are possible. Students may choose the standard program, the Folklore specialization, or the Public Sector Folklore specialization. The American Studies degree requires 30 credits, with a preference for the MA and the Plan A (thesis) options, although the MS and the Plan B options are also accepted.

Students in the standard program must take American Studies Theory and Method (ENGL 6600) early in their course of study. Students in the Folklore specialization must take Folklore Theory and Method (ENGL 6700) early in their course of study. Students selecting the Public Sector Folklore specialization will follow the same requirements as students in the Folklore specialization, with the following exception. All students in the Public Sector Folklore specialization are required to take Folklore Fieldwork (ENGL 6720), Public Folklore (ENGL 6730), and Graduate Internship (ENGL 6900).

Of special interest to students in American Studies are the *Western Historical Quarterly* and the *Western American Literature* journals published at USU, which often provide editorial and clerical positions for graduate students. Also, The Mountain West Center for Regional Studies sponsors lectures and programs and provides research assistance for students working in the field of regional studies. The Merrill Library is a regional depository for federal publications and receives 60,000 to 70,000 government titles each year. The library's Special Collections contain thousands of historical photographs, an immense store of pioneer diaries and papers, and a strong collection of books and manuscripts relating to the west, the pioneers, the Mormons, cowboys, and cowboy po-

etry. The Fife Folklore Archives, named after Utah folklorists Austin and Alta Fife and recognized as one of the best folklore archives in the country, contains over 3,400 books on folklore and folklore-related topics. The Special Collections also serve as the national repository for the American Folklore Society's Papers, over 50 linear feet of records and documents accumulated during the 114-year history of the organization.

General Requirements

All candidates for the MS and MA degrees must meet the School of Graduate Studies requirements (see pages 90-97 of this catalog). Only grades of *B-* or better will be accepted for credits in support of the degree programs; however, students must maintain an overall GPA of 3.0 to remain in the program.

All candidates must complete a comprehensive examination covering the material of their graduate program; however, the nature of this examination varies according to the particular specialization and the advice of the candidate's supervisory committee.

All candidates are required to defend their Plan A thesis or Plan B papers. After successfully defending their Plan A thesis, students must submit a department-approved final draft to the thesis coordinator in the School of Graduate Studies office (Main 164). After successfully defending their Plan B papers, students must submit a department-approved copy to University Library Special Collections (Merrill Library 143).

All candidates who are first-year graduate instructors are required to take Practicum in Teaching English (ENGL 6820) during their first semester. The candidate's supervisory committee will determine whether ENGL 6820 will be accepted as part of the candidate's graduate program.

Financial Assistance

The Department of English has a limited number of graduate instructor positions and Moyle Q. Rice Scholarships available on a competitive basis for both English and American Studies graduate students. Additional financial aid is available through the journal of *Western American Literature*. All applicants whose application materials are received by January 15 will automatically be considered for possible scholarship awards. All applicants who wish to be considered for a graduate instructorship should contact the Director of Graduate Studies in the English Department. The application deadline for instructorships is January 15.

English Faculty

Professors

Jay Anderson, folklife, material culture, folk art

Melody Graulich, American Literature, American Studies, Western American literature, feminist studies

Christine Hult, composition and rhetoric, teacher education (Associate Dean, College of Humanities, Arts and Social Sciences)

Thomas L. Kent, rhetoric and composition (Dean, School of Graduate Studies)

Joyce A. Kinkead, composition and rhetoric (Vice Provost for Undergraduate Studies and Research)

Lynn L. Meeks, teacher education, composition and rhetoric, literature for children and young adults

Jeffrey Smitten, eighteenth century British literature, Scottish literature, literary theory and criticism

Charlotte Thralls, professional communication, workplace culture (Associate Dean, College of Humanities, Arts and Social Sciences)

Barre Toelken, folklore, Native American studies, medieval literature

Professors Emeritus

Jan Bakker, nineteenth- and early twentieth-century American literature

Kenneth W. Brewer, poetry and essay writing

Associate Professors

Paul J. Crumbley, American poetry, nineteenth century American women writers, American identity, the wilderness experience

Kathryn R. Fitzgerald, teacher education, composition and rhetoric, writing assessment

Evelyn I. Funda, American literature, Western American literature

Patricia Gantt, teacher education, young adult literature, American studies, women and gender studies, southern literature

Keith A. Grant-Davie, composition and rhetoric, reading theory, technical communication

David E. Hailey, Jr., technical communication, online information, CBT technology

Phebe Jensen, sixteenth- and seventeenth-century British literature, Shakespeare

Sonia Manuel-Dupont, linguistics, technical communication, teacher education

Brian W. McCuskey, nineteenth-century British literature

John E. McLaughlin, linguistics, technical communication, Native American languages

Kristine A. Miller, twentieth-century British literature

Jan E. Roush, American Studies, folklore

Anne Shifrer, twentieth-century literature, women writers, poetry, literary theory and criticism

Ronald R. Shook, technical communication, linguistics

Stephen C. Siporin, folklore, folk narrative, material culture, folk ethnicity

Jeannie B. Thomas, folklore, legend, oral narrative, humor and gender

Associate Professors Emeritus

Kate M. Begnal, twentieth-century literature, postmodernism, literary theory and criticism

Patricia Gardner, world literature, children's and young adult literature, folklore

Assistant Professors

Christopher Cokinos, creative nonfiction, poetry writing, science and nature writing

Kelli Cargile Cook, technical communication

Brock Dethier, composition, creative writing

Jennifer Sinor, rhetoric and composition, teacher education

Michael Sowder, creative writing (poetry), American literature

Roberta S. Stearman, American literature, fiction writing

Andrea Tinnemeyer, American literature

Mark Zachry, rhetoric and professional communication

Adjunct Assistant Professor

Christie L. Fox, folklore; Program Coordinator of Honors Program

Senior Lecturer

Nancy O'Rourke, technical communication

Lecturers

Shanan L. Ballam, writing, creative writing

Star Coulbrooke, Assistant Director of Writing Center

Julie R. Foust, writing; Director of Rhetoric Associates

Marina L. Hall, American literature, composition

Charlene A. Hirschi, Director of Writing Center

Julie Robertson, writing

Paige Smitten, literature and writing

Anne H. Stark, literature and writing

Course Descriptions

English (ENGL), pages 387-391

Environment and Society

Department Head: Terry L. Sharik
Location: Natural Resources 201
Phone: (435) 797-1790
FAX: (435) 797-4048
WWW: http://www.cnr.usu.edu/envs

Undergraduate Advisors:
Maureen A. Wagner, Natural Resources 120, (435) 797-2448, maureen@cc.usu.edu
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Degrees offered: Bachelor of Science (BS) in Environmental Studies; BS, Master of Science (MS), and Doctor of Philosophy (PhD) in Recreation Resource Management; BS, Bachelor of Arts (BA), MS, and Master of Arts (MA) in Geography; MS in Bioregional Planning (offered jointly with Department of Landscape Architecture and Environmental Planning); MS and PhD in Human Dimensions of Ecosystem Science and Management

Vision/Mission: The vision of the Department of Environment and Society is one of bringing people and science together for healthy communities and enduring ecosystems. The mission of the department is based on three goals: (1) to promote scholarship and creativity in the discovery, synthesis, and transfer of knowledge relating to the human dimensions of natural resource and environmental management; (2) to apply social science concepts and approaches to better understand human-environment interactions at a range of spatial scales; and (3) to enhance the effectiveness of policies, planning, and administrative processes that affect sustainable use of the natural world.

To this end, the department's academic programs provide undergraduate and graduate students with a balanced exposure to the social, physical, and biological sciences within an interdisciplinary framework. This combination has great relevance for students aspiring to careers in natural resource and environmental policy, planning, management, education, and science, as well as careers in geography. The program is designed to provide students with a working knowledge of the human aspects of ecosystems and a speaking knowledge of the biophysical aspects, as well as experience using "state of the art" tools and techniques for integrating this knowledge.

Undergraduate Programs

Objectives

The department offers the following undergraduate degree programs: Environmental Studies, Geography, and Recreation Resource Management. Each of these programs offers a balanced exposure to key ideas and principles of the social, biological, and physical sciences, placing special emphasis on the human dimensions of natural resources and environmental management. The department's goal is to train professionals who can lead the way toward finding and keeping a sustainable balance between protecting the environment and enhancing human societies.

Departmental programs offer learning experiences in the classroom and in the field, frequent individual contacts with faculty as teachers and advisors, and opportunities to take part in student and professional organizations. Seasonal employment, internships, and other activities promoting hands-on experience in natural resource and geographic professions are strongly encouraged.

The **Environmental Studies** curriculum is designed for students who wish to acquire a broad understanding of natural resources and human-environment relationships, together with the technical background needed to understand environmental issues. In many ways, the curriculum provides a traditional "liberal arts education" with a strong natural resources emphasis. Moreover, it offers flexibility for the development of either specialization or breadth of content to match the student's interests.

The **Geography** curriculum provides a broad background in the basic themes of geography—human (cultural), physical, and regional geography—with a particular focus on environmental and earth resources geography. In addition, students acquire technical geographic analysis skills. Students also have the opportunity to study in a systematic, regional, or technical area of geography.

The **Geography Teaching** curriculum offers students an opportunity to prepare for a career in secondary education with a geography emphasis.

The **Recreation Resource Management** curriculum prepares students for careers in managing outdoor recreation settings, such as public forests and rangelands, state and national parks, and wilderness areas. Because these jobs require an understanding of both the land and the people who visit it, the major offers courses in both the natural and social sciences, along with an emphasis on communication skills.

Requirements

Admission Requirements. Admission requirements for the Department of Environment and Society are the same as those described for the College of Natural Resources (see pages 115-116).

Graduation Requirements. All courses listed as major subject courses must be taken on an *A-B-C-D-F* basis. The grade point average for all courses taught by the College of Natural Resources must be 2.5 or higher.

All students in the Environmental Studies and Recreation Resource Management majors must complete a series of basic lower-division courses providing the disciplinary foundation for natural resource professions before moving on to professional coursework. Equivalents of these foundation courses may be taken at many two- and four-year colleges. Some foundation and core courses may also be used toward the University Studies requirements, as shown by the University Studies designations listed in parentheses following the course numbers. Students should consult their academic advisor if they have questions about University graduation requirements.

Environmental Studies Major

The Environmental Studies major consists of 92 credits. This total includes the disciplinary foundation, professional courses, and a specialization option of 15 or more credits.

Lower-division Foundation: BIOL 1010 (BLS), 1020; CHEM 1110; HIST 3950 (DHA/CI) or PHIL 3510 (DHA); MATH 1050 (QL); STAT 2000 (QI).

Professional Coursework: AWER 3100 (DSC/CI) or ENVS 3600 (DSC); AWER 3700; ENVS 1990, 2340 (BSS), 3000, 3330, 3500 (QI), 4000 (DSS), 4400, 4990, 5000; FRWS 2200 (BLS), 3900; GEOG 1130 (BPS) or GEOL 1150 (BPS); GEOG 3850; one of the following: BIOL 3040 (DSC), FRWS 3050 (DSC), 3600, PLSC 3500; one of the following: ANTH 3110, 4110 (DSS), or another course in cultural resource management approved by faculty advisor.

Specialization Option: Students work with their faculty advisor to develop a specialization option fitting their interests and career goals. The option consists of 15 or more additional credits, and may include any approved University minor or a suite of courses meeting the student's particular needs. At least one course in the specialization area must be a natural resources policy course numbered 3000 or higher.

Geography Major

The Geography major consists of 43 credits. After meeting the University Studies, USU upper-division, and geography major requirements, students may take the remainder of their 120 required credits in any discipline from any department. Students interested in using their elective credits to develop a field of specialization should consult with their advisor to select appropriate courses.

Disciplinary Foundation: AWER 4930, GEOG 1030 (BSS), 1130 (BPS), 1140, 2030 (BSS), 3850, 4200 (CI), 4850; MATH 1050 (QL); STAT 2000 (QI).

Geography Specialization: Students work with their faculty advisor to develop a 12-credit specialization fitting their interests and career goals. The specialization may include internships, directed study, and courses offered throughout the University that complement their academic goals.

Geography Teaching Major

The teaching major in Geography consists of both the geography courses (36 credits) and the Secondary Teacher Education Program (STEP) (35 credits). For details about the STEP, students are referred to the geography major requirement sheet, or the STEP information listed in the Department of Secondary Education section (pages 306-307). A geography teaching major also requires a teaching minor in another field of study.

Foundation: GEOG 1030 (BSS), 1130 (BPS), 2030 (BSS), 3850, 4200 (CI) (both the Utah section and one other); one of GEOG 4850 or AWER 4930.

Professional Coursework: GEOG 4300, 4800, 5900.

Geography Electives: 6-10 credits of Geography courses numbered 2000 and above. It is recommended that students take additional regional, systematic, technology in geography education, or classroom technology practicum credits. All electives must be coordinated with a geography education advisor.

Recreation Resource Management Major

The Recreation Resource Management major consists of 82-86 credits.

Lower-division Foundation: BIOL 1010 (BLS), 1020; CHEM 1110; MATH 1050 (QL); STAT 2000 (QI).

Professional Coursework: AWER 3100 (DSC/CI) or ENVS 3600 (DSC); AWER 3700; ENVS 1990, 2340 (BSS), 3000, 3300, 3500 (QI), 4000 (DSS), 4130, 4400, 4500 (CI), 4600 or 5110, 4920 or 4950, 4990, 5000; FRWS 2200 (BLS), 3900; GEOG 1130 (BPS) or GEOL 1150 (BPS); GEOG 3850; SOIL 3000; one of BIOL 3040 (DSC), FRWS 3050 (DSC), 3600, or PLSC 3500; one of ANTH 3110, 4110 (DSS), or similar course approved by department.

Environment and Society Minors

The department offers minors in Environmental Studies, Geography, Geography Teaching, and Recreation Resources. Students in all University majors may complete a Geography, Geography Teaching, or Recreation Resources minor. The Environmental Studies minor is open to all majors, *except* those in the College of Natural Resources. Because the same courses cannot be counted toward both a student's major and minor, students must take additional courses beyond those listed here if their majors require courses that are also included in the minor. Students wishing to minor in the above areas should contact the department to meet with the designated advisor for that minor.

The **Environmental Studies** minor totals 15-17 credits and includes ENVS 2340 (BSS), ENVS 3000, FRWS 2200 (BLS); one of ENVS 4110, 4130, 4400, 5300, 5320, 5550; and one additional upper-division course (minimum 3 credits) that can be applied to natural resources management, chosen in consultation with faculty advisor.

The **Geography** minor totals 24 credits and includes AWER 4930; GEOG 1030 (BSS), 1130 (BPS), 1140, 2030 (BSS), 3850, 4200 (CI), 4850.

The **Geography Teaching** minor totals 26-27 credits and includes GEOG 1030 (BSS), 1130 (BPS), 2030 (BSS), 3850, 4200 (CI) (both the Utah section and one other), 4300, 4800, 4850 or AWER 4930. An approved teaching major in another subject is also *required*.

The **Recreation Resources** minor totals 15 credits and includes ENVS 3300, 4130, 4500 (CI), 4600; plus one of the following: ENVS 3330, 4000 (DSS), 4400, or 5110.

Financial Assistance

The main opportunities for undergraduates to find financial support through grants, work-study, and loans are listed on pages 22-26 in the *Financial Aid and Scholarship Information* section. Some students may be able to find paid internships with private or governmental organizations, or work for a faculty member on a research project. Interested persons should contact the College of Natural Resources Academic Service Center for more information on scholarships for undergraduate students.

Additional Information

For additional information about the Bachelor of Science requirements, course sequencing, and departmental specialization options and their related coursework, as well as updated information describing current programs and courses offered by the Department of Environment and Society, visit the Environment and Society main office, Natural Resources 201, or visit:
http://www.cnr.usu.edu/envs.

Graduate Programs

Admission Requirements

See general admission requirements on pages 90-91. Applicants for graduate study in the Department of Environment and Society should have a bachelor's degree from an accredited college or university, a cumulative GPA of at least 3.0 (out of 4.0), and GRE scores (quantitative and verbal) above the 40th percentile. Foreign students should submit a TOEFL score of at least 550. Exceptions to these standards will be considered on a case-by-case basis. Written statements of interest help match applicants with faculty advisors. A faculty member must agree to serve as the major professor in order for an applicant to be accepted. Prospective students are encouraged to contact faculty members early in the application process to investigate mutual interests, projects, and prospects for financial support.

The department's graduate programs focus on providing students with a broad foundation in the social and natural sciences as they relate to the study, planning, and management of ecosystems. The curriculum is designed to enhance interdisciplinary integration by emphasizing current and future environmental issues facing humanity. Coursework and research are focused on problem solving through application of social research methods, case studies, computer mapping, and other analytical techniques.

The department values intellectual, academic, and social diversity in the applicants for graduate study. Mature professionals seeking education to augment life experiences, or practical training to pursue new career paths, are also encouraged to apply. Knowledge gaps will be identified early in a student's program and addressed on a case-by-case basis through agreements between students and their graduate advisory committees.

Degree Programs

The department offers opportunities for graduate study through the MS, MA, PhD, and graduate certificate programs listed below. The department also offers opportunities to participate in a college-wide Master of Natural Resources (MNR) program administered through the Dean's Office of the College of Natural Resources. This program is described more fully on page 278.

The MS degree requires a minimum of 30 credits, of which 24 must be in residence. Candidates for the MA must complete the requirements for the MS, with the addition of at least two years (approximately 16 credits) of an approved foreign language or some other demonstration of foreign language proficiency. There are two options available in both the MS and MA programs. The **Plan A** requires students to complete coursework, as well as a research thesis. The **Plan B** is a nonthesis, terminal degree, based largely on coursework and a professional paper or project.

For the PhD degree, there is a more variable amount of required coursework, as well as a research dissertation. Compared to the MS degree, the PhD degree has a greater emphasis on theory, research methods, writing research proposals, and publishing research in peer-reviewed outlets.

Bioregional Planning. Graduate education in bioregional planning recognizes the importance of how the biophysical attributes of a region influence the human dimensions of settlement and culture. The reciprocal is also addressed. The two-year Master of Science degree in Bioregional Planning, offered jointly with the Department of Landscape Architecture and Environmental Planning, presents an interdisciplinary core of courses and faculty for the purpose of addressing complex issues in the areas of environmental analysis, planning, and policy. Emphasis is placed on four problematic content areas associated with environmental planning: social/behavioral, biophysical, economic, and public policy. The spatial focus is on planning for large regional landscapes with dispersed populations with a primary economic base in agriculture, energy development, tourism/recreation, retirement communities, and natural resources. The program prepares future planners and managers to work within an interdisciplinary environment, providing better alternatives for decisions and policy implementation. Bioregional planning is practiced in both the private and public sectors, which may include offices of the National Park Service, U.S. Forest Service, Bureau of Land Management, and various state, county, and community organizations. For further information, see page 242.

Geography. Graduate education in Geography provides opportunities for students to gain advanced technical knowledge and skills in formal specializations that include: (1) Human-Environment Interactions, (2) Geographic Information Systems, (3) International Rural Development, (4) Geographic Education, and (5) Environmental Education.

Human Dimensions of Ecosystem Science and Management. Graduate education in the *Human Dimensions of Ecosystem Science and Management* (HDESM) was created in response to a growing demand in natural resource fields for more interdisciplinary professionals with diverse skills and broader intellectual capabilities. Moreover, it is being recognized that social and managerial sciences are increasingly important in helping society better understand and solve environmental problems. The HDESM program will produce students who are problem solvers with an ability to integrate human and biophysical aspects of ecosystems, and to analyze policies and decisions that encourage both community and ecosystem sustainability. The HDESM degrees will train students for professional positions with local, state, national, and international resource management agencies, private consulting and environmental analysis firms, and nongovernmental environmental organizations. The MS degree will prepare students for professional practice in natural resources and environmental management and planning, policy and program analysis, public affairs, environmental education, community assessment and collaboration, conflict management, and extension/outreach positions. The PhD program puts greater emphasis on basic theory and research methods in one or more social science disciplines, depending on the student's interests. The PhD will prepare students for university teaching, research, and extension; conducting agency and private organizational research; and for positions in formal policy and program evaluation.

Recreation Resource Management. Graduate education in Recreation Resource Management provides opportunities for students to gain advanced knowledge and skills in topics such as: (1) outdoor recreation behavior and attitudes, (2) resource-based conflict and crowding, (3) natural resource-based tourism, (4) natural history interpretation, and (5) integration of outdoor recreation with protected area management or rural development.

Graduate Certificate Programs

Faculty in the Department of Environment and Society also administer two graduate certificate programs, including **Natural Resource and Environmental Education (NREE)** and **National Environmental Policy Act (NEPA)**. By meeting certain core requirements, students are able to obtain a certificate in one or both of these areas complementing their degree program. See pages 272-275 for a description of the NREE Program and pages 270-271 for a description of the NEPA Program. The Environment and Society Department is also affiliated with the Natural Resource and Environmental Policy (NREP) Program, which is described on pages 276-277.

Research

The generation of new knowledge through research is one of the key contributions that an academic department makes to professions and society at large. Research is also a major venue for the interaction of graduate students and faculty in the Department of Environment and Society. Although faculty and students work on many different issues, the research strives to be interdisciplinary and focuses on merging the relevant social and natural sciences. Work is undertaken in Utah and beyond, including several projects elsewhere in the United States and in developing nations. Funding comes from a variety of public and private sources. The department houses one institute and three programs that also collaborate on research. These include the Institute for Outdoor Recreation and Tourism, the Natural Resource and Environmental Policy Program, the Geographic Education Program, and the Environmental Education Program.

Financial Assistance

General aspects of financial support for graduate students at Utah State University are listed on pages 89-90 in the *Graduate Financial Assistance* section. This includes important information on the University-wide policies and terms of reference for research and teaching assistantships, graduate tuition obligations and benefits, Western Regional Graduate Programs, and competitive University-wide fellowships and scholarships.

The Department of Environment and Society intends that all graduate students be financially supported. Graduate research assistantships are available through major professors having contracts, grants, or other awards. Internships may also be created on a case-by-case basis. A student may want to author or co-author a proposal with a faculty member to fund a new initiative. There are also open competitions for graduate scholarships and fellowships through the College of Natural Resources. The department also has a few graduate teaching assistantships where graduate students typically help instructors with teaching, grading, or recitation in large courses. Interested persons should contact the department early in the application process for more information on financial assistance for graduate students. Prospective students may also visit **http://www.cnr.usu.edu/envs**.

Environment and Society Faculty

Professors

Clifford B. Craig, geographic education, community development, rural planning, economic geography, geography of Utah

Steven E. Daniels, natural resource policy, collaborative community processes

Leona K. Hawks, sustainability, energy efficiency, water conservation, healthy indoor environments, green consumerism in buildings and technologies

James J. Kennedy, policy and administration of natural resource and environmental management

Richard S. Krannich, natural resource policy and sociology

Jack M. Payne, Vice President and Dean for University Extension, conservation program administration, agriculture and natural resource policy

H. Charles Romesburg, natural resources research methods and natural resources ethics

Terry L. Sharik, natural resource and environmental management, institutional analysis, teaching and learning pedagogy, forest ecology

Derrick J. Thom, land use, population and settlement, rural development, remote sensing, geography of Africa

Richard E. Toth, bioregional and water resources analysis, planning, and management

Associate Professors

Ted J. Alsop, physical geography, climatology, geomorphology, photogrammetry, geography of North America

Dale J. Blahna, natural resource sociology, policy, outdoor recreation, and interpretation

Mark W. Brunson, social and psychological aspects of forest and rangeland management

Steven W. Burr, recreation resources, outdoor recreation and natural resource-based tourism, rural community development

D. Layne Coppock, rangeland ecology, management, and policy; international pastoral and agropastoral development; community-based natural resource management

Joanna L. Endter-Wada, cultural anthropology, natural resource policy and sociology

Robert J. Lilieholm, natural resource management and economics, land use planning, sustainable development

Robert H. Schmidt, wildlife policy, wildlife damage management

Assistant Professor

Nicole L. McCoy, natural resource economics

Senior Lecturer

Michael F. Butkus, recreation resources management and planning, interpretive planning

Lecturers

Judith A. Kurtzman, natural resource policy

Barbara Middleton, environmental education

Course Descriptions

Environment and Society (ENVS), pages 392-394
Geography (GEOG), pages 403-404
National Environmental Policy Act (NEPA), page 447

Family, Consumer, and Human Development

Department Head: Thomas R. Lee
Location: Family Life 203
Phone: (435) 797-1551
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E-mail (graduate): teresab@cc.usu.edu
WWW: http://www.usu.edu/fchd

Associate Department Head and Child Development Laboratory Director: Shelley L. Knudsen Lindauer, Family Life 106A, (435) 797-1532, lindauer@cc.usu.edu

Gerontology Certificate Program Coordinator: Jana Darrington, Family Life 218, (435) 797-7140, jdarrington@cc.usu.edu

Marriage and Family Therapy Program Director: Thorana S. Nelson, Family Life Center 104, (435) 797-7431, thorana.nelson@usu.edu

Undergraduate Academic Advisor: Marilyn B. Kruse, Family Life 205A, (435) 797-1530, marilynk@cc.usu.edu

Graduate Program Coordinator: Kathleen W. Piercy, Family Life 219, (435) 797-2387, kathyp@cc.usu.edu

Degrees offered: Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), and Doctor of Philosophy (PhD) in Family, Consumer, and Human Development; BS and BA in Early Childhood Education; BS and BA in Family and Consumer Sciences; Master of Family and Human Development (MFHD)

Undergraduate emphases: *BS, BA in Family, Consumer, and Human Development*—Deaf Education, Family and Community Services, Family Finance; Human Development; *BS, BA in Early Childhood Education*—licensure, K-3rd grades

Graduate specializations: *MS*—Adolescence and Youth, Adult Development and Aging, Consumer Sciences, Infancy and Childhood, Marriage and Family Relationships, Marriage and Family Therapy

Gerontology Certificate Program: The Gerontology Certificate Program at Utah State University is administered through the Department of Family, Consumer, and Human Development, and is open to all majors. Students preparing for careers in the field of aging complete selected aging-related coursework, including a supervised field practicum in a gerontological setting. For a list of requirements for this interdisciplinary certificate, contact the department. A minimum GPA of 2.75 is required for the Gerontology Certificate.

Undergraduate Programs

Objectives

The Family, Consumer, and Human Development Department offers undergraduate programs in Family, Consumer, and Human Development; Family and Consumer Sciences; and Early Childhood Education. All programs are designed to prepare students for successful careers.

The Family, Consumer, and Human Development major prepares students for careers serving individuals and families across the life span. Through classroom study and applied experiences, majors study how human development, family relationships, family economics, and consumer issues affect the individual and family.

Faculty members provide instruction and practicum supervision to prepare students to meet the needs of the people they will serve in their future careers in agencies and organizations serving individuals from infancy through later life, as well as families and consumers in many settings.

Student majors in Family, Consumer, and Human Development are required to complete a practicum experience, which is arranged with the department practicum coordinator. Types of practicum sites include state agencies, hospitals, pre-schools and child care centers, nursing homes, senior citizen centers, parenting programs, detention centers, crisis intervention programs, public schools, head start programs, and after-school programs, as well as financial institutions, credit counseling services, and housing services. Practicum experience in the Deaf Education and Human Development emphases includes the Adele and Dale Young Child Development Lab setting. Students majoring in Early Childhood Education complete a formal internship in the Adele and Dale Young Child Development Labs and in primary school grades as part of this focus.

Majors in Family, Consumer, and Human Development (FCHD), as well as in Early Childhood Education, receive the necessary preparation for graduate study in a family, consumer, and human development related field or employment. Early Childhood Education majors acquire a teaching license so they can also teach in the public schools.

In addition to preparation for advanced study or job opportunities, FCHD majors receive increased knowledge and skills in topics which will enhance their personal and family lives.

Certified Family Life Educator (CFLE). Students who complete the Family and Community Services emphasis are eligible to apply for the Certified Family Life Educator credential through the National Council on Family Relations.

Gerontology Certificate. Students pursuing the Gerontology Certificate must take additional courses and complete a gerontology practicum as required for certification. A complete list of requirements may be obtained in Family Life 214 or by calling (435) 797-7140.

Honors Program. The Department of Family, Consumer, and Human Development participates in the University Honors Program. Students can graduate with Departmental Honors. For further information, see the *Honors Program* section on page 226, or access the Honors Program home page at:
http://www.usu.edu/honors.

Departmental Requirements for Family, Consumer, and Human Development Major

Admission Requirements. Students with less that 24 semester credits can declare a premajor in FCHD. Completion of at least 24 semester credits (including FCHD 1100, 1500, and 2400) with a cumulative GPA of 2.75 is required for admission into the major.

Departmental Program Requirements. The department has established the following regulations, which govern students' academic progress:

1. The *P/D+, D,* and *F* option cannot be used for courses required in the FCHD major or minor.

2. An overall cumulative GPA of 2.75 is required to enter the major, and a cumulative 2.75 GPA is required for graduation. A GPA of 2.75 in FCHD major courses is also required for graduation.

Background Check. All students will be required to pass a background check prior to participation in a practicum experience (FCHD 4950, 4970, 4980, or 5950).

Emphasis Requirements. After admission to the FCHD major, students must complete the requirements for *one* of the following four emphases: Family and Community Services, Human Development, Deaf Education, or Family Finance. These requirements are shown below.

Family and Community Services and Human Development Emphases

Majors choosing one of these two emphases prepare for employment in a variety of occupational settings. Previous graduates have found employment in such settings as child care, Head Start programs, social services agencies, drug treatment centers, youth and adult residential care centers, foster care, youth centers, crisis centers, parent education programs, senior citizen centers, long-term care facilities, adult day care centers, and a host of related federal, state, and local agencies serving families and children. Students are prepared to work in their communities to develop and guide policies for families and children. In addition, FCHD majors receive increased knowledge and skills in topics which will enhance their personal and family lives.

Core Courses (54 credits). Core courses for the **Family and Community Services** and **Human Development** Emphases are as follows: FCHD 1100, 1500, 2400, 2610, 3100, 3110, 3130, 3210, 3510, 3520, 3530, 3540, 4220, 4230, 4240, 4900, 4980; PSY 2800 or SOC 3120. In addition to completing these core courses, all students must complete all courses listed below for *either* the Family and Community Services Emphasis *or* the Human Development Emphasis.

Family and Community Services Emphasis (7 credits). FCHD 3500 (Interdisciplinary Lab: Infancy *or* Middle Years; take concurrently with FCHD 3510 or 3520), 3350, 5540.

Human Development Emphasis (8 credits). FCHD 3500 (Interdisciplinary Lab: Infancy; take concurrently with FCHD 3510) 3500 (Interdisciplinary Lab: Middle Years; take concurrently with FCHD 3520), 4550, 4960.

Suggested Electives. FCHD 5550 (Workshop: Casework Training I) and FCHD 5550 (Workshop: Casework Training II).

Deaf Education Emphasis

Majors choosing this emphasis are prepared to work with infants and young children who are hearing impaired and their families. Once students have completed their undergraduate degree, they can apply to the graduate program in the Department of Communicative Disorders and Deaf Education and work toward a master's degree with a specialization in Early Childhood Communicative Disorders. This master's program can be completed in two semesters plus a summer session. Students completing the master's program will have the skills necessary to work in early intervention programs called Parent-Infant Programs (or PIP programs). These programs may be found in every state of the country. Upon completion of the undergraduate FCHD major with the Deaf Education emphasis and the graduate Early Childhood Communicative Disorders specialization, students will have the coursework necessary to cover the competencies for the 0-3 Hearing Endorsement and the EI-2 credential which are necessary to be a parent advisor in Utah.

Required Courses. The following courses are required for students selecting the Deaf Education Emphasis: FCHD 1100, 1500, 2400, 2610, 3100, 3110, 3130, 3210, 3500, 3510, 3520, 4220, 4550, 4900, 4960, 4980; COMD 2500, 2910, 3080; PSY 2800 or SOC 3120; SPED 4000. In addition to these courses, students must complete the following courses during their senior year: COMD 3080, 3910, 4630, 4750, 4770, 4780, 5610; SPED 5810. Students in this emphasis must meet with their advisor each semester.

Family Finance Emphasis

Majors choosing this emphasis will be prepared for careers in financial counseling, advising, and education. Coursework focuses on the financial decisions that individuals and families face relating to insurance, investing, credit, budgeting, and home ownership. Students will complete an off-campus practicum and a Financial Counseling practicum at the Family Life Center on campus. At the Family Life Center, students will encounter various types of financial experiences, including new home buyer counseling sessions and workshops, as well as financial problems related to credit and budgeting, mortgage defaults, and reverse mortgages. The Family Life Center is a U.S. Department of Housing and Urban Development (HUD) approved housing and financial counseling agency that provides free counseling and education to the community. Employment opportunities exist with consumer credit counseling services, credit unions, the armed forces, corporate employee assistance programs, employee benefits counseling firms, college financial aid offices, bank loan offices, hospitals, corporate credit offices, bankruptcy courts, community housing programs, Federal Home Administration, and Housing and Urban Development. A student graduating with a Family Finance emphasis may be employed as a personal banker, mortgage loan officer, credit counselor, financial counselor or educator, consumer relations coordinator, military financial educator, debt collections coordinator, credit investigator, fraud detective, insurance broker, stockbroker, or financial planner.

Admission Requirements. Students must complete at least 24 credits, including the following courses, with at least a 2.75 GPA in order to be admitted to the Family Finance emphasis: FCHD 1100, 1500, 2400, 2450.

Major Courses (46 credits). The following courses are required for students selecting the Family Finance Emphasis: FCHD 3130, 3280, 3310, 3340, 3350, 3450, 4220, 4330, 4350, 4460, 4950, 5340, 5950.

Required General Education Courses. Students in the Family Finance Emphasis must complete the following three courses, for which General Education credit will be granted: ECON 1500 (BAI), STAT 1040 (QL), and SPCH 1050 (CI).

Suggested Support Courses. The following courses are *suggested* (but not required) for students in the Family Finance Emphasis: PFP 5060, BIS 2450, Econ 2010.

Family and Human Development Minor

The minor in Family and Human Development (FHD) is designed to provide a knowledge base for understanding families and human development in order to enhance the training of majors in other academic disciplines. A 2.75 GPA is required for this minor. No more than 6 transfer credits may be used toward the FHD minor. Students applying for an FHD minor at USU, but transferring courses from other universities, must complete a minimum of three USU FCHD courses in order to earn an FHD minor. Courses counted toward the minor ***may not*** be taken *pass-fail*.

Required Courses (6 credits). The following two courses are required for the FHD minor: FCHD 1500, 2400.

Elective Courses (9 credits). Students must complete *three* of the following courses: FCHD 2610, 3100, 3110, 3210, 3510, 3520, 3530, 3540, 4220, 4230, 4240.

Students should be aware that the following courses *cannot* be used to fulfill requirements for the FHD minor: FCHD 2250, 2500, 3130, 4550, 4800, 4940, 5550; practica (FCHD 4900, 4950, 4960, 4970, 4980); and Readings and Conference (FCHD 4990).

Family Finance Minor

Required Courses (6 credits). The following two courses are required for the Family Finance minor: FCHD 2450, 3350.

Elective Courses (9 credits). Students must complete *at least 9 credits* in courses selected from the following: FCHD 3280, 3310, 3340, 3450, 4350.

Early Childhood Education Major

Majors in early childhood education are licensed to teach in preschool, kindergarten, and grades 1-3. Several practica and field experiences with children are provided, and a subject matter emphasis is selected. This major is a cooperative effort between the Department of Family, Consumer, and Human Development and the Department of Elementary Education. Students are required to complete a student teaching practicum in a preschool program, a kindergarten, and in the public schools grades 1, 2, or 3. Additional materials describing the ECE major in the Department of Family, Consumer, and Human Development are available from the advisors in FL 205.

Family and Consumer Sciences Major

The Family and Consumer Sciences (FCS) major is an integrative major that links the various fields within the family and consumer sciences profession and prepares the student for positions requiring interdisciplinary problem-solving skills. The Family and Consumer Sciences major prepares graduates for positions in business, local/state/federal agencies, child care centers, youth programs, job training centers, and other related agencies.

Admission Requirements. Prior to being admitted to the FCS major, students must complete at least 24 credits, including the following courses, with at least a 2.75 GPA: FCHD 1100, 1500, 2400, 2450.

Major Courses (48 credits). Students must select courses from each of the following five areas. The minimum number of credits to be selected from each area is shown in parentheses.

Human Development and Family Studies (12 credits): FCHD 2610, 3100, 3110, 3210, 3500, 3510, 3520, 3530, 3540, 4220, 4230, 4240, 4550.

Consumer and Family Finance (12 credits): FCHD 3280, 3310, 3340, 3350, 3450, 4330, 4350, 5340.

Foods and Nutritition (9 credits): NFS 1000, 1020, 1240, 1250, 2020, 2030, 3020, 3110, 4070, 4480.

Research Methods and Professional Courses (9 credits): FCHD 3130 (required); choose one of: BIS 1550, 2550, FCHD 4900, SPCH 1050, 2600; choose one of: FCHD 4900, PHIL 2400, 2500, 3520.

Practicum (6 credits): Complete a total of 6 credits from one or both of the following: FCHD 4950, 4960.

Suggested Support Courses. The following courses are *suggested* (but not required) for students in the FCS major: FCSE 1040, 2040, 3030, 3040, 3060; ID 1750, 1790, 3740, 3750.

Additional Information

For more detailed information about the Family, Consumer, and Human Development; Early Childhood Education; and Family and Consumer Sciences majors, see the current major requirement sheets or an advisor in the FCHD Advising Center (Family Life 205). Major requirements are also available on the department's home page at: **http://www.usu.edu/fchd**.

Financial Support

In addition to the scholarships, assistantships, grants-in-aid, and work-study programs available through the University, the College of Education and Human Services and the Department of Family, Consumer, and Human Development also give scholarships and other types of support each year. Students should inquire at the Dean's Office in Education 109, the departmental advising office in Family Life 205, or the Financial Aid Office in Student Center 106.

Graduate Programs

Admission Requirements

See general admission requirements on pages 90-91. Students may use either the GRE or MAT for application for all specializations in the MS degree, but the GRE is required for the PhD program. Additional assessment is required for admission to the MS marriage and family therapy specialization. An applicant's MAT

score, or the GRE verbal and quantitative scores, should be at or above the 40th percentile. Applications are expected to be completed by January 15, but may be considered throughout the year.

Degree Programs

Graduate students receive a strong research and theoretical base in family relationships, consumer sciences, and human development. In addition to the core courses required for each of the specializations, students have the opportunity to achieve their program goals with a wide range of other graduate courses in the department, as well as designated courses in related programs at USU. Graduate students also engage in independent study, practica, and other specialized professional experiences that help them to acquire specific skills.

The department provides advanced graduate education and training for students to (1) establish the professional competency necessary for employment in research, teaching, marriage and family therapy, extension, and administration; (2) develop skills necessary for agency administration in the field of family and child care services; (3) receive clinical training in marriage and family therapy; (4) develop the skills for supervisory responsibilities in child development laboratories, child-care facilities, and adolescent programs; and (5) develop the skills and expertise to work in financial and consumer services agencies and organizations.

MS in Family, Consumer, and Human Development. Students in the MS program complete a research thesis that makes a contribution to knowledge in family studies or human development.

All students in the MS Marriage and Family Therapy specialization also complete required clinical experiences. The MS Marriage and Family Therapy specialization satisfies basic educational requirements for Utah State licensure in marriage and family therapy and clinical membership in AAMFT. The Marriage and Family Therapy specialization is accredited by the Commission on Accreditation for Marriage and Family Therapy Education.

Master of Family and Human Development (MFHD). The MFHD is a practice-oriented, but nonclinical, master's degree especially suitable for individuals already working or planning to work in the family or social service sectors, education, corrections, or related fields. The MFHD does not require a thesis.

PhD in Family, Consumer, and Human Development. Students in the PhD program complete a major research dissertation that makes a significant contribution to the theoretical and empirical knowledge in family studies, consumer sciences, or human development.

Background Check. Students may be required to pass a background check prior to participation in a practicum experience (FCHD 6980 or 7980).

Specializations

The department offers the Master of Science (MS) degree in Family, Consumer, and Human Development and the Master of Family and Human Development (MFHD) degree. The department also offers a doctorate degree (PhD) in Family, Consumer, and Human Development. The MS degree has specializations in Adolescence and Youth, Adult Development and Aging, Consumer Sciences, Infancy and Childhood, Marriage and Family Relationships, and Marriage and Family Therapy. Further information may be obtained from the department and by accessing the department's home page at: **http://www.usu.edu/fchd**.

Course Requirements

The core substantive courses for the master's degree are FCHD 6030, 6050, 6060, and 6070. Master's students also complete course requirements under their chosen specialization in Marriage and Family Relationships, Marriage and Family Therapy, Consumer Sciences, Infancy and Childhood, Adolescence and Youth, or Adult Development and Aging. Elective courses and thesis topics are individualized with each student by faculty supervisory committees.

Doctoral core courses are FCHD 7060, 7070, and 7080. Doctoral students also complete topical seminars, methods and statistics courses, research and teaching internships, comprehensive exams, and dissertation research. For more specific information, see the department's *Graduate Student Handbook.*

Research

The department has three major child development laboratories, other research labs, marriage and family therapy facilities, and housing and financial counseling facilities that are available for research and training in the graduate program. The department enjoys a long history of research activities with preschools, public schools, extension programs, financial institutions, and other agencies throughout the state, and is building a program of gerontology research.

Recent faculty and graduate student research projects have been funded by the state Office of Child Care and the Office of Juvenile Justice, and by the national Office of Head Start, the Office of Adolescent Pregnancy Programs, Child Trends Inc., the National Institute of Child Health and Human Development, the National Institute of Health, the U.S. Department of Agriculture, the U.S. Department of Justice, and the Kellogg Foundation, among others.

Financial Assistance

Extensive teaching, research, and extension graduate assistantships are available for applicants for both the MS and PhD degrees. Attractive fellowships are available for strong PhD students with high GPA and high GRE scores. When an applicant's folder is complete, it is reviewed by the Graduate Admissions and Finance Committee, which makes specific recommendations regarding admission and financial support. Assistantships and fellowships include waivers for out-of-state tuition. Doctoral students can also receive waivers for in-state tuition with a half-time teaching or research assistantship.

Career Opportunities

Recent recipients of advanced degrees have found employment in public schools, academic departments at colleges and universities, research centers, hospitals, Head Start, child-care programs, social services agencies, mental health agencies, private and clinical practice settings, extension services, financial institutions and agencies, and related agencies that teach about, study, or serve individuals, families, and consumers.

Additional Information and Updates

The department publishes a *Graduate Student Handbook* providing more detail about graduate program admission and requirements. This handbook is available online at:
http://www.usu.edu/fchd.

Family, Consumer, and Human Development Faculty

Professors

Ann M. Berghout Austin, alternative child care and family life, development from birth to 12 years of age

Thomas R. Lee, parenting, family life education, family resiliency, at-risk youth, marriage education

Shelley L. Knudsen Lindauer, alternative child care, gender role development, early childhood education, curriculum administration, socialization, development in infancy and early childhood

Jean M. Lown, consumer and family economics

Brent C. Miller, marriage and family relationships, adolescent pregnancy, adoption, research methods

Lori A. Roggman, infant social development, attachment, parenting stress, play across the life span, physical attractiveness, early intervention

Barbara R. Rowe, family resource management, extension

Adjunct Professors

Frank R. Ascione, prosocial development, moral development, developmental psychopathology

Sarah Rule, methods of early intervention, applications of technology to staff development, improvement of service delivery systems

Professors Emeritus

Glen O. Jenson, marriage education, in-law and grandparent role performance, family life education, work/family challenges

Jay D. Schvaneveldt, marriage and family studies, family life education, international families, theory and methods

Associate Professors

Scot M. Allgood, family therapy process, assessment, and marital studies

Randall M. Jones, adolescent development, identity, problem behavior, prevention, research methods

Thorana S. Nelson, marriage and family therapy, gender, family therapy training and supervision

D. Kim Openshaw, marriage and family therapy, research and application, typological and intervention strategy advancement of youthful sexual offending, theoretical conceptualization of self-esteem, martial arts and mental health related syndromes

Kathleen W. Piercy, midlife, older adults and family caregiving, family policy, qualitative methodology

Assistant Professors

Troy E. Beckert, life span, human development, adolescence, research methods, parenting

Lucy Delgadillo, family and consumer sciences, housing

Yoon G. Lee, family and consumer sciences, family finance

Sylvia Niehuis, premarital relationships, transition from courtship to marriage, marriage preparation, prediction of marital outcomes, longitudinal research methods

Maria C. Norton, geriatric mental health, psychosocial and biological factors, research methodology and epidemiology

Linda M. Skogrand, families from diverse populations, transcending traumatic childhoods, marriage and family education

Adjunct Assistant Professor

Carol M. Baumann, child welfare, foster care, adoption

Adjunct Research Assistant Professor

Lisa K. Boyce, infancy and early childhood, language development, parent-child interaction

Senior Lecturer

Deborah B. Ascione, marriage, human development, child abuse and neglect

Lecturers

Jana Darrington, adult development and aging, relationship development, family policy

Susan L. Ericksen, undergraduate practicum coordinator, undergraduate advisor, marriage and family therapy, professional development

Alena Johnson, family financial management, financial counseling, students and debt

Farol Ann G. Nelson, early childhood education, child development, parent education, experiences in the arts for early childhood

Kaelin Olsen, infant and toddler development, developmentally appropriate practice in early childhood education, preschool curriculum, child guidance

Course Descriptions

Family, Consumer, and Human Development (FCHD), pages 394-397

Forest, Range, and Wildlife Sciences

Department Head: To be appointed
Location: Natural Resources 206
Phone: (435) 797-3219
FAX: (435) 797-3796
E-mail: lbarr@cc.usu.edu
WWW: http://www.cnr.usu.edu/frws

Undergraduate Advisors:
Maureen A. Wagner, Natural Resources 120, (435) 797-2448, maureen@cc.usu.edu
Stephanie W. Hamblin, Natural Resources 120, (435) 797-2473, stephanie.hamblin@usu.edu

Degrees offered: Bachelor of Science (BS) in Conservation and Restoration Ecology; BS, Master of Science (MS), and Doctor of Philosophy (PhD) in Forestry; BS in Rangeland Resources; BS in Wildlife Science; MS and PhD in Ecology; MS and PhD in Range Science; and MS and PhD in Wildlife Biology

Graduate specializations: *MS, PhD in Ecology*—Conservation Biology, Wildlife Ecology; *MS, PhD in Wildlife Biology*—Conservation Biology, Problem Wildlife Management, Wildlife Management

Undergraduate Programs

Objectives

The Department of Forest, Range, and Wildlife Sciences (FRWS) offers four undergraduate degrees: Conservation and Restoration Ecology, Forestry, Rangeland Resources, and Wildlife Science. These degree programs offer broad educational opportunities for students interested in the analysis and management of forest and rangeland ecosystems and their associated wildlife populations. The department's philosophy of education is to promote a broad interdisciplinary approach to natural resources analysis, management, and science.

Requirements

Admission Requirements. Admission requirements for the Department of Forest, Range, and Wildlife Sciences are the same as those described for the College of Natural Resources on pages 115-116.

Graduation Requirements. All *General Science Foundation Courses*, *Departmental Common Courses*, and all courses listed as major subject courses must be taken on an *A-B-C-D-F* basis. A grade of *C-* or better is required for all Forest, Range, and Wildlife Sciences courses used to meet the requirements for a major or minor in the department. The grade point average for all courses taught by the College of Natural Resources must be 2.5 or higher.

In addition to completing the University Studies course requirements, all students earning an undergraduate degree in the Department of Forest, Range, and Wildlife Sciences must complete the *General Science Foundation Courses* and the *Departmental Common Courses*, as listed below. Some of these courses may be used toward the University Studies requirements, as indicated by the University Studies designations listed in parentheses following the course numbers.

General Science Foundation Courses (34 credits). BIOL 1210, 1220 (BLS); CHEM 1210, 1220 (BPS),1230; MATH 1050 (QL), 1100 (QL); SOIL 3000; STAT 2000 (QI) or 3000 (QI); NR 2220.

Departmental Common Courses (36 credits). ENVS 3000, 4000 (DSS); FRWS 2000, 2010, 3600, 3610, 3700, 3710, 3800, 3810, 3850, 3900.

The first two years of study in the Department of Forest, Range, and Wildlife Sciences are designed to provide students with a sound background in the natural sciences, an introduction to the field of natural resources management, and an introduction to their respective major. The last two years are designed to provide an advanced understanding of natural resource management and science, depth concentration in the major, and experience with the integration of scientific and management concepts across a diversity of disciplines and management scenarios. Students are expected to enroll for 15 or more credits of coursework per semester.

Bachelor of Science in Conservation and Restoration Ecology. Students in the Conservation and Restoration Ecology major must meet the course requirements for University Studies, as well as complete the *General Science Foundation Courses* and the *Departmental Common Courses* listed above. They must also complete 27 credits of *Professional Coursework*, including FRWS 4600 and 4700, and a 21-credit specialization. This specialization is designed by the student in consultation with a faculty advisor to meet specific goals and career objectives and must be approved by the FRWS department head.

Bachelor of Science in Forestry. Students in the Forestry major must meet the course requirements for University Studies, as well as complete the *General Science Foundation Courses* and the *Departmental Common Courses* listed above. They must also complete 19 credits of *Professional Coursework*, including: AWER 3700, 4930; ENVS 3300; FRWS 5350, 5700, 5710; and an option in *either* soils/watershed (AWER 4490 and SOIL 5130) *or* Remote Sensing/Geographic Information Systems (AWER 5930 and FRWS 5750).

Bachelor of Science in Rangeland Resources. Students in the Rangeland Resources major must meet the course requirements for University Studies, as well as complete the *General Science Foundation Courses* and the *Departmental Common Courses* listed above. They must also complete 22 credits of *Professional Coursework*, including: ADVS 2080 or 2090; AWER 3700; BIOL 3400, 4400 (QI); FRWS 4000; SOIL 5130; and an upper-division range economics course approved by the FRWS department head.

Bachelor of Science in Wildlife Science. Students in the Wildlife Science major must meet the course requirements for University Studies, as well as complete the *General Science Foundation Courses* and the *Departmental Common Courses* listed above. They must also complete 21 credits of *Professional Coursework*, including: BIOL 5250 (CI), 5560 or 5570, 5580; FRWS 3300, 4500, 4600, 4880.

Career Opportunities

Graduates in Forest, Range, and Wildlife Sciences (FRWS) qualify for a broad range of career opportunities specific to their major. The Bachelor of Science degrees in Forestry, Rangeland Resources, and Wildlife Science are designed to meet the U.S. Office of Personnel Management (OPM) requirements for professional, permanent, full-time jobs with the Forest Service, Fish and Wildlife Service, Bureau of Land Management, National Park Service, or other federal natural resources agencies. The Bachelor of Science in Conservation and Restoration Ecology is designed to meet OPM requirements for Ecologist, but is flexible and intended to meet the needs of nongovernmental careers as well, such as the Nature Conservancy or private natural resource consulting firms, as well as state and county restoration and management agencies. Graduates in all degree programs receive a solid background in biological and quantitative sciences, as well as the communication skills needed to succeed in many career paths.

Financial Assistance

The main opportunities for undergraduates to find financial support through grants, work-study, and loans are listed on pages 22-26 in the *Financial Aid and Scholarship Information* section. In addition, more than 30 scholarships are available for eligible students in the College of Natural Resources. Some students may be able to find paid internships with private or governmental organizations, or work for a faculty member on a research project. Interested persons should contact the college's Academic Service Center for more information on financial assistance for undergraduate students.

Additional Information

The undergraduate program may be tailored to individual student needs with the help of a faculty advisor. For additional information about the degree requirements, course sequencing, and departmental specialization options and their related coursework, as well as updated information describing current programs and courses offered by the Department of Forest, Range, and Wildlife Sciences, visit the Forest, Range, and Wildlife Sciences main office, Natural Resources 206, or visit:
http://www.cnr.usu.edu/frws.

Graduate Programs

Admission Requirements

The Department of Forest, Range, and Wildlife Sciences offers opportunities for graduate study through MS and PhD degree programs in Ecology, Forestry, Range Science, and Wildlife Biology. The department also offers opportunities to participate in a college-wide Master of Natural Resources (MNR) degree program administered through the College of Natural Resources. The MNR is described more fully on page 278.

The programs of instruction and research leading to graduate degrees in the department are available only to students meeting high scholastic standards who are accepted for study by the departmental faculty. Students desiring entrance to these graduate programs should contact the department head for information concerning eligibility.

USU School of Graduate Studies general admission requirements are described on pages 90-91. Applicants for graduate study in the department should have a bachelor's degree from an accredited college or university, a cumulative GPA of at least 3.0 (out of 4.0), and GRE scores (quantitative and verbal) above the 40th percentile. Foreign students should submit a TOEFL score of at least 550. Exceptions to these standards will be considered on a case-by-case basis. Written statements of interest help match applicants with faculty advisors. A faculty member must agree to serve as the major professor in order for an applicant to be accepted for study. Prospective students are encouraged to contact faculty members early in the application process to investigate mutual interests, projects, and prospects for financial support.

A natural resources baccalaureate degree is not required for admission to the department, although a sound background in the natural sciences is strongly recommended. Students lacking the requisite background will work with their supervisory committee to address deficiencies.

Degree Programs

The MS degree is offered for students motivated toward a management or administrative career in natural resources management. The MS may be obtained through either a Plan A (research thesis) or Plan B (nonthesis) program, as described on page 95. The **Plan A** option requires a thesis based on original research conducted by the student. The **Plan B** option is recommended for professional forestry, rangeland, or wildlife managers who do not desire research training. The PhD degree is intended for students seeking a natural resources research or academic career. Comprehensive exams (both oral and written) are required in the doctoral program.

The minimum requirement for an MS degree is 30 credits, including at least 24 credits in residency and 6 credits of thesis research. The minimum requirement for a PhD degree is 60 approved graduate credits in addition to an MS degree, or 90 approved graduate credits with no MS degree. At least one year (a minimum of 32 credits), including a minimum of two consecutive semesters, of full-time registration must be in residence at USU.

With committee approval, graduate credit may be transferred from accredited graduate schools, provided the minimum residency requirement (including thesis and dissertation credit) at USU is met. Transfer credit, which must not have been used for any other degree, will be shown on official USU transcripts at completion of the degree.

Research

Cooperation with other departments and research centers of the University, as well as with government collaborators, permits strong graduate programs in all aspects of forest, range, and wildlife-related sciences. Particular mention should be made of the USU Ecology Center, in which the Forest, Range, and Wildlife Sciences Department is very active; the Utah Agricultural Experiment Station, which has a full program in both applied and basic research; the Utah Cooperative Fisheries and Wildlife Research Unit; the Predator Ecology and Behavior Field Station; the Jack H. Berryman Institute; the U.S. Forest Service Rocky Mountain Forest and Range Experiment Station; and the USDA Agricultural Research Service.

Financial Assistance

General aspects of financial support for graduate students at Utah State University are listed on pages 89-90 in the *Graduate Financial Assistance* section. This includes important information on the University-wide policies and terms of reference for research and teaching assistantships, graduate tuition obligations and benefits, Western Regional Graduate Programs, and competitive University-wide fellowships and scholarships. The College of Natural Resources also offers a limited number of Quinney Doctoral Fellowships for incoming doctoral students.

Graduate research assistantships may be available on a competitive basis to both MS and PhD students through major professors having contracts, grants, or other awards from the University, private sector, or government agencies. These assistantships vary in the amount of support offered, but they commonly offer a stipend to help cover living expenses and operating funds to carry out the research. Other benefits may include assistance with tuition and student health insurance, as well as opportunities to travel.

The department also has a few graduate teaching assistantships for students who help with teaching, grading, or recitation in large courses. These typically pay only a modest supplement on a semester basis, however, and are not sufficient to cover living expenses. Domestic PhD students on a research assistantship in some departmental degree programs are required to hold at least one teaching assistantship during their program, to obtain experience in classroom (mainly undergraduate) instruction. MS students may also hold teaching assistantships, contingent upon availability of funds. Acceptance to pursue graduate study does not guarantee the student financial assistance.

Additional Information

For more information about graduate programs and departmental faculty and their research emphasis areas, as well as updated information describing current programs and courses offered by the Department of Forest, Range, and Wildlife Sciences, visit the Forest, Range, and Wildlife Sciences main office, Natural Resources 206, or visit **http://www.cnr.usu.edu/frws**.

Forest, Range, and Wildlife Sciences Faculty

Professors

John A. Bissonette, Leader, Utah Cooperative Fish and Wildlife Research Unit, landscape ecology, terrestrial vertebrate ecology

F. E. "Fee" Busby, Dean of College of Natural Resources, effects of livestock grazing

Martyn M. Caldwell, Director Ecology Center, plant physiological ecology

Michael R. Conover, animal behavior, wildlife damage management

Raymond D. Dueser, conservation ecology

James N. Long, forest ecology, silviculture

John C. Malechek, rangeland management

Terry A. Messmer, fisheries and wildlife extension specialist, wild ungulate and waterfowl management, wetlands ecology, private land management, conservation communication

Frederick D. Provenza, range animal production

Neil E. West, rangeland desertification/condition/trend

Michael L. Wolfe, wildlife ecology and management

Research Professors

Michael M. Jaeger, behavioral ecology

Frederick F. Knowlton, Predator Ecology and Behavior Project, predator ecology, behavior and management

Jesse A. Logan, forest insect ecology, disturbance ecology, dynamical systems analysis

Leila McReynolds Shultz, plant taxonomy and geography

Adjunct Professors

Barbara H. Allen-Diaz, plant community ecology

Gary E. Belovsky, population ecology

James E. Bowns, range ecology

John W. Connelly, upland game ecology, conservation, management

Norbert V. DeByle, forest ecology

Douglas A. Johnson, plant ecophysiology

Jerran T. Flinders, range science and wildlife ecology

Scott R. Winterstein, wildlife population dynamics and management

Professors Emeriti

Thadis W. Box, range management

Theodore W. Daniel, silviculture

John A. Kadlec, wetlands ecology, wildlife management

Ronald M. Lanner, forest genetics, dendrology

Frederic H. Wagner, wildlife ecology, natural resources policy

John P. Workman, range economics

Associate Professors

Frederick A. Baker, forest pathology, computer applications

Roger E. Banner, range extension specialist

Christopher A. Call, vegetation manipulation/management

Thomas C. Edwards, Jr., Utah Cooperative Fish and Wildlife Research Unit, spatial ecology, habitat modelling, biostatistics

Michael J. Jenkins, disturbance ecology and management, insects, fire, snow avalanches

Michael R. Kuhns, forestry extension specialist, urban forestry, tree physiology

R. Douglas Ramsey, remote sensing, geographic information systems, landscape ecology, spatial analysis

Eugene W. Schupp, plant population ecology and restoration ecology

Helga Van Miegroet, forest soils and biogeochemistry

Research Associate Professors

Eric M. Gese, Predator Ecology and Behavior Field Station, predator behavior and ecology

John A. Shivik, predator ecology

Adjunct Associate Professors

Dale L. Bartos, range ecology

Mark W. Brunson, social and psychological aspects of forest and rangeland management

David C. Chojnacky, forest mensuration

D. Layne Coppock, animal production systems/technology transfer and international pastoral development

John L. Crane Jr., environmental resource management

Thomas A. Jones, native grass breeding

Bruce A. Kimball, range ecology

Niki S. Nicholas, biogeochemistry

Kenneth C. Olson, grazing livestock nutrition

James A. Pfister, poisonous range plants

Michael H. Ralphs, poisonous plants/grazing management

Robert H. Schmidt, wildlife policy, wildlife damage management

Associate Professors Emeriti

Brien E. (Ben) Norton, grazing ecology, international range management

Gar W. Workman, wildlife ecology and management

Assistant Professors

Karen H. Beard, community ecology, ecosystem ecology, conservation biology

Karen E. Mock, conservation genetics and applied molecular ecology

Daniel K. Rosenberg, population, conservation, and landscape ecology

Ronald J. Ryel, plant physiological ecology

Research Assistant Professors

Barbara J. Bentz, forest entomology

Thomas J. DeLiberto, Predator Ecology and Behavior Field Station, veterinary medicine of wild species

Jennifer A. Gervais, ecotoxicology, population dynamics

Temporary Research Assistant Professor

Juan J. Villalba, foraging behavior

Adjunct Assistant Professors

Larry M. Conner, wildlife ecologist, wildlife damage management, mammalogist

Mary M. Conner, quantitative ecology and estimation of population parameters

Charles G. Johnson, Jr., plant and community ecology

Kyran E,. Kunkel, carnivores, predator/prey ecology, mammal restoration ecology

Chris L. Lauver, range ecology

Nicole L. McCoy, natural resource economics

Thomas A. Monaco, research ecologist

Dale L. Nolte, foraging behavior

William C. Pitt, Acting Station Leader and wildlife research biologist, Predator Ecology and Behavior Field Station

Johanna M. Ward, population dynamics, avian ecology, conservation biology

Assistant Professor Emeritus

Barrie K. Gilbert, wildlife ethology, behavioral ecology

Adjunct Instructors

Jon Keith Schnare, timber harvest planning and logging methods

David Torell, collaborative processes, natural resources issues management, volunteer management, fundraising

Katherine S. Voth, wildland/urban interface, fire fuels management, student internships

Course Descriptions

Forest, Range, and Wildlife Sciences (FRWS), pages 399-402

Geology

Department Head: John W. Shervais
Location: Geology 205
Phone: (435) 797-1273
FAX: (435) 797-1588
E-mail: geology@cc.usu.edu
WWW: http://www.usu.edu/geoldept

Undergraduate Advisor: Peter T. Kolesar, Geology 110, (435) 797-3282, peter.kolesar@usu.edu

Graduate Director: W. David Liddell, Geology 212, (435) 797-1261, davel@cc.usu.edu

Degrees offered: Bachelor of Science (BS), Bachelor of Arts (BA), and Master of Science (MS) in Geology; BS in Composite Teaching in Earth Science

Undergraduate emphases: *BS in Geology*—Hydrogeology-Engineering Geology and Geoarchaeology

Graduate Specializations: *MS in Geology*—Geomorphology, Hydrogeology, Igneous Petrology, Paleoecology, Sedimentary Geology, Structural Geology, and Tectonics

Undergraduate Programs

Objectives

Geology is the study of the planet Earth, the materials of which it is made, the processes that act on these materials, the products formed, and the history of the planet and its life forms since its origin. Geology considers the physical forces that act within and on the Earth, the chemistry of its constituent materials, and the biology of its past inhabitants as revealed by fossil evidence. Geologists integrate biology, chemistry, engineering, mathematics, and physics in the study of our natural surroundings. The knowledge thus obtained is used by geologists to explore for energy, mineral, and water resources; to identify geologically stable sites for major structures; and to provide foreknowledge of some of the dangers associated with the mobile forces of a dynamic Earth. Geologists provide fundamental information required by modern society to plan for cultural and industrial development, reduce geological hazards, identify potential resources, and assist in the design of waste-disposal facilities.

The Department of Geology prepares students for professional careers in the geosciences and provides the background required for advanced studies. The department offers three options of study to meet the growing demand for geoscientists with training in general geology (BS in geology without an emphasis), hydrogeology-engineering geology emphasis, or geoarchaeology emphasis. All options provide exposure to the sciences and an appreciation of our physical surroundings. The BS program in Geology meets the curriculum standards established by the American Institute of Professional Geologists.

The department also offers the Composite Teaching Major in Earth Science to prepare teachers of earth science at the secondary school level. Requirements for this major meet or exceed the standards of the National Science Teachers Association. Those students who major in earth science should be aware that state licensure is required of secondary education teachers. The Composite Teaching Major in Earth Science fulfills the requirements that provide eligibility for licensure. Licensure requirements vary from state to state, and students should investigate the requirements for the states in which they intend to seek employment. Advising for the Secondary Teacher Education Program (STEP) and State of Utah secondary education licensure is provided by the USU Department of Secondary Education.

The Department of Geology is housed within the Geology Building, which is located at the northeast corner of the Old Main Quad. The Geology Building provides spacious, well-equipped teaching labs, classrooms, and facilities, including a display and study area for students, computer access, document room, map room, preparation facilities, and research labs.

General College of Science Requirements

All general College of Science requirements are embedded within the various major requirements listed below. No extra coursework is required to fulfill the general college requirements.

Requirements

Departmental Admission Requirements. New freshmen admitted to USU in good standing qualify for admission to this major. Transfer students from other institutions need a 2.2 GPA, and students transferring from other USU majors need a 2.0 GPA for admission to this major in good standing. Students seeking admission to the Composite Teaching Major in Earth Science should be aware that a 2.75 minimum GPA is required for admission to the Secondary Teacher Education Program (STEP) in the Department of Secondary Education. Students in the Hydrogeology-Engineering Geology emphasis must meet all College of Engineering GPA standards appropriate for the courses to be taken having either the ENGR or CEE prefix.

Field Trips and Labs. Most Geology courses have required laboratories and/or field trips. Those enrolled are expected to dress properly for the conditions and observe safety precautions issued by the instructors. Most courses require modest lab fees.

Bachelor of Arts Degree. For a BA in Geology, the foreign-language requirement must be satisfied in addition to the Bachelor of Science in Geology requirements.

Bachelor of Science Degree in Geology. Three options of study are available for a BS in Geology: General Geology (BS in Geology without an emphasis), Hydrogeology-Engineering Geology Emphasis, and Geoarchaeology Emphasis. For a **BS in Geology (General Geology option)**, the following courses are required: GEOL 1150, 3200, 3500, 3520, 3550, 3600, 3700, 4500, 4700, 5200; CHEM 1210, 1220, 1230, 1240; PHYX 2210, 2220; MATH 1210; STAT 3000 or MATH 1220; CS 1050 or CS 1700 or CEE 5190 or AWER 4930; 12-20 credits of Geology electives; and up to 8 electives in approved, science-related areas. For a list of approved courses, students should see the current major requirement sheet or consult their geology advisor.

For a **BS in Geology (Hydrogeology-Engineering Geology Emphasis)**, the following courses are required: GEOL 1150, 3200, 3500, 3550, 3600, 3700, 4700, 5200, 5510, 5600; CHEM 1210, 1220, 1230, 1240; PHYX 2210, 2220; MATH 1210, 1220, 2250; ENGR 2000, 2040; CEE 3500; CEE 3430 or 4300; SOIL 3000 or 5130.

For a **BS in Geology (Geoarchaeology Emphasis)**, the following courses are required: GEOL 1150, 3200, 3500, 3550, 3600, 3700, 4700, 5430; CHEM 1210, 1220, 1230, 1240 *or* CHEM 1110, 1120, 1130; BIOL 3010; MATH 1210; STAT 3000; ANTH 1030, 4350, 4360, 5300, 5310; SOIL 3000 or 5130; and any two courses chosen from: BIOL 2220, 3030, 3040, 3220, AWER 4930, 5930.

Bachelor of Science Degree in Composite Teaching—Earth Science. For the BS in Composite Teaching—Earth Science, the following courses are required: GEOL 1150, 2500, 3200, 3500, 3550, 3600, 3700, 4700; CHEM 1210, 1220, 1230, 1240; PHYX 2210, 2220; MATH 1210; STAT 3000; CS 1050 or 1700; PHYX 3010; ENVS 5110 or FRWS 2200; BMET 2000; AWER 3000 or GEOL 3300; SCI 4300; INST 5200; SCED 3100, 3210, 3300, 3400, 4200, 4210, 4300, 4400, 5300, 5500, 5600; SPED 4000; USU 1360.

Geology Minor. A minimum of 18 credits is required for an approved minor in Geology. Required courses are GEOL 1100 or 1150; and GEOL 3200. Elective geology courses must be numbered 3500 or higher.

Senior Thesis. Geology majors in good academic standing may elect to complete a senior thesis. This is an endeavor which normally spans a year in its preparation and presentation. Senior thesis credits may be applied toward the elective requirements in the General Geology option. For further information, students should contact their geology advisor or the geology department head.

Geology Honors. Geology majors with a minimum GPA of 3.30 may elect to complete the requirements for the Geology Honors degree option. This is a departmental recognition which is separate from the University Honors program. For further information, students should contact their geology advisor or the geology department head.

Graduate Programs

Admission Requirements

See general admission requirements on pages 90-91. In addition, applicants must have acceptable GRE scores. Minimum scores of 40th percentile on the Verbal section and 40th percentile on the Quantitative section and a combined minimum of 1,000 are required. A member of the Geology faculty must agree to serve as the major professor for the applicant prior to acceptance.

Applications will be considered throughout the year, but program entry in fall semester is preferred. Students who wish to be considered for assistantships or other financial aid must have complete applications on file no later than February 15 for entry into the program the following fall semester.

Prerequisites for Matriculation

Completion of a BS or BA in geology, biology, physics, chemistry, or engineering is required for matriculated status. Suggested prerequisite courses include: CHEM 1210, 1220, 1230, 1240; PHYX 2210, 2220; MATH 1210; STAT 3000; and CS 1050 or CS 1700 or CEE 5190 or AWER 4930. Deficiencies in geology are determined based on current USU undergraduate degree requirements for either the Geology or Hydrogeology-Engineering Geology option, as appropriate. The following geology courses or their equivalents are expected: GEOL 1150, 3200, 3500, 3550, 3600, 3700, 4700, and 5200. It is expected that any deficiencies will be made up before the end of the first year of study.

Degree Program

Master of Science Degree. The department offers advanced study and research opportunities leading to the MS degree in Geology. Although many research specialties require advanced courses selected primarily from Geology offerings, additional courses may be selected from other departments on campus, such as Civil and Environmental Engineering; Plants, Soils, and Biometeorology; Biology; Mathematics and Statistics; Aquatic, Watershed, and Earth Resources; Environment and Society; and Forest, Range, and Wildlife Sciences.

Specializations

Fields of specialization for graduate research include the following: hydrogeology, igneous petrology, paleoecology (including invertebrate paleontology), sedimentary geology (including petrology, basin analysis, sedimentation, stratigraphy, and petroleum geology), process geomorphology, Quaternary geology, structural geology, and regional tectonics.

Degree Requirements

Only the Plan A thesis option is allowed for the MS degree in Geology. The recommended distribution is 20 credits of coursework and 10 credits of thesis to obtain the required 30 credits for the MS degree. A minimum of five 6000-level geology courses (other than GEOL 6800) is recommended for the degree program. Only two grades of less than *B* (*C* to *B*-) will be accepted as part of the required degree program as listed on the "Program of Study for Master's Degree." A 3.0 grade point average must be obtained in required coursework as listed on the Program of Study. Thesis credits will be graded *P*-*F* only (i.e., no letter grade will be given). Geology graduate students using department or University facilities and/or under geology faculty supervision must register for a minimum of 3 credits every semester, up to and including the semester in which the thesis is cleared by the School of Graduate Studies. Registration may not be required during the summer.

Research

There are six broad areas of research emphasis within the department: (1) sedimentary geology, (2) structural geology (3) regional tectonics, (4) igneous petrology and geochemistry, (5) geomorphology, and (6) hydrogeology.

Research in **sedimentary geology** is diverse: sedimentation and development of coral reefs and associated carbonate environments during Pleistocene and Holocene times, changes in shallow-water carbonate environments through early Paleozoic time,

nonmarine siliciclastic depositional systems and petroleum reservoirs, geochemical provenance methods, and large-scale architecture of Mesozoic-Cenozoic intracontinental basins in Asia. Research activities are dominantly field-oriented, and often have a subsurface component. Studies are ongoing in the western United States, Mexico, the Carribean, China, and west Africa.

Research in **structural geology** includes the examination of the mechanical and chemical evolution of fault zones, the development of fold-and-thrust structures in Idaho, Montana, Wyoming, and Utah, and the characterization of fluid-flow properties in fractured crystalline rocks.

Research in **regional and global tectonics** examines the structural and tectonic development of extensional structures in the Great Basin and Salton Trough; collisional and accretionary tectonics in the Western U.S., Pakistan, and the southern Appalachians; the relationship of ophiolites to active margin processes; and the application of basin analysis to the tectonics of basin formation and large scale crustal structures in China, Mongolia, Pakistan, and west Africa.

Research in **igneous petrology and geochemistry** focuses on the origin and evolution of basic to intermediate magmatic systems, and their relationship to global tectonic processes. Current projects include plume-related volcanism and its interaction with continental lithosphere in the Snake River Plain, Idaho; the origin and tectonic evolution of accreted arc terranes; the multi-stage origin of ophiolites; and the formation and evolution of lunar highlands crust.

Geomorphology research includes the study of climate and anthropogenic controls on landscape change and sedimentation; controls on alluvial stratigraphy; hillslope processes; numerical modeling of climate controls on basin stratigraphy; Quaternary landscape evolution of the Grand Canyon; and the integration and evolution of the Colorado River.

Research activity in **hydrogeology** includes wellhead protection in confined to semiconfined aquifers, the relationships between stream losses and water table depths, and the identification and geochemical characterization of groundwater recharge to surface streams.

Geology faculty members commonly interact with the faculty and staff of the Utah Water Research Laboratory; the College of Natural Resources; the Department of Plants, Soils, and Biometeorology; and the Department of Civil and Environmental Engineering.

Financial Assistance

Departmental financial support for incoming graduate students consists primarily of graduate teaching assistantships, which are awarded on a competitive basis. There is often other financial support available, such as research assistantships, resulting from grants or other external funding. Students requesting financial support should apply directly to the department no later than February 15. Admission to the MS program does not guarantee financial assistance.

Additional Information

Additional information on the research activities of faculty and graduate students may be obtained directly from the Department of Geology's website at **http://www.usu.edu/geoldept**.

Geology Faculty

Professors

James P. Evans, structural geology, structural petrology

W. David Liddell, marine ecology, paleoecology, sedimentology

John W. Shervais, igneous petrology, geochemistry

Adjunct Professors

Lynn M. Dudley, soil chemistry

David G. Tarboton, water resources and hydrology

Professor Emeritus

Robert Q. Oaks, Jr., sedimentary petrology, stratigraphy

Associate Professors

Donald W. Fiesinger, igneous petrology, Dean of College of Science

Susanne U. Janecke, tectonics, structural geology

Peter T. Kolesar, carbonate petrology, geochemistry

Thomas E. Lachmar, hydrogeology

Adjunct Associate Professors

Janis L. Boettinger, soil mineralogy

John C. Schmidt, fluvial geomorphology

Assistant Professors

Joel L. Pederson, process geomorphology, Quaternary geology

Bradley D. Ritts, basin analysis

Research Assistant Professor

Carol M. Dehler, sedimentation, geochemical cycles

Adjunct Assistant Professor

David G. Chandler, surface hydrology

Course Descriptions

Geology (GEOL), pages 404-406

Health, Physical Education and Recreation

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Location: Health, Physical Education and Recreation 122
Phone: (435) 797-1498
FAX: (435) 797-3759
E-mail: hper@cc.usu.edu
WWW: http://www.coe.usu.edu/hper

Graduate Program Coordinator: Richard D. Gordin, Jr., HPER 147, (435) 797-1506, gordin@cc.usu.edu

Undergraduate Academic Advisors:
Health Education Specialist Major *and* Parks and Recreation Major: Mary Lou Reynolds, HPER 111B, (435) 797-1278, reynolds@cc.usu.edu

Physical Education Major: Suzanne D. Stones, HPER 111C, (435) 797-1495, suzies@cc.usu.edu
(**Note:** During the summer months, the advisor for the Physical Education Major is Mary Lou Reynolds.)

Degrees offered: Bachelor of Science (BS) in Health Education Specialist; BS in Parks and Recreation; BS in Physical Education; Master of Science (MS) and Master of Education (MEd) in Health, Physical Education and Recreation

Undergraduate emphases: *BS in Health Education Specialist*—School Health and Community Health; *BS in Physical Education*—Exercise Science, Pre-Physical Therapy, and Teaching

Graduate specializations: *MS*—Corporate Wellness, Exercise Science, and Health Education

Undergraduate Programs

Objectives

Undergraduate Programs of Study. The Health, Physical Education and Recreation (HPER) Department offers undergraduate programs of study designed to prepare USU students for successful careers in one of three areas: Health Education Specialist, Physical Education, or Parks and Recreation. Preparation is accomplished through well-rounded, rigorous course requirements.

Activity Courses. USU students are served by an extensive elective lifetime-skill activity course program. The number and diversity of courses encourages students to increase their lifetime participation skills and enjoy opportunities, creativity, and expression. Students may also achieve and maintain a high level of personal fitness and adopt a proactive lifestyle conducive to health and well-being.

Recreational and Intramural Activities. The intramural program is planned and conducted to meet the needs of all students regardless of skill or ability. The major objectives are to offer a wide variety of sports experiences, to encourage lifetime sports participation, to develop habits of fair play, and to provide leadership experiences. The intramural concept not only embraces the traditional highly-organized program with teams, leagues, and tournaments, but also voluntary free play activities where opportunities are provided for physical recreation for all segments of the University community.

Departmental Admission Requirements

Health Education Specialist Majors and Minor. New freshmen, transfer students, and students from other USU majors who have at least a 2.75 total GPA qualify to enter the Health Education Specialist pre-major. Students must formally apply to the School Health emphasis and minor. Pre-major/minor coursework must be completed before application to the school health major or minor. Pre-major coursework for the School Health emphasis includes: ENGL 1010, Breadth Humanities, NFS 1020, BIOL 2000, 2010, MATH 1050 or STAT 1040 (or higher), Breadth Physical Sciences, FCHD 1500, Breadth Creative Arts, and Breadth American Institutions. Pre-minor coursework for the School Health minor includes: ENGL 1010, BIOL 2000 or 2010, HEP 2500, MATH 1050 or STAT 1040 (or higher), and NFS 1020. For application materials and deadlines, contact the HPER Department Main Office (PE 122). No formal application is required for the Community Health emphasis; however, students must complete at least 30 credits and must have at least a 2.75 total GPA before they will be considered Health Education Specialist majors.

Physical Education Majors and Minor. New freshmen, transfer students, and other USU majors who have at least a 2.75 total GPA qualify to enter the Physical Education major. A 2.75 total GPA is also required for the Physical Education Coaching minor. Students who are qualified to enter the Physical Education Coaching minor should enroll in the advising office.

Parks and Recreation Major and Minor. New freshmen, transfer students and students from other USU majors who have at least a 2.5 total GPA qualify to enter the Parks and Recreation major or minor.

Course Requirements

Health Education Specialist Major. All students in the Health Education Specialist major must complete the following 30 credit hour core: BIOL 2000, 2010; NFS 1020; HEP 2000, 2500, 3000, 3200, 3600, 4200, 5100. In addition, students must complete requirements for either the Community Health Emphasis or the School Health Emphasis, and must achieve a *C-* or better grade in all HEP courses. A 2.75 total GPA is required for graduation.

Community Health Emphasis. The Community Health emphasis offers a program of study leading to a Bachelor of Science degree as a Health Education Specialist. The emphasis requires a total of 72 credits. Students must complete the Health Education Specialist 30-credit core, and the Community Health Education 36-credit core which consists of the following: HEP 3800, 3900,

4100, 4600; INST 5400; MHR 3110; NFS 4480; PSY 2800 (prerequisite: STAT 1040); PUBH 5010, 5020. Students must complete 6 credits of elective courses, taking at least one course from two of the following three areas: *Human Nature*: ANTH 3110, 4130; FCHD 1500, 3110, 3530; PSY 1010, 1100, 1210, 4240; SOC 2500, 3010, 3330; SW 2500; *Content and Methods in Education*: BIS 1400, 1550; JCOM 1110, 2200, 3010; HEP 3100, 3400, 3500, 4400, 4500, 5700; NFS 2020; PEP 4100; SOC 3750; SPCH 1050; *Organizational Dynamics in the Family and Community*: FCHD 3100; HEP 5000; JCOM 2300; MHR 3820; POLS 3810; PUBH 3120, 3310; SPCH 2600, 3250; SW 2400, 3750.

School Health Emphasis. The School Health emphasis offers a program of study leading to a Bachelor of Science degree as a Health Education Specialist, and is an approved teaching major through the Department of Secondary Education. The emphasis requires a total of 74 credits. It is also necessary for students to complete an approved teaching minor (credits will vary). Students must complete the Health Education Specialist 30 credit core, the Secondary Education 35 credit core, and the School Health Education 9 credit core. The School Health Education core includes: FCHD 1500; HEP 3100, 4500; and the 35-credit professional education framework for secondary teacher preparation. (HEP 4400 is included in the professional education framework.)

School Health Minor. The School Health minor requires a total of 32 credit hours. Required courses include: BIOL 2000 or 2010; FCHD 1500; HEP 2000, 2500, 3000, 3100, 3200, 4500, 5100; NFS 1020. (HEP 4400 is included in the professional education framework.)

Parks and Recreation Major. The HPER Department offers a program of study leading to a Bachelor of Science Degree in Parks and Recreation. This program prepares students to become professionals in the areas of public, private, commercial, therapeutic, voluntary, and special service settings of parks and recreation. Graduates of the program will be capable of directing, planning, designing, managing, and administering parks and recreation programs. The Parks and Recreation major requires 51 credits. The following courses are required: PRP 1000, 2500, 3000, 3100, 3500, 3750, 3900, 4000, 4300, 4400, 4700, 4750, 5000; BIS 1400 or INST 5400. In addition, the student must choose 6 credits from the following courses: LAEP 1030; ENVS 4130, 4500, 4600; HEP 2000, 3400; PRP 1500, 4200; up to 3 credits in three different activity courses numbered PE 1000-2000. Students must also complete an outside minor, which must be approved by the HPER Department. Instead of a minor, Parks and Recreation majors may elect to complete a Therapeutic Recreation Track (22 credits). Required courses include: BIOL 2000, 2010; FCHD 1500; PSY 1010, 3210. Students must also choose two courses from the following: PSY 1100, 1210, 2100; REH 1010; SOC 3410; SPED 4000. Additionally, students must complete PRP 4200 as part of their major electives. A 2.5 total GPA is required for graduation.

Parks and Recreation Minor. A minor in Parks and Recreation consists of a minimum of 20 credits of coursework selected from the core courses and electives listed below. The required courses in this minor include PRP 1000, 1500, 2500, 3000, and 3500. In addition, students must select 5 credits from the following courses: PRP 3100, 3900, 4000, 4300, and ENVS 4500.

Physical Education Major: Exercise Science Emphasis. The Physical Education Exercise Science emphasis consists of 51 credits of coursework leading to a Bachelor of Science Degree in Physical Education. The following courses are required: PEP 2000, 3100, 4100, 4200, 4400; HEP 2500; PE 3000. (The prerequisites for these courses include: BIOL 2000, 2010; MATH 1050.) No fewer than 5 credits must be taken from the following: HEP 2000, 3200, 3400; PEP 4000, 5070, 5430. A minimum of 4 credits (including lab) must be taken from the following: BIOL 1010, 1020, 1210, 1220, 3200, 5190. At least 3 credits must be taken from the following: CHEM 1010, 1110, 1120, 1130, 1210, 1220, 1230, 1240. No fewer than 3 credits must be selected from the following: PHYX 1100, 1200, 2110, 2120; PSY 1010, 2100, 2800, 3210; NFS 1020, 3020; STAT 1040. Three (3) different Physical Education Activity Classes must be taken to complete the required coursework. A 2.75 total GPA is required for graduation.

Physical Education Major: Pre-Physical Therapy Emphasis. The Physical Education Pre-Physical Therapy emphasis consists of 69 credits of coursework leading to a Bachelor of Science Degree in Physical Education. *Please note that it is the student's responsibility to check with the individual physical therapy schools concerning courses required for admission. The HPER Department will not guarantee admission into physical therapy school.* The following courses are required: PEP 2020, 3100, 4100, 4200, 4250, 4400; PE 3000; PHYX 2110, 2120. (The prerequisites for these courses include: BIOL 2000, 2010; MATH 1050; MATH 1100 or 1210; PHYX 2110.) A minimum of 4 credits (including lab) must be taken from the following courses: BIOL 1010, 1020, 1210, 1220, 3200, 5190. (The prerequisites for these courses include: BIOL 1210, 1220, 3200; MATH 1050; CHEM 3700.) A minimum of 9 credits (including lab) must be taken from the following courses: CHEM 1110, 1120, 1130; **or** CHEM 1210, 1220, 1230, 1240. (The prerequisites for these courses include: MATH 1050; CHEM 1210, 1230.) A minimum of 6 credits must be taken from the following courses: MATH 1100 or 1210; STAT 1040 or PSY 2800. (The prerequisites for these courses include: MATH 1050 for MATH 1100; MATH 1050 and 1060 for MATH 1210; MATH 0900, STAT 1040.) A minimum of 3 credits must be taken from the following courses: PSY 1210, 2100, 3210. (The prerequisite for these courses is PSY 1010.) A 3.0 total GPA is required to graduate.

Physical Education Major: Teaching Emphasis. The Physical Education Teaching emphasis requires 90 credits of coursework and leads to a Bachelor of Science Degree in Physical Education with a K-12 teaching license. The following courses are required: PEP 2000, 2100, 2200, 2300, 2400, 2500, 3050, 3100, 3200, 3350, 3400, 3500, 4000, 4100, 4200, 4350, 4400. (The prerequisites for these courses include: BIOL 2000, 2010; MATH 1050; HEP 2000; PE 3000.) Students must also complete PEP 4500. In order to obtain a teaching license, students must complete the 35-credit Secondary Teacher Education Program (STEP). Students also need to complete a teaching minor. A 2.75 total GPA is required for graduation.

Physical Education Coaching Minor. The Physical Education Coaching minor requires 24 credits of coursework, plus 20 credits of prerequisite courses. The following courses are required: PEP 3100, 3200, 4000, 4100, 4350, 4400. (The prerequisites for these courses include: BIOL 2000, 2010; MATH 1050; HEP 2000; PE 3000.) Students must complete three of the following courses: PEP 2100, 2200, 2300, 2400, 2500. Students must complete two of the following courses: PEP 3350, 3400, 3500. In addition, students must complete PEP 2050 and 4500. In order to obtain a teaching certificate, the following additional coursework is required: PEP 3300 or 4300, and PEP 4900. Courses within the Secondary Teacher Education Program (STEP) are also required.

Additional Information

Updated information concerning undergraduate courses and major or minor requirements can be obtained from the HPER Department, or check the departmental home page at: **http://www.coe.usu.edu/hper**.

Financial Support

The College of Education and Human Services distributes scholarship applications beginning in January of each academic year. For information on those scholarships awarded by the HPER Department, visit the departmental office in HPER 122.

Graduate Programs

Please refer to the general admission requirements on pages 90-91 of this catalog. In addition, the letters of recommendation must be written by professionals in health or physical education who know the applicant and his/her work well. Students with fewer than 12 credits of undergraduate health or physical education coursework must make up any deficiencies before being granted matriculated status. Basic competencies that have not been acquired through courses or experience may be obtained by completing prerequisite undergraduate courses without credit. Other nongraduate credit courses may be required by the admissions committee. Students with weak oral or written English skills will be required to take remedial work or complete undergraduate or Intensive English classes.

Degree Programs

Master of Science. The MS is available for students who plan to teach, provide community leadership, or do further graduate or research study.

Master of Education. The MEd is designed for students desiring to improve teaching competencies.

Specializations

MS students may select an area of emphasis for research and study from the following specializations: Corporate Wellness, Exercise Science, and Health Education.

Course Requirements

Core Courses

MS candidates specializing in ***Corporate Wellness*** must complete the following courses: EDUC 6570; HEP 6800; PEP 6290, 6400, 6450, 6500, 6540, 6800, 6810; and PSY 6470.

MS candidates specializing in ***Exercise Science*** must complete PEP 6400, 6800, 6810, 6970; EDUC 6570. Eleven credits must be selected from the following: PEP 6050, 6070, 6420, 6430, 6450, 6540, 6830; HEP 6100; EDUC 6600.

MS candidates specializing in ***Health Education*** must complete EDUC 6010, 6570, 6600; HEP 6100, 6600, 6800, 6970. Students must also complete 6 credits from the following: FCHD 6020, 6060; FCSE 6210; HEP 6300, 6700, 6900, 6950; INST 5230, 6350; MHR 6370; NFS 6200, 6210; PEP 6290, 6400, 6540; PSY 6470, 7700; PUBH 5010, 5020, 5310; SOC 6460. Other courses may be selected on the basis of a student's need and interests, subject to the approval of the student's committee.

MEd candidates must complete EDUC 6410, 6550, 6710; PEP 6050, 6070, 6400, 6420, 6430, 6690, 6800, 6830, 6960.

Research

Research areas include health promotion, health education, exercise science, corporate wellness, sport psychology, sport in society, biomechanics, and pedagogy.

Financial Assistance

Teaching and research assistantships are available through the HPER Department and are awarded on a competitive basis. Application for the assistantships must be made by March 15 to the department head. A formal application for admission must be submitted to the School of Graduate Studies at the same time as the application for an assistantship. A recipient of a graduate assistantship is usually eligible for a waiver for the out-of-state portion of his or her tuition.

Additional Information

Additional and/or updated information about graduate courses and programs may be obtained from the HPER Department, or check the departmental home page at: **http://www.coe.usu.edu/hper**.

Health, Physical Education and Recreation Faculty

Professors

Richard D. Gordin, Jr., motor learning, sport psychology

Craig W. Kelsey, parks and recreation

Professors Emeritus

Lanny J. Nalder, corporate wellness, exercise physiology, preventive and post-coronary exercise rehabilitation

Robert E. Sorenson, health and wellness, stress management

Associate Professors

Hilda Fronske, motor learning

Julie A. Gast, community health, multicultural health issues, women's health

Donna L. Gordon, health promotion

Edward M. Heath, exercise physiology

Arthur R. Jones, recreation administration

John M. Kras, administration, history, philosophy and sociology of sport

Dennis A. Nelson, family recreation, multicultural education, recreation programming

Rolayne Wilson, elementary physical education

Nontenure Assistant Professors

Eadric Bressel, biomechanics

Brett Holt, education pedagogy

Phillip Waite, community health, therapeutic reminiscence, worksite health promotion, program evaluation

Senior Lecturers

Delphine C. Haberstick, school health education, holistic health

Peter J. Mathesius, conditioning, sport skills, and teaching methods

Course Descriptions

Health Education Professional (HEP), pages 408-409

Physical Education Professional (PEP), pages 454-456

Parks and Recreation Professional (PRP), page 466

Physical Education Activity (PE), pages 452-454

Dance West Summer Classes (DE), page 375

History

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Location: Main 323
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E-mail: mingold@hass.usu.edu
WWW: http://www.usu.edu/history

Graduate Program Coordinator: Michael L. Nicholls, Main 310, (435) 797-3791, nicholls@hass.usu.edu

Director of Undergraduate Studies: Denise O. Conover, Main 321H, (435) 797-0870, conoverd@hass.usu.edu

Degrees offered: Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), Master of Arts (MA) in History; participates in Master of Social Sciences (MSS)

Undergraduate Programs

Objectives

The Department of History offers a flexible program to accomplish the following objectives:

1. To train undergraduates to research, analyze, synthesize, and communicate reasonable conclusions about the past by using the historical method.

2. To inculcate cultural literacy and provide the knowledge necessary for informed decision-making by citizens of Utah, the United States, and the world.

3. To provide students with crucial work skills in research, analysis, communication, and collaboration, as well as enriching their lives.

4. To contribute to the liberal arts curriculum of the University through general education, general interest courses, the history major, the history teaching major, minors in history and classics, and the interdisciplinary programs of folklore, American studies, and British and commonwealth studies.

History is a reading- and writing-intensive program.

Requirements

Departmental Requirements. New freshmen accepted in good standing by the University may apply for admission to the History Department. Students transferring from another institution or another major will be admitted if they have a minimum 2.5 GPA in history courses and an overall minimum GPA of 2.5. A minimum 2.75 GPA is required for entry into the teacher education program.

Candidates for a degree must earn a grade of *C* or better in all history courses used to meet the requirements for a history major or minor, a history teaching major or teaching minor, or a classics minor.

Bachelor of Arts (BA) Degree in History

The BA degree requires a minimum proficiency in a foreign language. This proficiency may be established in one of the following ways:

1. 16 credits in a single language.

2. Documentation of a proficiency level of "intermediate low" or better through an examination administered by the USU Department of Languages, Philosophy, and Speech Communication.

3. Completion of any upper-division foreign language course constituting a third-year course of study with a grade of *C* or higher.

Bachelor of Science (BS) Degree in History

The BS degree in history requires 15 credits of math and science beyond the University Studies requirements. Of the 15 credits, 3 must be earned in a statistics course, preferably in social science statistics. The remaining 12 credits must include a course series from the following list: BIOL 1210, 1220; CHEM 1210, 1220; GEOL 1150, 3200; PHYX 2110, 2120, 2210, 2220.

History Major. Thirty-six credits of history coursework are required. A grade of *C* or better must be earned in all history courses used for the major. Each major must complete *one* of the following three courses in the area of premodern civilization: HIST 1020, 1040, or 1060. Each major must complete *one* of the following two courses in the area of modern civilization: HIST 1030 or 1050. Each major must complete *one* of the following two courses in the area of American history: HIST 2700 or 2710. (If a student has taken HIST 1700 on another campus or at USU before entering the History Major, this course may be counted toward meeting the American history survey requirement.) No student, including transfer students, may count more than 12 credits of lower-division coursework toward the history major. Every senior must take HIST 4990, the capstone course for the major. Students should complete their remaining 21-24 credits by taking 3000- and 4000-level history courses. Since new courses may be approved from time to time, any upper-division course listed in the current *Schedule of Classes* under *History* is acceptable.

No more than 3 credits of HIST 4930 may be applied toward the major.

Since the study of history requires an understanding of many fields of human endeavor, students majoring in history must select a minor. Historians are encouraged to take electives in fields that will broaden their knowledge of the world and are closely allied to history, such as literature, economics, geography, anthropology, political science, sociology, classics, philosophy, or foreign language.

Students wishing to undertake graduate work should pursue the BA degree. During their senior year, they should take the graduate record exam (GRE).

History Teaching Major. Thirty-nine credits, earned in history courses, are required. A grade of *C* or better must be earned for all history courses used for the major. Each major must complete *one* of the following three courses in the area of premodern

civilization: HIST 1020, 1040, or 1060. Each major must complete *one* of the following two courses in the area of modern civilization: HIST 1030 or 1050. Each major must complete *one* of the following two courses in the area of American history: HIST 2700 or 2710. (If a student has taken HIST 1700 on another campus or at USU before entering the history teaching major, this course may be counted toward meeting the American history survey requirement.) No student, including transfer students, may count more than 12 credits of lower-division coursework toward the history teaching major. Every history teaching major must take *one* of the following three courses as a senior capstone course: HIST 4850, 4860 or 4870. Students should complete their remaining 24-27 credits by taking 3000- and 4000-level history courses. A minimum of two courses must be taken from each of the following areas: U.S. history, European history, and world history. Since new courses may be approved from time to time, any upper-division course listed in the current *Schedule of Classes* under *History* is acceptable. To become licensed to teach history, students must be admitted to the Secondary Teacher Education Program (STEP). A 2.75 GPA is required for admission, as well as a writing test, a speech and hearing test, and a background check. Application should be made as soon as practical after the history teaching major has begun. Applications for admission are available in the History Department office. The STEP requires 35 credits of coursework, in addition to the 39 credits of history courses. For additional information about the STEP, contact Harold Heap, secondary education undergraduate advisor, (435) 797-2222.

All teaching majors must also have a teaching minor in an area for which teaching licensure can be granted.

No more than 3 credits of HIST 4930 may be applied toward the major.

Minor in History. Twenty-one credits are required. A grade of *C* must be earned in all history courses used for the minor. Every student must complete *one* of the following three courses in the area of premodern civilizations: HIST 1020, 1040, or 1060. Every student must complete *one* of the following two courses in modern civilization: HIST 1030 or 1050. Every student must complete one of the following courses in the area of American history: HIST 2700 or 2710. (If a student has taken HIST 1700 on another campus or at USU before entering the history minor, this course may be counted toward meeting the American history survey requirement.) No student, including transfer students, may count more than 12 credits of lower-division coursework toward the history minor. Students should complete their remaining 9-12 credits by taking 3000- and 4000-level history courses.

No more than 3 credits of HIST 4930 may be applied toward the minor.

History Teaching Minor. Twenty-four credits are required. A grade of *C* or better must be earned in all history courses used for the minor. Every student must complete *one* of the following three courses in premodern civilization: HIST 1020, 1040, or 1060. Every student must complete *one* of the following two courses in modern civilization: HIST 1030 or 1050. Every student must complete one of the following courses in the area of American history: HIST 2700 or 2710. (If a student has taken HIST 1700 on another campus or at USU before entering the history teaching minor, this course may be counted toward meeting the American history survey requirement.) No student, including transfer students, may count more than 12 credits of lower-division coursework toward the history minor. All teaching minors in history must take one of the following: HIST 4850, 4860 or 4870. Students should complete their remaining 9-12 credits by taking 3000- and 4000-level history courses.

No more than 3 credits of HIST 4930 can be applied toward the minor.

Classics Minor with Emphasis in Civilization. Twenty-one credits of coursework are required. All students must take HIST 3130 and 3150. They must take *one* of the following three courses in ancient archaeology: HIST 3110, ANTH 1030, or ANTH 3170. They must take *one* of the following three ancient literature courses: CLAS 1100, 3210, or THEA 5290. They must take *one* of the following three ancient art courses: HIST 3110, 4210, or ART 4710. They must take *one* of the following two ancient thought courses: POLS 4310 or PHIL 3100. The remaining 3 credits are elective and may include any of the courses listed above.

Classics Minor with Emphasis in Latin Language. Thirteen credits are required. All students must complete HIST 3150 and 7 credits of upper-division (3000- and 4000-level) courses in Latin language. They must also complete *one* of the following courses: ART 4710, CLAS 1100, 3210, HIST 4210, or THEA 5290.

Classics Minor with Emphasis in Greek Language. Thirteen credits are required. All students must complete HIST 3130 and 7 credits of upper-division (3000- and 4000-level) courses in classical Greek language. They must also complete *one* of the following courses: ART 4710, CLAS 1100, 3210, PHIL 3100, or THEA 5290.

Academic Opportunities

Departmental Honors in History. Students in the department with a minimum GPA of 3.5 may apply to pursue an honors degree in history. Those interested should consult the department honors coordinator.

Phi Alpha Theta. History students with a minimum GPA of 3.1 in history classes and an overall minimum GPA of 3.0 are eligible for membership in the national history honor society, Phi Alpha Theta. Those interested should consult the faculty advisor for Phi Alpha Theta.

Undergraduate Teaching Fellows. The UTF program is designed to provide students, particularly potential teachers, with the opportunity to assist professors and, thereby, learn first-hand about the nature of the profession. UTFs must maintain a minimum GPA of 3.0 and be sponsored by a professor. Application forms are available in the History Department office.

Additional Information

For updated information concerning programs and courses offered by the Department of History, visit the departmental web page at **http://www.usu.edu/history**.

Financial Support

Scholarships, grants-in-aid, and work-study programs are available through the University. The History Department offers tuition waivers and scholarships to outstanding students. In addition, undergraduates may be employed as research assistants and clerical assistants within the department. For current information on scholarships and employment opportunities, consult the department head.

Graduate Programs

Admission Requirements

Graduate applicants may be admitted to the program for either the master of arts or master of science in history if they meet the following qualifications: (1) hold a baccalaureate degree; (2) have at least a 3.0 cumulative GPA over the last 60 credits of undergraduate work, with a 3.5 GPA in history courses recommended; (3) submit Graduate Record Examination (GRE) general test scores, with a **required** minimum score at the 40th percentile on the verbal section, and a **recommended** minimum score at the 40th percentile on *both* the quantitative and analytical portions of the exam; (4) submit three letters of recommendation from persons acquainted with the applicant's academic performance and potential; and (5) submit a brief statement of proposed fields of interest and career goals.

The Department of History also strongly recommends that applicants have either an undergraduate major or minor in history or a closely related field (i.e., American studies, classics). Familiarity with one or more foreign languages is highly desirable and is required for the master of arts degree and for master's level research in many fields of history. Applications will be strengthened by the submission of an example of the student's historical writing, such as a paper (about 15 pages in length) written for a seminar or upper-division course.

The final recommendation for admission will be made upon consideration of all the above factors by the department and the School of Graduate Studies.

Degree Programs and Additional Requirements

Master's Degree, Plan A (Thesis). The thesis option should be taken by anyone intending to do research or enter another program for the doctoral degree. A master of arts, master of science, or master of social sciences degree can be completed with this option.

The program consists of 30 semester credits beyond the bachelor's degree, 6 credits of which must be in thesis research. Students must take HIST 6000, as well as either HIST 6010 or 6020, or another theory-intensive course approved by the director of graduate studies. Students may apply a maximum of 4 internship credits earned while working in an archives, for a museum, on the staff of a scholarly journal, or as a teaching intern in an upper-division undergraduate course.

The remainder of the 30 credits may be taken as electives in history or related courses relevant to the student's program.

Upon arrival at USU, students are urged to meet with the departmental graduate advisor, who will direct them to one or more faculty members with similar interests. Through consultations with the graduate and faculty advisor, the first-year student will form a thesis committee and formulate a course of study. By the end of the first year, most students will have submitted to their committees a proposal for the thesis, which they will write under the close supervision of the committee members. The oral defense usually takes place in the spring semester of the second year.

Master's Degree, Plan B (Nonthesis). A nonthesis master's program can help a student attain employment in many areas, but is not recommended for students planning to secure a doctorate. A master of arts, master of science, or master of social sciences degree can be completed with this option.

The Plan B program consists of 30 credits beyond the bachelor's degree. The course requirements are identical to those of the Plan A program, except that only 3 thesis credits are permitted.

Students completing the Plan B program do not write a full-length thesis. Instead, Plan B students write a research paper of approximately 30 pages in length and submit a portfolio of their graduate writing, which includes two additional and distinct pieces of writing. Students defend their Plan B research papers and writing portfolios before their major professor and the members of the supervisory committee. Final approval of the Plan B rests with the department, rather than with the School of Graduate Studies.

Master of Arts. To receive a master of arts (MA) degree, students must successfully complete two years of foreign language at the undergraduate level. If two years of undergraduate language study already appear on the student's transcript, he or she must demonstrate current competence through successful completion of a language exam or by taking a 3000- or 4000-level language course for which a grade of *B* or higher proves competency. In all cases, an individual assessment must be made of a student's language status. For further information, see page 95.

Students planning to continue on for a doctorate should be aware that many doctoral programs in history require that students pass written proficiency exams in two languages.

Master of Science. To receive a master of science (MS) degree in history, students may be required to demonstrate, to the satisfaction of their supervisory committee, the ability to incorporate scientific methodologies in their research as appropriate.

Master of Social Sciences (MSS). Like the MA and MS in history, the MSS degree requires a minimum of 30 credits, including 15 credits in the major discipline of history, plus a minimum of 15 credits from one of the following two tracks. *Track A:* a minimum of 15 credits from two approved minor areas, with at least two courses in each minor area. *Track B:* a minimum of 15 credits from an approved minor and a liberal arts and sciences cluster, with at least two courses in the minor and two courses in the cluster. Accepted minor disciplines include instructional technology, environment and society, political science, psychology, and sociology/anthropology. This degree is designed for secondary school teachers who need more training to obtain licensure in additional teaching fields or who simply wish to deepen their understanding of a related field.

Students in the MSS program are required to take HIST 6000 and 3 credits of HIST 6970 for their Plan B. A supervisory committee consists of a major professor in history and two committee members, each representing one of the student's minor fields. MSS students, like other Plan B students in history, must write a research paper of approximately 30 pages and submit a portfolio of their graduate writing that consists of two separate and distinct pieces of work, one from each of their two minor fields. An oral

defense of the student's Plan B paper and portfolio is held before the student's supervisory committee.

Additionally, the master of social sciences (MSS) in history requires students to demonstrate an understanding of statistical applications in the social sciences.

Financial Assistance

The primary financial assistance offered by the Department of History is through graduate assistantships. Each year, the History Department offers to qualified students, on a competitive basis, a total of seven graduate assistantships. These assistantships entail approximately 20 hours of work per week, assisting faculty members with departmental introductory survey courses. The award carries a stipend and an out-of-state tuition waiver. To keep their assistantships, graduate assistants must maintain a GPA of 3.0 (or a *B* average) and be a full-time student (see page 89). While enrolled in the MA or MS program, graduate assistants may hold graduate assistantships for a maximum of two years. Applications for graduate assistantships should be postmarked *no later than February 1*, for the upcoming academic year.

Graduate students may be eligible for Carr Scholarships to supplement their graduate assistantships. Competitive grants to support travel and research are also available to history graduate students.

In addition, financial assistance is available through the *Western Historical Quarterly,* a journal published at USU. The editors of the journal offer, during alternate years, the S. George Ellsworth Editorial Fellowship and the Robert M. Utley Editorial Fellowship. These fellowships are awarded to highly qualified students working as editorial assistants in that office. These fellowships are nationally competitive and allow graduate students to learn all aspects of journal production. They carry a stipend (with additional funding possible during the summer) and a waiver of the out-of-state portion of the tuition. Materials should be postmarked no later than February 1, for the upcoming academic year. Applicants will be notified in early April.

Funding for the S. George Ellsworth Fellowship is provided by the *Western Historical Quarterly*, the School of Graduate Studies, the College of Humanities, Arts and Social Sciences, and the S. George Ellsworth Endowment of the Mountain West Center for Regional Studies. The S. George Ellsworth Fellowship is being offered for the 2005-2006 academic year.

Funding for the Robert M. Utley Fellowship is provided by the *Western Historical Quarterly* and the School of Graduate Studies. The Robert M. Utley Fellowship is being offered for the 2004-2005 and 2006-2007 academic years. For further information about *Western Historical Quarterly* fellowships, write to: *Western Historical Quarterly*, Utah State University, 0740 Old Main Hill, Logan UT 84322-0740; or send e-mail to: **cdoyle@hass.usu.edu**.

The application deadline for both fellowships is February 1, for the upcoming academic year.

Additional Funding. In addition to graduate assistantships and the *Western Historical Quarterly* editorial assistantships, the School of Graduate Studies awards a limited number of scholarships. To be eligible for these awards, all students should complete the application for admission and send it, along with GRE scores and letters of recommendation, to the School of Graduate Studies by February 1. A financial aid application form (which may be obtained from the History Department) should be returned to the History Department by February 1.

Students interested in establishing eligibility for federal loans and work-study will need to complete the Free Application for Federal Student Aid (FAFSA) and submit it to: Financial Aid Office, Utah State University, 1800 Old Main Hill, Logan UT 84322-1800. Questions about eligibility should be directed to the Financial Aid Office, tel. (435) 797-0173.

Career Opportunities

Some graduates of USU's master's program continue their formal education in PhD programs or law schools. Others find employment in the two-year college or secondary school systems, as teachers or administrators. Still others work for historical societies, museums, publishing firms, and a variety of enterprises in the private sector.

Additional Information

Current announcements and other information are posted to the History Department website, **http://www.usu.edu/history**.

History Faculty

Professors

Jay Anderson, folklore, folklife, film studies

C. Robert Cole, England, modern European history

Kermit L. Hall, President of Utah State University, American legal history

Norman L. Jones, medieval, early modern Europe, Britain, Christianity

David R. Lewis, American Indian, environmental, Utah, editor of *Western Historical Quarterly*

Daniel J. McInerney, American intellectual history, Nineteenth Century

Leonard N. Rosenband, France, European economic and labor history

Frances B. Titchener, ancient Greece and Rome, Latin, Greek

Barre Toelken, folklore and folklife, director of Folklore Program

Adjunct Professors

Doran J. Baker, Electrical and Computer Engineering Department, history of science

Barry M. Franklin, Secondary Education Department, history of education

Christopher B. R. Pelling, Regias Professor of Greek, Oxford University: Classics

Trustee Professor Emeritus

Anne M. Butler, U.S. West, U.S. Women

Professors Emeritus

William F. Lye, Africa, India, Canada

F. Ross Peterson, U.S. modern political history, Black history

Associate Professors

Christopher A. Conte, Africa, world, and environmental history

Mark L. Damen, ancient world, theatre history, Latin, Greek

R. Edward Glatfelter, Russia and East Asia, associate dean of College of Humanities, Arts and Social Sciences

Peter Mentzel, Eastern Europe, Ottoman empire, Islamic civilization

Michael L. Nicholls, early American history

Colleen O'Neill, West, Native American, labor, associate editor of *Western Historical Quarterly*

Stephen C. Siporin, folklore, oral narrative folklore, folk art

Assistant Professors

Jennifer Ritterhouse, U.S. history, African-American history, U.S. South, women's history

James Sanders, Latin America

Susan O. Shapiro, Greek intellectual history, ancient Greek and Latin language

Timothy S. Wolters, science and technology, American history

Adjunct Assistant Professors

Daniel M. Davis, photograph curator, U.S. West

Stephen C. Sturgeon, manuscript curator, Twentieth Century U.S. West, political, environmental history

Lecturer

Denise O. Conover, American diplomatic history, U.S. military, American civilization

Adjunct Instructors

Michael W. Johnson, Director of Utah History Fair, Mountain West Center for Regional Studies

Elaine Thatcher, Associate Director of Mountain West Center for Regional Studies

Course Descriptions

History (HIST), pages 409-413
Latin (LATN), page 430
Greek (GRK), page 408
Classics (CLAS), page 368

Honors Program

Director: David F. Lancy
Location: Merrill Library 374
Phone: (435) 797-2715
FAX: (435) 797-3941
E-mail: honors@cc.usu.edu
WWW: http://www.usu.edu/honors/

Program Coordinator: Christie L. Fox, Merrill Library 374, (435) 797-3940, clfox@cc.usu.edu

Staff Assistant: Kay Gamble, Merrill Library 374, (435) 797-2715, kgamble@cc.usu.edu

Undergraduate Program

Overview

Utah State University's Honors Program, established in 1966, provides an enhanced academic environment for highly motivated undergraduates. The Honors Program includes a community of scholars whose curiosity, creativity, and enthusiasm for learning foster educational achievement and personal growth.

Honors offers students intensive seminars, experimental classes, interdisciplinary courses, writing projects, leadership opportunities, and special activities. Participants may define independent study programs and design special research projects. Honors students work in close contact with professors in smaller classes; they pursue studies in greater depth than regular classes would allow. Participants also enjoy the company of other committed students who encourage and support one another's intellectual growth and productivity. Honors students participate actively in their own education.

Honors serves students who work hard, raise questions, and seek answers. It is designed for students who want to go beyond minimum requirements and narrow specialties. The program benefits those who want to make the most of their university experience.

The Honors program maintains strict standards for both entering and completing its program. However, there are no extra fees to pay, and there are Honors options suitable for both entering freshmen and transfer students. The most important criterion for success is a student's motivation and dedication to learning.

Entrance to the Honors Program

Students enter Honors at one of two points during their academic career. The majority will enter through the "Scholars Forum." Students with strong academic qualifications, who plan to enroll at Utah State as freshmen, are automatically given membership in the Scholar's Forum, which includes enrollment in a 1-credit online orientation class (HONR 2000H) and an appropriate Honors University Studies class. The Scholar's Forum gives high-ability students the opportunity to explore various options to maximize the value of their undergraduate education. Many will elect to continue along the "Honors Pathway" until graduation.

Other students may elect to join Honors after they have completed all or nearly all of their General Education requirements. These students will initially enroll in HONR 2100H (Honors Inquiry Seminar), which will prepare them to pursue an Honors degree in their major (i.e., "Departmental Honors").

Participation in Honors

To be eligible for entrance into Honors, a student must have a GPA of 3.50. To maintain eligibility and to graduate in Honors, a student must not allow her or his GPA to drop below 3.30. The Honors Office places students with a GPA of less than 3.30 on probation. A student with a GPA of less than 2.50 will be dropped from the program. Reinstatement can be requested if the GPA is raised to 3.30. Honors students must also register for one Honors class per semester in order to remain in the program.

Honors Degrees

Utah State University offers Honors Degrees designed to fill a variety of student needs. Members may work toward one of three degree options:

1. **Department Honors.** Requires 15 semester credits as specified in a Department Honors plan, including a senior thesis/project.
2. **Department Honors with Honors in University Studies.** Requires 27 semester credits including as many as 12 credits from the *Honors Course List* and at least 15 credits, including Honors senior thesis/project credits, in an approved Department Honors Plan.
3. **University Honors.** Requires 27 semester credits including at least 12 credits from the *Honors Course List* and as many as 15 credits, including Honors senior thesis/project credits, in an upper-division plan of study that has been approved by the Honors Director.

Listing of Honors Courses

Class offerings change frequently. For the most complete list, see the *Honors Course List* available in the Honors Program office, Merrill Library 374.

Course Descriptions

Honors (HONR), pages 413-414

Industrial Technology and Education

Department Head: Maurice G. Thomas
Location: Industrial Science 112E
Phone: (435) 797-1795
FAX: (435) 797-2567
E-mail: mthomas@cc.usu.edu
WWW: http://www.engineering.usu.edu/ite/

Graduate Program Coordinator: Edward M. Reeve, Industrial Science 108, (435) 797-3642, fast@cc.usu.edu

Undergraduate Advisor: Ronnie Green, Engineering 312, (435) 797-2790, ronnie@engineering.usu.edu

Degrees offered: Bachelor of Science (BS) in Technology and Industrial Education, BS in Aviation Technology—Maintenance Management, BS in Aviation Technology—Professional Pilot, A&P Certificate in Aircraft Maintenance Technician—Airframe & Powerplant, Master of Science (MS) in Industrial Technology

Undergraduate emphases: *BS in Technology and Industrial Education*—Technology Education and Trade and Technical Education

Undergraduate Programs

Objectives

The Department of Industrial Technology and Education offers degrees in two fields: **technology education** and **aviation technology**. The department values the integration of academic knowledge with hands-on technical skills. This is achieved by emphasizing the application of scientific and technological principles in extensive laboratory activities. The department strives to ensure that all graduates will obtain employment to match their interests and preparation.

The **Technology and Industrial Education** programs prepare graduates to teach in public schools, applied technology colleges, and community colleges. **Aviation Technology—Maintenance Management** graduates fill aviation maintenance management positions in government and industry. The **Aviation Technology—Professional Pilot** curriculum prepares graduates to be professional pilots. The **A&P Certificate in Aircraft Maintenance Technician—Airframe & Powerplant** provides training and FAA licensing for graduates to perform maintenance and repairs on aircraft.

Admission Requirements

Admission requirements are commensurate with those outlined for the University. See pages 15-18 in this catalog.

Professional Technology Program (PTP)

The Professional Technology Program (PTP) applies to the Aviation Technology—Maintenance Management major, as well as to the Aviation Technology—Professional Pilot major. The purpose of the program is to provide a quality education for students by requiring that they be fully prepared for upper-division coursework by having satisfactorily completed all required pre-professional courses.

Enrollment in upper-division ITE courses (3000-level and above) is available only to students who have been accepted into the PTP or into an appropriate graduate program or to students with a non-ITE major requiring a specific class. (Non-ITE majors may take a *maximum of two* upper-division ITE classes.)

To be eligible to apply for admission to a professional program, a student must be in good academic standing in the University and college, must achieve a grade of *C-* or better in every required preprofessional course, and must have an overall grade point average of 2.0 in required preprofessional coursework completed at USU.

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

Although transfer credit accepted by the department and the college may be applied toward PTP admission requirements, the grades received will not be used in the USU GPA calculation. A final decision on admission of a transfer student into the PTP will not be made until after the applicant has completed at least 15 credits of acceptable coursework at USU.

Eligible students must apply for admission to the PTP during the semester in which they are completing the required preprofessional courses.

For all technology majors in the Professional Program, the following academic regulations apply in addition to University regulations:

1. A minimum GPA of 2.0 must be maintained in technology/math/science/business courses required for, or used as technical electives in, the chosen major. Courses which were part of the preprofessional program requirements and University Studies courses are not included in this GPA calculation.

2. No more than 6 hours of *D* or *D+* credit may be applied toward meeting graduation requirements in technology/math/science/business classes.

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

4. The *P-D-F* grading option may not be used in required or elective courses completed as part of a Professional Program. (The *P-D-F* grading option is approved for University Studies courses.)

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

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

a. Students will be placed on probation if they (i) earn an *F* in a technology/math/science/business course which could be used to satisfy graduation requirements for the chosen degree (see item 5 above); (ii) have more than 6 hours of *D* credit (see item 2 above); or (iii) have a GPA of less than 2.0 (see item 1 above).

b. Students remain on probation until they improve their standing by repeating and passing all failed classes, repeating classes to reduce the number of *D* credits to 6 or less, and/or by raising their GPA above 2.0.

c. While on probation, a student must earn a semester GPA of 2.0 or higher in technology/math/science/business classes and must not earn any grades of *D* or *F*.

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

Requirements

Bachelor of Science in Technology and Industrial Education

Technology Education. This emphasis prepares the student to teach in junior and senior high schools. The curriculum requirements include the following: ITE 1000, 1010, 1020, 1030, 1040, 1200, 2030, 2300, 3030, 3050, 3200, 3220, 3300, 3440, 4300, 4400, 5220, 5500, 5630; MATH 1050, 1060; BIS 1400; PHYX 1800; Instructional Technology course (contact advisor for course number); SCED 3100, 3210, 4200, 4210; SPED 4000; ENGL 1010, 2010. Students are also required to complete a technical option (either ITE 1640 *or* ITE 4200). Students in this emphasis also take University Studies courses and electives. See major requirement sheet, available from the department, for further information.

Trade and Technical Education. This emphasis prepares the student to teach applied technology education courses at the high school or post-high school level. The curriculum requirements include the following: technical courses/work experience, 47 credits; professional courses, 27 credits, including INST 5200, ITE 3200, 3300, 3900, 3930, 4300, 4400, 4700, 5220, 5910, SPED 4000; University Studies, 24 credits; general electives, 9 credits; ENGL 1010, 2010; BIS 1400; MATH 1050; SPCH 1050; and STAT 2000.

State licensure requires a minimum of two years of approved vocational experience. Successful completion of a trade competency examination is accepted in lieu of vocational experience.

Bachelor of Science in Aviation Technology—Maintenance Management

Aviation Technology—Maintenance Management graduates are qualified to enter the work force in many rewarding career fields in aviation. Employment opportunities exist in target industries such as major airline carrier maintenance management, commuter airline maintenance management, fixed-base operator (FBO) maintenance, and Federal Aviation Administration (FAA) aircraft inspection after some field experience. This major has a great deal of depth in general maintenance, which applies to most industrial maintenance operations. Although the major's focus is aviation, the knowledge and skills gained can be used in other fields.

The courses for **Aviation Technology—Maintenance Management** are as follows: ITE 1030, 1100, 1130, 1140, 1170, 1200, 1240, 2100, 2110, 2140, 2150, 2170, 2180, 2190, 2200, 2300, 2420, 2430, 2440, 3010, 3120, 3280, 3610, 4200, 4490, 4610, 4620; MATH 1050, 1060, 1100; PHYX 1800; STAT 2300; ENGL 1010, 2010; MHR 3110, 3710; and BIS 1400.

Students in Maintenance Management must also complete 10 credits of technical electives, which must be chosen from upper-division courses. Technical electives include: ITE 3030, 3230, 3410, 4250; BA 3700, 4720. Students in this degree also take University Studies courses and electives. See major requirement sheet, available from the department, for further information.

Bachelor of Science in Aviation Technology—Professional Pilot

Aviation Technology—Professional Pilot graduates are trained to be commercial pilots. The degree requirements include completion of the following FAA licenses: private, instrument, commercial, CFI, CFII, and Multi-Engine. The courses for this specialization are as follows: ITE 1100, 1130, 2170, 2180, 2300, 2330, 2350, 2430, 2510, 2520, 2540, 2550, 2620, 2660, 2720, 2740, 2860, 2880, 3010, 3120, 3140, 4280, 4490, 4660, 5400, 5410; MATH 1050, 1060, 1100; BMET 2000, 3250; ENGL 1010, 2010; BIS 1400, 1550; PHYX 1800; and MHR 3110. Nine credits of upper-division electives are required, chosen from the following list: MHR 3710, 3720; INST 5230, 5400; SOC 3320, 3500; PSY 4240; BIS 4350, 4550; PHIL 3520; and ITE 4250. Also 21 credits of University Studies classes and 7 credits of other electives (including upper-division courses) need to be taken to fulfill requirements for graduation. Prior to taking some of the courses required for this major, students must attain a 2.5 cumulative GPA.

A&P Certificate in Aircraft Maintenance Technician—Airframe & Powerplant. This two-year technical program emphasizes aircraft repair and maintenance. Required courses are: ITE 1030, 1130, 1140, 1170, 1200, 1240, 2100, 2110, 2140, 2150, 2170, 2180, 2190, 2200, 2300, 2420, 2430, 2440, 3280, 4200; MATH 1050, 1060; PHYX 1800; and ENGL 1010. FAA regulations require students to earn a 70 percent or higher score to pass each course.

Graduate Programs

The Master of Science (MS) degree in Industrial Technology is offered by the department. Candidates may choose either the Plan A thesis option or the Plan B nonthesis program.

Admission Requirements

See the general admission requirements for graduate study in this catalog (pages 90-91). Students applying for admission to the MS program must complete the GRE with a minimum quantitative and verbal score of 1,000 and a 40th percentile minimum score on the verbal and quantitative tests or must complete the MAT with a minimum score of 43. Admission committees also consider experience, undergraduate record, and formal recommendations.

MS Degree

The degree is designed for industrial educators who want to strengthen their background in current educational theory and practice. Students are required to complete a professional core of courses relating to technology education or applied technology education and to select additional courses from a list of related courses. Plan A requires a minimum of 30 semester credits, including a thesis. Plan B is a nonthesis option that requires 33 semester credits, including a creative project. The core courses for this specialization are as follows: ITE 6090, 6100, 6150, 6450, and 6750.

Financial Assistance

The department offers a limited number of graduate research and teaching assistantships. For further information, contact the Industrial Technology and Education Department.

Industrial Technology and Education Faculty

Professors

Kurt Becker, technology education, construction technology, computer aided drafting
Edward M. Reeve, technology education, communication technology
Maurice G. Thomas, technology education

Professor Emeritus

Jay C. Hicken, technology education, wood technology, power/energy/transportation

Associate Professors

Ward P. Belliston, computer electronics technology
Gary A. Stewardson, technology education, manufacturing technology
David P. Widauf, aviation technology

Assistant Professor

Kevin S. Garrity, aviation technology, professional pilot

Senior Lecturer

James L. Garrett, aviation maintenance

Lecturers

Randy Chesley, aviation maintenance
Gary R. Green, aviation technology, professional pilot

Chief Flight Instructor

Sean E. Heiner

Course Descriptions

Industrial Technology and Education (ITE), pages 420-424

Instructional Technology

Department Head: Byron R. Burnham
Location: Emma Eccles Jones Education 215A
Phone: (435) 797-2692
FAX: (435) 797-2693
E-mail: gbaird@cc.usu.edu
WWW: http://it.usu.edu/

Degrees offered: Master of Education (MEd), Master of Science (MS), Educational Specialist (EdS), Doctor of Philosophy (PhD) in Instructional Technology

Graduate specializations: *MEd*—Educational Technology, Information Technology and School Library Media Administration; *MS and EdS*—Instructional Development for Training and Education

Undergraduate Programs

Objectives and Requirements

There is no major in instructional technology at the undergraduate level because of the need for those preparing in the field to have especially strong general education knowledge as well as depth in a specialized field of study. The minors include School Library Media or Multimedia Development. The objectives and requirements of these minors are as follows:

School Library Media Minor Objectives

1. Provides students with library media skills.
2. Prepares students to receive a Utah Library Media Certificate.
3. Prepares students for employment as a School Library Media Specialist.

School Library Media Minor Requirements

This minor is available only through distance education. Those persons wanting to certify for positions in the public schools must complete a teaching certificate and the prescribed School Library Media minor. A 2.7 grade point average is required for admission and certification as a school library media specialist at the bachelor's level. For detailed requirements, contact the department.

Multimedia Development Minor Objectives

1. Provides students with design skills.
2. Develops students' multimedia production skills.
3. Prepares students for employment in the multimedia field.

Multimedia Development Minor Requirements

Persons not seeking a public school position may elect the minor in Multimedia Development, in conjunction with a major in other fields. The Multimedia Development minor is especially appropriate for fields which require computer-based instruction, such as business, computer science, engineering, communications, and others. For detailed requirements, contact the department.

Graduate Programs

Instructional technology is a systematic way of designing, developing, implementing, and evaluating the processes of learning and teaching with specific objectives based on research in human learning and communication. It employs a combination of human and nonhuman resources to bring about more effective instruction. Instructional technology includes aspects of instructional design, product development, interactive learning technologies, multimedia, distance education, and library and information literacy. Each aspect of the field has unique contributions to make to the teaching-learning process.

The department offers specializations in Educational Technology, Information Technology and School Library Media Administration, and Instructional Development for Training and Education. A program emphasis in online learning communities in education and training is also offered.

Graduates are in demand in business and industrial settings, as well as in education, because of their preparation in training and instructional design. Admission to the graduate program is open to all students regardless of their undergraduate preparation.

Admission Requirements

See general admission requirements, pages 90-91. The MS and MEd admission requirements include a 3.0 GPA for the last 60 semester credits (90 quarter credits) and an MAT score or GRE verbal and quantitative scores at or above the 40th percentile. In addition, the department requires that those applying for the EdS program have a master's degree, and a score at or above the 40th percentile on the verbal/quantitative tests of the GRE or 46 percent or above on the MAT. Those applying for the PhD program must have GRE verbal and quantitative test scores at or above the 40th percentile. Demonstrated writing and computer proficiency is required of all applicants. A minimum score of 550 on the TOEFL is required for all prospective international students.

Applications for all degree programs must be submitted to the School of Graduate Studies by January 31. Space permitting, additional qualified candidates will be considered until the beginning of summer semester. Students who wish to be considered for financial aid must submit applications by January 31 for the coming academic year. All graduate students are expected to begin their programs in the fall semester.

Applicants for the EdS and PhD programs who do not hold a master's degree in Instructional Technology must complete additional course requirements.

No applications will be considered until all required information is received by the School of Graduate Studies.

Degree Programs

Master of Science (MS). This degree emphasizes instructional design and development, and prepares the graduate with skills to apply principles of instructional systems design to education and training. The program prepares instructional developers to take positions in corporate training programs in business and industry.

It also leads to careers in public and higher education, development of interactive learning technologies, telecommunications, distance education, and adult education.

The MS degree is available to qualified students with bachelor's degrees from any field. Undergraduate students planning in advance for an MS in Instructional Technology should consider the department's Multimedia Development minor as part of their bachelor's program.

Master of Education (MEd). This master's program is only available through extension and distance education via EDNET (a two-way audio/video system). The MEd degree is a two-year cohort rotation (i.e., students proceed as a group through the two-year program). To be successful in this master's degree program, students should own or have access to a personal computer. They will also need an e-mail address and internet access in order to communicate with faculty members and other students in the program. Persons choosing the MEd have two specializations available: Educational Technology and Information Technology and School Library Media Administration.

The **Educational Technology** specialization is directed at public school educators and administrators who are interested in applying the principles of educational technology to the teaching/learning process. This specialization may lead to a position as a district-level or building-level educational technology specialist responsible for technology integration and in-service training related to computers and other technologies.

The **Information Technology and School Library Media Administration** specialization is directed at persons seeking employment in a school library media center. Students seeking this specialization must complete the School Library Media minor (available only through extension and distance education) and apply for a Utah State Library Media Certificate. This specialization may lead to a position as a district-level or building-level school library media specialist (K-12). The library media specialist is prepared to apply principles of library and information technology to help students and teachers. The library media specialist also understands the effective use of learning resources in the teaching/learning process.

Educational Specialist Degree (EdS). The Educational Specialist degree is intended for students interested in acquiring advanced skills in instructional technology beyond those of the master's degree. This program involves coursework, independent study, practicum experiences, and a culminating experience. The degree requires a minimum of 30 credits beyond the master's degree, providing the master's degree was received in the instructional technology field. For students with a master's degree in a field other than instructional technology, a minimum of 40 credits is required.

Doctoral Degree (PhD). The doctor of philosophy degree emphasizes research and theory building in instructional design and development. The degree offers advanced preparation for graduates seeking a career in higher education, research centers, or corporate training and development.

Course Requirements. Course requirements for all degrees are dependent upon the area of emphasis and are individually planned by the student and the supervisory committee. For planning materials and program details, contact the department.

Financial Assistance. Fellowships, assistantships, and other financial support are available and awarded on a competitive basis. Apply through the department.

Instructional Technology Faculty

Professors

Byron R. Burnham, adult learning
J. Nicholls Eastmond, Jr., theory and evaluation
Alan M. Hofmeister, research
M. David Merrill, instructional design
Barbara A. White, distance education

Professors Emeriti

Don C. Smellie, foundations
Ron J. Thorkildsen, research and interactive learning
R. Kent Wood, theory, foundations

Associate Professors

Mimi Recker, cognitive modeling, interactive learning
J. Steven Soulier, message design, computer applications
Linda L. Wolcott, distance education, library media, and foundations

Assistant Professors

Joanne P. Bentley, learning theory and evaluation
Brett E. Shelton, immersive technologies, cognitive studies
David A. Wiley, learning objects, instructional design theory

Research Assistant Professor

Charles G. Stoddard, school library media, technology education

Adjunct Instructors

Val W. Dawson, instructional development
JaDene M. Denniston, school library media
Kevin L. Reeve, distance education
Thomas M. Risk, multimedia development
Nathan M. Smith, Jr., computer applications
Marilyn Taylor, school library media

Lecturer

Sheri Haderlie, Assistant Outreach Coordinator, technology for preservice teachers

Course Descriptions

Instructional Technology (INST), pages 416-419

Intensive English Language Institute

Director: Glenda R. Cole
Location: Main 075
Phone: (435) 797-2059
FAX: (435) 797-4050
E-mail: gcole@cc.usu.edu
WWW: http://www.hass.usu.edu/~ieli/

Assistant Director: Thomas J. Schroeder, Main 073, (435) 797-1237, faschroe@cc.usu.edu

Undergraduate Advisor: Janel Campbell, Main 069, (435) 797-2081, janel.campbell@usu.edu

Objectives

The Intensive English Language Institute (IELI) is an academic program in the College of Humanities, Arts and Social Sciences. IELI teaches international students, residents, and refugees the English skills and cultural knowledge they need to be successful university students. IELI also trains international teaching assistants (ITAs) for USU. Information about the ITA training is available through the School of Graduate Studies.

The IELI program accepts students seeking a degree at Utah State University, as well as students who want to study English for personal or professional reasons. Students may enroll to study *only* English.

Undergraduate students who apply to USU without a TOEFL score of at least 173 computerized or 500 paper/pencil and graduate students applying without a minimum TOEFL score of 213 computerized or 550 paper/pencil must take the IELI Placement Examination, given the first day of each semester, including the first day of the IELI summer session. Based on the examination results, students will be required to study in the IELI or be exempted from further study and permitted to take classes in their major fields.

Curriculum

Four levels of study are offered each semester. The ability levels of classes range from elementary through advanced. Several of the level 1 and 2 classes are combined into multilevel classes. Classes focus on listening, speaking, reading, writing, and cultural skills. In addition, there are topics courses, covering topics ranging from current events and the environment to academic literacy and the cultures of the U.S. through literature and film. Students must complete one topics course for every level they study in the IELI program.

Students advance from one level of a class to the next higher level by obtaining a grade of *C*- or higher in the lower-level class. Students who do not obtain a *C*- or higher in a class must repeat the class. Students who complete all level 4 classes with a *C*- or higher may begin taking courses outside of IELI. Students at level 4, who have less than a full course load remaining in IELI, must take other University credits sufficient to stay in status with visa requirements. Exceptions to this policy must be approved by the director of IELI in consultation with students' major field advisors and the international student officer.

Credit for Intensive English Study

Classes in IELI carry academic credit. Full-time students at each level take 18 credits per semester. A student who begins IELI at level 1 and progresses to level 4 may earn a total of 72 undergraduate elective credits. While all the credits will appear on a student's transcript, a maximum of 18 can be counted toward graduation. Application of the 18 credits will be determined by the student's college and major department. Students must, therefore, meet with their departmental advisors to determine the role of IELI credits in their graduation requirements.

Services

New students in IELI take the Placement Examination and attend an orientation meeting prior to the beginning of each semester. All students are assigned an advisor in IELI who helps them with various difficulties they may encounter. In addition, all the services and privileges offered to students on campus are available to IELI students. These services include health care services, recreational opportunities, and numerous special programs for international students.

Intensive English Language Institute Faculty

Associate Professors

Franklin I. Bacheller
James E. Bame
Glenda R. Cole
James R. Rogers II
Thomas J. Schroeder

Assistant Professor

Ann E. Roemer

Course Descriptions

Intensive English Language Institute (IELI), pages 415-416

Interdisciplinary Studies Major

Contact and Advising: Science/HASS Advising Center
Location: Student Center 302
Phone: (435) 797-3883
FAX: (435) 797-2096
E-mail: mleavitt@hass.usu.edu

Degrees offered: Bachelor of Science (BS) and Bachelor of Arts (BA)

Objectives

The organization of academic departments and their associated degree programs reflects the history and traditions of study in those fields. The Interdisciplinary Studies major is intended to serve the needs of students who want to design a unique individualized academic program, obtain a broadly-based education, and diversify their professional potential. The degree is not intended to replace existing majors or curricula. Rather, it is designed to provide the small number of students whose degree needs cannot be met with other majors with a program which is less restrictive and more responsive to their individual plans and interests. Students who complete their programs will receive the Bachelor of Science or (if they meet the language requirement) the Bachelor of Arts degree. The degree cannot be used as part of a dual major.

Application

Students may apply for admission to the Interdisciplinary Studies program after completing a minimum of 45 credits. Students who wish to pursue this degree must submit a letter of application which must include the folowing information: (1) a clear statement of the student's educational objectives, (2) a proposed program of study which includes the specific courses, and (3) a brief statement explaining why the program is worthy of a college degree. A current transcript must also be included.

The application will be reviewed to determine (1) that the proposal represents a coherent and carefully planned program of study and (2) that space is available in the courses proposed for the program. After approval, an advisor in the Science/HASS Advising Center will assist the student in completing the program.

Requirements

With guidance and approval from the advisor, the student selects and completes at least 45 credits of coursework for the major. Courses used to meet the 45-credit requirement may come from any department with the following restrictions:

1. At least 21 of the 45 credits in the major must be taken at the 3000 level or above.
2. Courses used for the major must include at least 15 credits each from two different academic disciplines.
3. The selection of the courses in the major must focus on an overarching theme and be consistent with the student's educational and career goals.
4. As part of the 45 credits, the student must complete a 3-credit senior project or thesis supervised by a faculty advisor.
5. Courses used for University Studies Breadth or selected Depth Education requirements may not be counted toward the 45 credits.
6. Students must pass every course approved in the program of study and earn a composite GPA of at least 2.0 in the 45 credits of courses used for the major. Students must also earn a USU GPA of at least 2.0 to graduate in this major.

Course Descriptions

Interdisciplinary Studies (ITDS), page 419

Interior Design Program

Director: Tom C. Peterson
Location: Family Life 320A
Phone: (435) 797-1556
FAX: (435) 797-8245
E-mail: carol.hatch@usu.edu

Degrees Offered: Bachelor of Science (BS) and Bachelor of Arts (BA) in Interior Design

A Master of Science (MS) degree is also available. Degree options are designed for graduates with degrees in interior design, as well as those without interior design degrees. For additional graduate degree information, contact the Interior Design Program.

Undergraduate Emphases: Studio Emphasis, Design Sales and Marketing Emphasis

Overview

The program in interior design is structured with two specific emphases, both of which offer a BS and BA degree. Each has been developed to prepare students for entry into the varied professions of interior design. Students must identify, research, and creatively solve problems pertaining to the function and quality of the interior environment, as well as its relationship to natural and man-made resources. Students must also gain an understanding of the legal and ethical issues that guide and direct the profession.

An interior designer renders professional services with respect to interior and related spaces, both commercial and residential, with special attention to the individuals who will eventually reside in those spaces. These services include programming, design analysis, space planning, and aesthetics, using specialized knowledge of interior construction, building codes, equipment, materials and furnishings. Another component of each student's training in interior design is the preparation of drawings and documents relative to the design of interior spaces, in order to enhance and protect the health, safety, and welfare of the public.

In an effort to meet the needs of the design profession, the Interior Design Program provides foundation training and technical skill building during the freshman and sophomore years. This is followed by a review process which determines the choice of emphases students may select to complete their degree. The two available emphases are (1) **Studio** and (2) **Design Sales and Marketing**.

Course Requirements

The suggested sequence for completing required coursework for the two Interior Design emphases are as follows.

All Majors

Freshman Year: ID 1700 (1 credit), 1750, 1790, 3740, 3750; ART 1110, 1120; University Studies Breadth courses (6 credits); ENGL 1010; and one Quantitative Literacy course (3 credits).

Sophomore Year: ID 1700 (1 credit); ID 2710, 2720, 2730, 2750, 2760; ENGL 2010; either ART 2710 or 2720 (3 credits); and one art elective.

Studio Emphasis

Junior Year: ID 1700 (1 credit); ID 3730, 3760, 3770, 3780, 3790; PHIL 3810; one art elective; University Studies Breadth courses (6 credits); ID 4710 (4 credits), which should be taken the summer semester after the junior year.

Senior Year: ID 1700 (1 credit); ID 4740, 4750, 4760, 4770; BUS 3250; FCHD 3340; MHR 2990; PHYX 4020.

Design Sales and Marketing Emphasis

Junior Year: ID 1700 (1 credit); ID 3730, 3790; MHR 2990; PHIL 3810; BIS 2450; BUS 3250; one art elective; University Studies Breadth courses (6 credits); ID 4710 (4 credits), which should be taken the summer semester after the junior year.

Senior Year: ID 1700 (1 credit); ID 4740; FCHD 3340; BIS 2550, 3550; BA 3500; MHR 3110, 3710; PHYX 4020.

Laptop Computer Requirement

Students entering sophomore-level interior design courses must bring their own laptop computer. Specifications for the laptop will be provided by the Interior Design Program. The computer should be purchased just prior to beginning the sophomore year. Required software will be made available.

Sophomore Review

In addition to basic undergraduate and graduate requirements set forth in this catalog, students in Interior Design must participate in a Sophomore Review in order to matriculate to junior class standing. The review takes place during the spring semester of a student's sophomore year in the program. Students wishing to enroll in junior-level courses must first submit projects from as many of the following courses as possible: ID 1790, 2710, 2720, 2730, 2750, 2760; ART 1110, 1120; and one elective art skills class. Students will be provided a space for the display of their projects. The manner in which the work is exhibited is at the discretion of the program.

An additional component of the Sophomore Review will be an analysis of the student's academic performance. Courses considered for junior status are: ID 1750, 1790, 2710, 2720, 2730, 2750, 2760, 3740, 3750; ART 1110, 1120; three credits from ART 2710 or 2720; and one art skills course. The student's overall GPA will also be used as part of the review process.

Students with a cumulative GPA of 3.0 or above will be given preference in this process, following the successful completion of the first portion of the review. As studio space is limited, admission to the Studio Emphasis will be offered first to those ranking

highest in the review process, until capacity is reached. Others who successfully complete the review process will be offered a place in the Design Sales and Marketing Emphasis.

If a student who has been approved to take upper-division classes stops out of the program, he or she will be readmitted if space is available. Due to space limitations, first preference will be given to students with continuous registration in the program.

Tours

Each year the Interior Design Program may sponsor a tour to a major design center. Students should plan to take advantage of this opportunity while enrolled in the program.

Interior Design Faculty

Professor

Tom C. Peterson, design process and experiential learning

Assistant Professor

Steven R. Mansfield, architecture and computer aided design

Lecturers

Darrin S. Brooks, residential design and interior history

Kevin H. Woolley, commercial design and space planning

Course Descriptions

Interior Design (ID), pages 414-415

International Studies Major and Minor

Contact: Veronica Ward
Location: Main 324E
Phone: (435) 797-1319
FAX: (435) 797-3751
E-mail: vward@hass.usu.edu
WWW: http://websites.usu.edu/politicalscience/

Advising: Political Science Department, Main 320, (435) 797-1306

Degree offered: Bachelor of Arts (BA)

Area Options: World Economy and Development, Peace and Security, Global Environment and Natural Resources, and Peoples and Nations

Admission Requirements for this Major

1. New freshmen admitted to USU in good standing qualify for admission to this major.
2. Transfer students from other institutions or from other USU majors need a 2.5 total GPA for admission to this major in good standing.

Overview

Problems of security, development, ethnic conflict, and human rights, as well as problems relating to the environment and natural resources, are increasingly confronted at a global rather than a national level. With its theoretical models and real-world application, the study of international studies is an exciting and highly relevant interdisciplinary major. This program cultivates the development of language and intercultural skills, develops understanding of global problems and circumstances, and expands the student's capacity to make informed judgments regarding complex international and global issues.

Requirements

In addition to completing the necessary core courses listed below, students must also choose **one area option** from one of the four available options. Through these options, students gain a level of expertise in their chosen area.

Each student must also complete a senior research project (3 credits). This project must fit within the area option chosen by the student. Under the direction of a faculty member, this project may be completed within the context of an existing course, or may be completed independently under the guidance of the chosen faculty member.

In addition to the senior research project and the choice of one area option, the student must also complete an international experience component. The student may choose the traditional study abroad experience in an accredited program, which must be approved by the international studies advisor. The student may also choose an internship. The internship must have a clear international focus and must be supervised by a faculty member. The relevant faculty member, as well as the international studies advisor, must approve proposals for internships. Students may count a total of 3 credits earned during an internship toward completion of the major.

Graduation Requirements

International Studies Major (39 credits minimum). Students must complete *at least* 39 approved semester credits. These must include POLS 2100; ECON 1500 or 3400; ANTH 1010 or 2100; GEOG 1030; and HIST 1020 or 1030. Students must also select a minimum of 6 upper-division credits from any one of the following four area options: (1) World Economy and Development, (2) Peace and Security, (3) Global Environment and Natural Resources, and (4) Peoples and Nations. In addition, students must acquire at least a basic knowledge of one foreign language. Students must successfully complete *either* one language course at the 3000 level, *or* pass a competency examination at the same level. An overall GPA of 3.0 is required.

Minor (18 credits). Students may obtain a minor in International Studies by completing a total of 18 semester credits. These must include POLS 2100; ECON 1500 or 3400; ANTH 1010 or 2100; GEOG 1030; and HIST 1020 or 1030. Students must also select 3 elective upper-division credits from any one of the following four area options: (1) World Economy and Development, (2) Peace and Security, (3) Global Environment and Natural Resources, and (4) Peoples and Nations. An overall GPA of 3.0 is required.

Journalism and Communication

Department Head: Edward C. Pease
Location: Animal Science 310
Phone: (435) 797-3292
FAX: (435) 797-3973
E-mail: jcom@cc.usu.edu
WWW: http://www.usu.edu/journalism

Assistant Department Head: Penny M. Byrne,
Animal Science 108A, (435) 797-3289, pennyb@hass.usu.edu

Graduate Program Coordinator: Michael S. Sweeney,
Animal Science 311, (435) 797-3213, msweeney@cc.usu.edu

Degrees offered: Bachelor of Science (BS) and Bachelor of Arts (BA) in Journalism; Master of Science (MS) and Master of Arts (MA) in Communication

Undergraduate emphases: Broadcast/Electronic Media, Print Journalism, Public Relations/Corporate Communications

Graduate specializations: Print, Photo, and Broadcast Journalism

Undergraduate Programs

Objectives

The undergraduate major in the Journalism and Communication Department, leading to the Bachelor of Arts or the Bachelor of Science degree in Journalism, is designed to prepare students for careers in a wide range of communication fields, through instruction in the philosophical groundings, theoretical perspectives, and hands-on applications of communications skills and practice. The curriculum integrates practical mass communications skills training with critical thinking skills, while helping students to understand the processes and effects of communication, as well as the relationships, roles, and interactions of mass communication with other social institutions.

With individual student objectives in mind, the Department of Journalism and Communication offers a flexible program of study having the following goals:

1. Provide students with theoretical and practical understanding of the workings of mass communication principles and practice.
2. Provide students with abilities and practical skills required to work in communications professions.
3. Provide students with a grounding in the philosophical, ethical, and legal frameworks of mass communication, as well as an understanding of the roles and responsibilities of mass communication in a democratic society.
4. Develop in students critical thinking and analytical abilities, facility in social science research methods, and strong written and oral communication skills, within a broad liberal arts context.

The Department of Journalism and Communication maintains professional studios and labs, designed to train students in various communications and journalism skills. These include the multimedia computer newsroom, a digital nonlinear video editing lab, a full TV studio, and a photographic darkroom. Students receive instruction in traditional journalistic basics, such as writing, information-gathering, reporting, and video production; in new technologies of online information gathering; and in critical skills of media literacy.

Requirements

Course Requirements. Journalism majors must complete a minimum of 30 credits and a maximum of 36 credits in Journalism and Communication courses, while pursuing one of the three emphasis course sequences outlined below. Of the 120 semester credits required for graduation from Utah State University, Journalism majors must complete at least 65 credits in other departments within the College of Humanities, Arts and Social Sciences. In addition, majors must complete a minor/cognate area outside of the Journalism and Communication Department, selected with the approval of an advisor.

Therefore, the basic Journalism course of study is as follows: Journalism and Communication courses, 30-36 credits; University Studies courses, 30 credits; courses in the minor/cognate area, 18 credits; electives from outside the Journalism and Communication Department, 36-40 credits; **Total Credits, 120**.

Major Status. Students may apply for major status upon completion of a minimum of 60 semester credits, including the Journalism Premajor Core requirements, while maintaining a 2.5 cumulative GPA. Students may declare themselves as Journalism Premajors at any time after their admission to the University. Majors must maintain a minimum 2.5 GPA, both overall and in the major. Students whose GPA drops below 2.5 will be placed on probation and may be dropped from the major if grades do not improve within one semester. No Journalism and Communication class may be repeated more than once. All courses in the major must be taken for a grade (not *Pass-Fail*). Courses must be taken in sequence.

Students transferring from other institutions may be accepted into the major if they fulfill these requirements. Up to 9 transferred semester credits may count toward the major, if approved by an advisor.

Premajor Core Requirements (9 credits). The following courses are required for all majors, and must be completed prior to application for major status: JCOM 1000, 1110, and 2000. Prior to taking JCOM 1110, students must complete ENGL 1010, a language proficiency test, and a typing test. Majors must complete each of the premajor requirements with a *C+* or better.

Major Requirements (6 credits). The following courses are required for all majors after acceptance into the department: JCOM 2110, 4000, and 4030. Premajor core and individual course prerequisites must be taken prior to taking these courses. Prior to taking JCOM 2110, students must complete JCOM 1110 with a grade of *C+* or higher. Senior standing is required for enrollment in JCOM 4000. Junior standing or permission of the instructor is required for enrollment in JCOM 4030.

Emphasis Areas. Each student must select one of the following emphasis areas: **Broadcast/Electronic Media** (Requirements: JCOM 2200, 2210, and *either* JCOM 4210 and 4220 *or* JCOM 4230 and 5210); **Print Journalism** (Requirements: JCOM 2120, 3110, and 3120); or **Public Relations/Corporate Communications** (Requirements: JCOM 2300 2310, 3300, 5300, plus one upper-division JCOM skills elective).

Other Communications Electives. In addition to the Pre-major, major, and emphasis area courses listed above, students must select additional electives from courses in the Department of Journalism and Communication, to ensure a total of 30-36 credits completed in the Journalism and Communication Department.

Journalism Minor

Students may earn a minor in Journalism by completing a minimum of 18 JCOM credits. These credits must include JCOM 1000 and *either* JCOM 1110 or 2000. For the remaining 12 JCOM credits, students must select one of the following options: (a) JCOM 2120, plus nine JCOM faculty advisor-approved upper division (3000 or higher) JCOM credits; (b) JCOM 2200 and 2210, plus six JCOM faculty advisor-approved upper-division (3000 or higher) JCOM credits; or (c) JCOM 2300 and 2310, plus six JCOM faculty advisor-approved upper-division (3000 or higher) JCOM credits. The minimum GPA requirements for Journalism minors are the same as those required for Journalism majors.

Financial Support

In addition to general scholarships and other financial support opportunities available through the University and the College of Humanities, Arts and Social Sciences, the Department of Journalism and Communication awards various scholarships to juniors, seniors, and graduate students. For a listing of scholarships, deadlines, and application requirements, contact the Department of Journalism and Communication. In addition, many professional paid and unpaid internships are available through the department.

Careers in Journalism and Communication

Journalism majors often begin their careers in various media professions, such as newspapers, radio and TV broadcasting, and public relations, many serving as interns while still attending school. Upon graduation, they land jobs in a variety of capacities for both journalism businesses and other industries requiring workers with excellent communication and problem-solving skills. In recent years, USU journalism students have routinely swept state, regional, and national competitions in print and video journalism, multimedia and new technologies, and, increasingly, public relations.

This success translates into an excellent reputation for USU students among businesses hiring USU students as interns and hiring USU graduates for professional positions. Jobs held by recent graduates include newspaper and magazine reporter, photographer, graphic artist, and editor; radio and television reporter, anchor, and producer; public relations director and account executive; multimedia software designer for HTML, web pages, CD-ROMs, etc.; and public information officer for politicians, legislative and lobbying groups, sports teams, and colleges, as well as for environmental organizations and other groups in the business and public sectors. Training and expertise in communication, including writing and reporting, visual literacy, publication layout and design, computer graphics, and online applications, prove to be valuable add-on skills for graduates entering a variety of occupations or going on to graduate school and law school.

In addition to these kinds of opportunities enjoyed by undergraduates, master's degree graduates often return to communication careers in new capacities, or teach at the community college level in journalism and communication departments.

Additional Information

For further information about publications, curriculum, scholarships, faculty, and other program offerings, including USU's TV studio facilities; weekly newscasts and TV programs; the award-winning student news website, the Hard News Café; and the Media and Society Lecture Series; check out the Journalism and Communication Department's website:
http://www.usu.edu/journalism.

Graduate Programs

The Master of Science (MS) and the Master of Arts (MA) degrees in Communication combine professional practice and theoretical training, and are designed to fit individual student needs. Students may specialize in print, photo, or broadcast journalism. Application to the graduate program is made through the USU School of Graduate Studies.

Objectives

The master's program in Communication at Utah State University offers a two-track approach to graduate study, designed for the maximum individual flexibility in pursuit of the student's goals.

The Plan A, also known as the "Thesis Option" or "Media Research," is a course of study designed for students considering or planning to go on to a doctoral program. The Plan A option requires more coursework in theory and methodology, as well as in research tools, in order to provide grounding for advanced study at the PhD level, whether in communication or another discipline. This option also requires completion of a master's thesis, consisting of original research.

The Plan B, also known as the "Professional Option" or "Media Practice," is designed for students seeking the master's degree as a terminal degree, and planning to go from USU into the mass media professions, or into a teaching position at the junior college level. Typically, Plan B students are mid-career media professionals seeking retooling, refreshers, or credentials for community college teaching. The Plan B option requires a professional project, approved by a major professor, in place of the research thesis.

In either case, graduate students in Communication work closely with advisors throughout their programs to design coursework and a research or professional activity agenda, along with appropriate study in a cognate area outside of Communication, that will permit them to achieve their individual goals, within the core framework of Communication coursework, whether they include professional training or additional doctoral work.

Admission Requirements

For admission to the graduate program in Communication, all students must complete the department's English Language Proficiency Examination, and must complete or demonstrate competency in the following Communication foundation courses: JCOM 1110, 3110, 4020, and 4030. Competency may be demonstrated through previous coursework or experience, and one or more of these requirements may be waived with permission of the graduate program coordinator. These credits do not count toward the graduate degree. In addition, other undergraduate courses may be required.

Degree Requirements

Students may elect either the Plan A (thesis) or the Plan B (professional) option to fulfill the degree requirements of 30 semester credits as outlined below. Plan A is intended for students planning to continue graduate study, to teach, or to enter professions requiring research skills. Plan B is intended for students seeking a terminal professional degree. Selection of either the Plan A or Plan B option must be made in consultation with the student's advisor and filed with the graduate coordinator by the end of the first semester of study.

All students must complete core requirements in either plan. Students must, in consultation with their advisor, select an appropriate research tools class in research methods; the course need not be taught by the Journalism and Communication Department. To remain in good standing, all students must fulfill Graduate School requirements.

Plan A: Media Research

Core Requirements (21 credits). All students must complete the following courses: JCOM 6000 (3 cr.), 6020 (3 cr.), 6040 (3 cr.), 6400 (3 cr.), and 6970 (6 cr.). In addition, students must select an appropriate 3-credit Research Tools course (from any department), providing methodological training most appropriate for the student, in consultation with the advisor.

Journalism and Communication Electives (6 credits)

Cognate Area (6 credits). With advisor permission, students may include additional Journalism and Communication electives.

Plan B: Media Practice

Core Requirements (18 credits). All students must complete the following courses: JCOM 6000 (3 cr.), 6020 (3 cr.), 6040 (3 cr.), 6400 (3 cr.), and 6500 (3 cr.). In addition, students must select an appropriate 3-credit Research and Practice course, in consultation with their advisor. A Research Tools course (from any department), providing methodological training most appropriate for the student, must also be selected in consultation with the advisor.

Journalism and Communication Electives (6 credits)

Cognate Area (9 credits). With advisor permission, students may include additional Journalism and Communication electives.

Additional Information

For more information about graduate studies in the Department of Journalism and Communication, contact the School of Graduate Studies or the Department of Journalism and Communication. Also, check out the departmental website at: **http://www.usu.edu/journalism**.

Journalism and Communication Faculty

Professor

Edward C. Pease, journalism, media criticism

Professor Emeritus

Nelson B. Wadsworth, print journalism

Associate Professors

Penny M. Byrne, broadcasting, media law

Brenda Cooper, media criticism, gender and mass communication

Michael S. Sweeney, print journalism, media history

Associate Professors Emeritus

Scott A. Chisholm, media management, literary journalism

James O. Derry, international mass communication development

Assistant Professors

Cathy Ferrand Bullock, mass communication theory and research methods

Emmanuel E. "Emeka" Nneji, public relations

Les A. Roka, public relations

Nancy M. Williams, print journalism, Internet

Video Lab Supervisor

S. Dean Byrne, broadcast and electronic media

Temporary Lecturer

R. Troy Oldham, public relations, corporate communications

Adjunct Instructors

Tim Vitale, public relations

Jay C. Wamsley, print journalism

Course Descriptions

Journalism and Communication (JCOM), pages 425-427

Landscape Architecture and Environmental Planning

Department Head: To be appointed
Location: Fine Arts Visual 230
Phone: (435) 797-0500
FAX: (435) 797-0503
E-mail: ainscoughm@hass.usu.edu
(faculty e-mail addressess available on departmental website)
WWW: http://www.usu.edu/laep/

Undergraduate Program Director: Michael L. Timmons, Fine Arts Visual 260, (435) 797-1510, michael.timmons@usu.edu

Graduate Program Director: John C. Ellsworth, Fine Arts Visual 238, (435) 797-0504, john.ellsworth@usu.edu

Degrees offered: Bachelor of Landscape Architecture (BLA) and Master of Landscape Architecture (MLA); Master of Science (MS) in Bioregional Planning. BLA and first professional MLA programs are fully accredited by the American Society of Landscape Architects.

Graduate specializations: *MLA*—Land Rehabilitation/Revegetation, Small Town Rehabilitation, Urban Wildlife, Visual Resource Management

Department Objectives

The objectives of the department are to (1) provide an educational and technical program responsive to current societal needs related to environmental planning, landscape architecture, and urban design; (2) give students the opportunity to participate in collaborative learning experiences with other disciplines on campus; (3) prepare students for professional careers in the private or public sector, and (4) conduct original research to advance the body of knowledge in landscape architecture, environmental planning, and design.

Undergraduate Programs

Admission and Graduation Requirements

The Bachelor of Landscape Architecture (BLA) degree program is an intensive four-year studio-based course of study, fully accredited by the American Society of Landscape Architects. Accreditation standards require the department to maintain a reasonable faculty/student ratio. Space in the program is limited by available facilities, faculty, and qualified applicants. Admission to the upper division is competitive, and is limited to students who are determined by the faculty to have the best potential for academic success. Matriculation into the upper division will normally be limited to 25 students, although additional students may be matriculated in special circumstances at the discretion of the LAEP faculty.

Any student admitted to USU is eligible for enrollment in lower-division LAEP courses. Declared LAEP majors will be advised of their relative class standing at the end of their freshman year and at the mid-point of their sophomore year, to assist in their personal academic career planning. At the end of the sophomore year, a selection process will determine which students will matriculate into the upper division of the program.

Eligibility for matriculation requires the completion of the following prerequisite courses: LAEP 1030, 1200, 1350, 2300, 2600, 2650, 2700, 2720; PLSC 2620; and ITE 1200. Students applying for matriculation must have a minimum USU GPA of 2.5.

Selection of students to be matriculated to the upper division is based on a letter of intent; a portfolio demonstrating creative potential, problem solving skills, and graphic fluency; and cumulative GPA earned in the eight LAEP prefix courses listed above. Portfolios and letters of intent are to be submitted by the last Monday in March. Detailed information regarding the letter of intent and portfolio requirements may be obtained from the LAEP Office. The final selection of students to matriculate to the upper division is a decision of the LAEP faculty. The review of students for matriculation will take place during the week following spring semester final exams, and students will be notified as soon as possible thereafter.

Students who have had LAEP courses waived or covered by articulation from another institution will have their GPA calculated only on the basis of LAEP grades actually earned at USU.

Transfer students from other programs of landscape architecture who have completed the equivalent of the lower-division USU LAEP coursework may apply for admission to the upper division of the program through submission of a portfolio, letter of intent, transcript of grades, and description of landscape architecture courses taken. Students who have previously been enrolled and matriculated into the upper division at USU, and must interrupt their education for up to three academic years, may resume their studies at the same level of the program which they departed upon returning to USU. Students who have stopped-out longer than three years must reapply, following the guidelines specified for transfer students. The decision on applications from transfer students and for readmission rests with the LAEP faculty and will be considered on a case-by-case basis.

Computer Requirement. Personal computer design, graphic, and operational competence is an essential component of the contemporary professional environment. Appropriate computer skills are required for most entry-level opportunities in landscape architecture and environmental planning.

Course content increasingly relies on computer skills and personal access to computers with the appropriate software.

All students entering the upper division of the BLA program must purchase, lease, or otherwise obtain continuing and uninterrupted access to a personal computer which meets the configuration requirements specified by the LAEP Department. Contact the department for current specifications.

High school students planning to major in landscape architecture may enhance their preparation with courses in art, natural sciences, social sciences, and math through college algebra.

BLA Degree. The Bachelor of Landscape Architecture (BLA) degree is a four-year program consisting of courses relating to theory, design, history, and the various technical areas of the profession. The degree provides a substantial basis for a professional career, as well as an excellent foundation for advanced graduate studies. In addition to the courses required for upper-division status, the following LAEP courses are required for graduation: LAEP 3100, 3120, 3300, 3500, 3610, 3700, 4100, 4110, 4120, and 4920. Additional non-LAEP courses required are: MATH 1050, ASTE 3050, GEOL 3100, AWER 1200 or FRWS 2200, and SOC 3610 or 4620. Students must also complete the University Studies requirements. For more detailed information, see major requirement sheet available from the department.

Specialized Service Courses. LAEP 1030, 1200, 2300, and 3700 are available for majors in other fields who may wish to gain an exposure to the different aspects of landscape architecture and environmental planning. A minor is not given in LAEP; however, these service courses are available, without prerequisites, for those requesting them.

Graduate Programs

Admission Requirements

The application deadline for consideration in the first round of reviews is March 15. Applications received later than March 15 will be considered as space availability allows. February 1 is the application deadline for consideration for some scholarships, fellowships, and other financial aid. For general admissions requirements, see the appropriate sections of this catalog.

Computer Requirement. Personal computer design, graphic, and operational competence is an essential component of the contemporary professional environment. Appropriate computer skills are required for most entry-level opportunities in landscape architecture and environmental planning.

Course content increasingly relies on computer skills and personal access to computers with the appropriate software.

All students entering the second year of the First Professional Degree MLA program and all students entering the first year of the Advanced Professional Degree MLA program must purchase, lease, or otherwise obtain continuing and uninterrupted access to a personal computer which meets the configuration requirements specified by the LAEP Department. Contact the department for current specifications.

Master of Landscape Architecture

The program for the Master of Landscape Architecture (MLA) emphasizes both traditional site scale planning and design, as well as broader areas of the profession, such as large-scale regional landscape analysis and planning, and computer-aided design and planning techniques. The MLA first professional degree is fully accredited by the Landscape Architectural Accreditation Board of the American Society of Landscape Architects.

The Master of Landscape Architecture program is designed to prepare the student for the landscape architect's challenging role of providing a holistic approach to environmental planning and design. In order for landscape architects to contribute effectively to an interdisciplinary effort, they must be competent in the fundamentals of landscape architecture and also have an understanding of the subject matter of other professions. Landscape architects must master the communication skills necessary to achieve meaningful collaboration. In support of this philosophy, the following are the major objectives of the MLA program.

1. To provide a well-structured curriculum in fundamental professional knowledge and skills.

2. To research, analyze, and resolve land use and design issues related specifically to the Intermountain West. The scope of the program examines national, regional, and local issues; and their impact on the visual, physical, and cultural setting of the Intermountain West.

3. To integrate field experience and research into major graduate studio courses structured around real-world projects.

4. To provide opportunities for each student for exploration and development of an area of specialization as noted elsewhere.

5. To draw upon the regional, national, and international relationships of Utah State University to facilitate a program of academic and professional excellence which will allow the student to achieve eminence in practice, research, or education.

Areas of Faculty Expertise

The Master of Landscape Architecture Program provides opportunities for each student to study and conduct research in areas which take advantage of the strengths of Utah State University and the landscape context of the Intermountain West centered around the expertise of the LAEP Department faculty, including: *Land Rehabilitation/Revegetation*—Ellsworth and Johnson; *Regional Landscape Planning*—Shapiro and Nicholson; *Visual Resources Management*—Ellsworth; *Urban Wildlife/Refuge Planning*—Johnson; *Riparian Systems*—Johnson and Bell; *Community Planning*—Nicholson, Lavoie, and Bell; *Public Lands/Recreation*—Timmons; *Urban Design/Theory*—Lavoie; *Historic Landscapes and Preservation*—Timmons.

These areas of faculty expertise include an assessment of the relevant environmental, design, social, economic, and public policy issues utilizing a wide range of computer-compatible techniques and models.

Specializations

Graduate specializations (MLA) may be designated on a student's transcript with the approval of the supervisory committee after completion of a Plan A original research thesis. There are currently four specializations: Land Rehabilitation/Revegetation, Small Town Rehabilitation, Urban Wildlife, and Visual Resource Management.

Course of Study

The graduate program director advises all incoming students until they have selected a thesis topic. A major professor whose interests are closely aligned to those of the student (see *areas of faculty expertise* above) supervises thesis work. A minimum of 30 graduate-level credits, including thesis work, is required. Students supplement requirements with courses negotiated with the major professor and supervisory committee. An outside area of emphasis

or graduate specialization (see above) may be pursued by concentrating elective coursework in another department.

The department offers two MLA programs. One is for students who have previously earned baccalaureate degrees in landscape architecture from accredited programs and the other is for students with degrees from other fields.

MLA—Advanced Professional Degree

The MLA—Advanced Professional Degree is a two-year program of study. Applicants must hold baccalaureate degrees in landscape architecture from accredited programs. The advanced degree allows outstanding students to expand their knowledge in areas of special interest under the supervision of a major professor and supervisory committee.

For information about currently required and recommended coursework, as well as other requirements for this degree, contact the LAEP Department.

MLA—First Professional Degree

A three-year program leading to the MLA degree is available for candidates with previous baccalaureate degrees in fields other than landscape architecture. The curriculum includes a substantial lecture and studio sequence designed to establish fundamental professional skills.

For information about currently required and recommended coursework, as well as other requirements for this degree, contact the LAEP Department.

Master of Science in Bioregional Planning (joint degree program with Environment and Society)

Good planning and management of natural resources and systems supersedes individual disciplines, requiring an interdisciplinary approach for the successful resolution of environmental issues. The intent of this program's curriculum is to integrate the biophysical disciplines more closely while also addressing the social and political sciences. This degree program is offered jointly by the Department of Landscape Architecture and Environmental Planning in the College of Humanities, Arts and Social Sciences, and by the Department of Environment and Society in the College of Natural Resources.

This program consists of a two-year period of study with a required thesis or paper/project. To maintain a program focus, the student selects from three clusters of coursework (research methods/case studies, biophysical, and social/economic policy). A minimum of 36 graduate-level credits, including 3-6 credits of thesis or paper/project is required. A capstone course is required for all LAEP students. The program contains a total of nine elective credits from which the candidate and his or her committee can formulate an area of emphasis.

Course of Study

This two-year MS program is comprised of an interdisciplinary core of courses and faculty for addressing complex issues in the areas of bioregional planning and management. Emphasis is placed on four problematic content areas: biophysical, social/demographic, economic, and public policy. The spatial focus is on the planning for large landscape areas with dispersed populations with a primary economic base in agriculture, energy development, tourism/recreation, retirement communities, and natural resources.

The program requires a minimum of 36 graduate-level credits, including 3-6 credits of work on a thesis or paper/project. Nine of the required credits may be in an area of emphasis. These nine credits are to be negotiated with the candidate's major professor and supervisory committee. Requirements for the MS in Bioregional Planning are as follows:

Required. Environment Systems Research Institute (ESRI) certification course or ENVS 6900 (Geographic Information Systems), LAEP 6740, and ENVS 6900 (Shipley Seminar/ NEPA/EIS).

Research Methods/Case Studies (3-4 credits). One of the following courses is required: FRWS 6500, SOC 6100, 6150.

Biophysical (3-4 credits). One of the following courses is required: FRWS 5400, 6710, AWER 6330. For those students without a background in ecology, FRWS 4600 is also required. Credits earned for FRWS 4600 or equivalent *do not apply* to the graduate program.

Social/Economic Policy (3-4 credits). One of the following courses is required: ENVS 6000, POLS 5180, or SOC 6630.

Capstone Course (5 credits). LAEP 6100 is required *for all LAEP students*.

Area of Emphasis (9 credits). Nine credits should be available to the candidate for an area of emphasis.

Thesis or Project (3 or 6 credits). A thesis or Plan B paper/project option is required and is to be negotiated with the candidate, major professor, and supervisory committee.

Total Credits: 36-39

Environmental Field Service

Practical Education and Community Service. The department sponsors a program of planning and design services in which MS, MLA, and BLA students may participate. The Environmental Field Service program offers students the opportunity to interact with community leaders and citizens and to test concepts and skills acquired in the classroom while working on real projects.

Internships and Cooperative Education

Many students take advantage of the practical learning opportunities available through internships and cooperative education programs. The department, student, and government agency or private firm make the necessary arrangements. Internshps and cooperative education experiences are not required for degree completion. In some cases, these experiences may be used as the basis for waiver of selected courses, subject to approval in advance by the major professor, graduate program director, and department head. Students completing these experiences are required to make a summary presentation to department faculty and students.

Financial Assistance

The application deadlines for scholarships and financial assistance vary. For current application deadline information, contact the LAEP Department, the USU Financial Aid Office, and the School of Graduate Studies. Acceptance to pursue graduate study does not guarantee the student financial assistance.

Career Opportunities

The Department of Landscape Architecture and Environmental Planning provides education for careers in landscape architectural site planning, design, environmental planning, and management, with special consideration for conditions in the Intermountain West. Graduates are employed by local, state, and federal agencies, as well as by private sector professional firms. LAEP graduates also find employment in academia at both the undergraduate and graduate levels.

Landscape Architecture and Environmental Planning Faculty

Sumner Margetts Swaner Professor

Tamara F. Shapiro, regional landscape planning

Professors

John C. Ellsworth, visual resources management, computer applications, and disturbed lands rehabilitation

Craig W. Johnson, planting design, land rehabilitation, wildlife habitat planning and design

Associate Professors

David L. Bell, residential design, landscape construction, and community planning and design

Caroline Lavoie, urban design/theory

John K. Nicholson, urban and regional planning, and computer applications

Michael L. Timmons, site planning and design, recreation planning, and landscape history

Associate Professor Emeritus

Vern J. Budge, landscape construction and recreation planning

Adjunct Instructor

David G. Garce

Lecturer

Kristofor L. Kvarfordt, design visualization, illustration graphics, 3-D design development

Course Descriptions

Landscape Architecture and Environmental Planning (LAEP), pages 428-429

Languages, Philosophy, and Speech Communication

Department Head: Charlie Huenemann
Location: Main 204
Phone: (435) 797-1209
FAX: (435) 797-1329
E-mail: langphil@cc.usu.edu
WWW: http://www.usu.edu/langphil

Undergraduate Advisors:
French: Charlie Huenemann, Main 204A, (435) 797-0254, hueneman@cc.usu.edu
German: Renate Posthofen, Main 212, (435) 797-1336, posthofr@cc.usu.edu
Philosophy: Richard Sherlock, Main 202E, (435) 797-1244, ruffie@cc.usu.edu
Spanish: M. Isela Chiu-Olivares, Main 202G, (435) 797-1213, isela@cc.usu.edu
Spanish Teaching: John E. Lackstrom, Main 211, (435) 797-1210, fat88@cc.usu.edu
Speech: Harold J. Kinzer, Barn 202, (435) 797-3610, kinzer@cc.usu.edu

Degrees offered: Bachelor of Arts (BA) in French, German, and Spanish; BA and Bachelor of Science (BS) in Philosophy; BA and BS in Speech; Master of Second Language Teaching (MSLT)

Undergraduate Programs

Mission Statement

The Department of Languages, Philosophy, and Speech Communication offers programs in modern languages and literature, philosophy, and speech communication. While these programs differ widely in their curricula, they are bound together by two considerations: (1) an emphasis on humanistic content and method of inquiry; and (2) a recognition on the part of the departmental faculty that a critical part of becoming an educated person lies in achieving a greater understanding of one's self and of others, an understanding opened up through insight into the spoken and written word.

Courses offered by the department provide majors and minors with opportunities to achieve this understanding by increasing their communicative, logical, interpretive, linguistic and research skills; their ability to function within an increasingly globalized society; and their awareness of ethical, aesthetic, and other values. Courses offered by the department also give teaching majors and minors the opportunity to serve the needs of the education professions.

Through its participation in the University Studies program, the department provides all students with an opportunity to gain knowledge of how people come to understand themselves through their cultural, literary, and philosophical achievements. The department also furthers the education of both traditional and non-traditional students through faculty participation in inter- disciplinary programs such as Honors, Liberal Arts and Sciences, Asian Studies, and Women and Gender Studies; and in cooperative education, distance learning, extension, and study-abroad programs.

Admission Requirements

Admission requirements for freshmen desiring entrance to major programs offered by the Department of Languages, Philosophy, and Speech Communication are the same as those for Utah State University (see pages 15-18). Transfer students from other institutions and from other majors within Utah State University must have an overall minimum GPA of 2.5 (2.75 for Spanish) to be admitted to the department's major programs.

All students majoring in programs offered by this department must maintain a minimum GPA of 2.5 in their major (2.75 in Spanish) to be in good standing in the department and to obtain official approval for graduation.

Career Information

The Department of Languages, Philosophy, and Speech Communication maintains a resource center in the departmental office (Main 204) containing general information about graduate schools and nonacademic careers in modern languages, philosophy, and speech communication. Students are invited to use this resource center during office hours.

Scholarship Information

Four scholarships are offered through the Department of Languages, Philosophy, and Speech Communication. The **Brett Blanch Memorial Scholarship** is awarded to an outstanding philosophy major. The **Carl T. Degener Memorial Scholarship** is awarded to an outstanding language major at the junior level. Outstanding upper-division students in French (and under some circumstances Spanish) are eligible for the **Jean Inness Scholarship**. The **Thain Scholarship** is awarded to an outstanding high school senior enrolling in a language or philosophy course at USU. For more details, contact the department office.

Graduate Program

Master of Second Language Teaching (MSLT)

The Master of Second Language Teaching (MSLT) degree program is designed for students desiring additional training at the graduate level in an integrative, interdisciplinary program combining coursework in the field of Foreign Language Education, Bilingual Education, and ESL/EFL Education. Attainment of the degree requires the completion of a minimum of 30 credits of coursework in the MSLT program. The program leading to the MSLT consists of a core curriculum of 18 credits and a profes-

sional curriculum of 12 credits. Courses in the core curriculum are designed to respond to the program's emphasis areas in language, literacy, and culture. Courses in the professional curriculum address teaching methodology, curriculum preparation, materials development, and testing. A Master's Project in the form of a substantial cumulative Master's Portfolio is also required. The Master's Portfolio will include a comprehensive statement of the candidate's philosophy of second language teaching and learning and how this philosophy will be applied in a professional environment. This project will be defended at the end of the degree program. All candidates must take a research course in the professional curriculum designed to aid in preparing the Portfolio Project.

This master's degree program does not lead to licensure by the Utah State Board of Education. Individuals who do not have Utah State Board of Education licensure and wish to obtain that credential must take the three-semester Secondary Teacher Education Program (STEP) in the College of Education and Human Services.

For program information, including admission requirements, degree requirements, courses, and financial assistance, contact the departmental office or see the program's website at: **http://www.usu.edu/langphil/mslt**.

Languages

Language faculty members in the Department of Languages, Philosophy, and Speech Communication teach courses leading to undergraduate degrees in French, German, and Spanish, as well as to undergraduate minors in Chinese, French, German, Japanese, Portuguese, Russian, and Spanish. Teaching majors and minors are also offered in French, German, and Spanish. The department also offers a minor program in Linguistics.

French, German, and Spanish Major Programs. The goal of the French, German, and Spanish BA degree programs is to prepare students to be able to take advanced studies in these languages, literatures, and cultures; to be quality teachers of these languages, literatures, and cultures in the public schools; and to provide those who may enter other professions a solid grounding in these languages, literatures, and cultures, in order that they may function as members of the international community. The curricula supporting these goals includes courses in language, literature, civilization, culture, and linguistics. See the course requirements which follow.

Course Requirements

Language Major Requirements

Bachelor of Arts in French. *French Major (33 credits):* 30 credits of upper-division coursework in French, plus LING 4100; and other University Studies courses as required by the University. LING 4100 must be taken before FREN 4200. *French Teaching Major (35 credits):* LING 4100, 3300 or 4300, 4400; FREN 3060 or 4060; FREN 3090 or 4090; 18 credits selected from the following: FREN 3550, 3570, 3600, 3900, 4200, 4610 or 4620, LING 4920; and other University Studies courses as required by the University.

Bachelor of Arts in German. *German Major (33 credits):* GERM 3000, 3040, 3050; LING 4100; plus 21 credits of additional upper-division coursework selected from German courses, LING 4900 or 4920, and other University Studies courses as required by the University. *German Teaching Major (35 credits):* GERM 3000, 3040, 3050, 4200; LING 4100, 3300 or 4300, 4400; plus 16 credits of additional upper-division coursework in German, and other University Studies courses as required by the University.

Bachelor of Arts in Spanish. *Spanish Major (33 credits):* SPAN 3040; at least 3 courses from among the following: SPAN 3600, 3610, 3620, 3630; SPAN 3550 or 3570; SPAN 4900 or 4910; LING 4100, and three additional credits in Linguistics; plus 9 credits of upper-division coursework in Spanish or Linguistics and other University Studies courses as required by the University. *Spanish Teaching Major (36 credits):* SPAN 3040, 3550, 3570, 3600 or 3610, 3620 or 3630, 4200, 4900 or 4910; LING 4100, 4190, 3300 or 4300, 4400; plus 6 credits of upper-division coursework in Spanish or Linguistics, and other University Studies courses as required by the University. At least half of the credits applied toward the major must be completed at USU or through its sponsored programs.

Language Minor Requirements

Chinese Minor. 12 upper-division credits in Chinese.

French Minor. 12 upper-division credits in French.

French Teaching Minor. FREN 3090 or 4090, 3600, 4200; LING 4190, 3300 or 4300, 4400.

German Minor. GERM 3000, 3040, 3050, and one other upper-division German course.

German Teaching Minor. GERM 3000 or 3300, 3040, 3050, 4200; LING 3300 or 4300, 4400; plus one other upper-division German course.

Japanese Minor. 12 credits selected from the following courses: JAPN 3010, 3020, 3050, 3100, 3510.

Portuguese Minor. PORT 1020, 2010, 2020, 3040.

Russian Minor. RUSS 3040, 3050, 3300, 3510, 3540.

Spanish Minor. SPAN 3040, 3550 or 3570; one of the following: SPAN 3600, 3610, 3620, 3630; plus one other upper-division course in Spanish or Linguistics from the department, excluding LING 4920.

Spanish Teaching Minor: SPAN 3040, 3550 or 3570, 4200; one of the following: SPAN 3600, 3610, 3620, 3630; LING 3300 or 4300, 4400; plus one other upper-division course in Spanish or Linguistics from the department, excluding LING 4920.

Linguistics minor. 12 credits selected from the following courses: LING 4100, 4190, 4400, 4900; ENGL 3020, 4200, 4210, 4230, 5210.

For additional information on language major and minor programs offered by the Department of Languages, Philosophy, and Speech Communication, contact the department office.

Proficiency Tests and Placement in Language Courses. Students who have completed one or more years of language study in high school may take proficiency tests to determine their proper placement in language courses offered by the department.

Credit by Special Examination. Where basic skills in a department-taught language other than Spanish have been acquired by means other than college courses, up to 16 lower-division credits with a letter grade may be earned by completing a course in that language at a higher level than the credits to be acquired. This course needs to be completed with a grade of *B* or better. In Spanish, these credits must be obtained by taking a placement test. To receive all 16 credits in Spanish, students must pass the test with a score of 500 or better. These credits will count as transfer credits. They will not count toward semester or USU GPA, but will be counted into the cumulative GPA.

Where basic skills in a language not offered by the department have been acquired by means other than college courses, up to 12 lower-division credits may be earned by special examination. All credit received by special examination is listed on transcripts as *P* (pass) grade. For further information, contact the department.

Technology Assisted Language Center. The department operates a technology assisted language center, located in Main 002, for instructional use associated with language classes, and for students desiring additional language practice outside of the classroom. The center includes computer workstations capable of running multimedia applications, televisions, VCR players, and audio equipment.

Exchange Programs. The department serves as the academic administrative home to student exchange programs with the University de la Rioja in Spain, and with three institutions in Japan: Kansai Gaidai, Gifu University, and the Faculty of Cross-Cultural Studies at Kobe University. Information about these programs can be found on the department's website or through the USU Study Abroad Office. (See page 69 in this catalog.)

Summer Study-abroad Programs. The department offers summer study programs in Germany, France, and Spanish-speaking countries. Students must be in good standing at the University and must have some language background to participate in these programs. In addition, the department also conducts an annual two- to three-week travel-study tour to Russia, including visits to Moscow and St. Petersburg. Students can receive credit for participating in these programs. For more information, contact the department.

National Honor Societies

Lambda Pi Eta (LPH) is the National Communication Honor Society of the National Communication Association for undergraduate junior and senior communication students. Among the goals of LPH are to recognize, foster, and reward outstanding scholastic achievement; and to provide an opportunity for faculty and students to discuss and exchange ideas about their field of interest.

Sigma Delta Pi (SDP) is the National Collegiate Hispanic Honor Society of the American Association of Teachers of Spanish and Portuguese for students studying Spanish. Among the goals of SDP are to honor those who attain excellence in the study of the Spanish language and of the literature and culture of the Spanish-speaking peoples, and to encourage college and university students to acquire a greater interest in and a deeper understanding of Hispanic culture.

Languages Course Descriptions

Chinese (CHIN), pages 367-368
French (FREN), pages 398-399
German (GERM), pages 406-407
Italian (ITAL), page 419
Japanese (JAPN), pages 424-425
Korean (KOR), page 428
Language (LANG), page 430
Linguistics (LING), pages 430-431
Navajo (NAV), page 447
Portuguese (PORT), pages 465-466
Russian (RUSS), pages 473-474
Spanish (SPAN), pages 481-482

Philosophy

Philosophy at USU reflects the ideals of the liberal arts in encouraging the respect for truth without promoting dogmatism, and in offering the opportunity for students to increase their self-understanding at the same time as they increase their knowledge of the world around them.

Philosophy faculty in the Department of Languages, Philosophy, and Speech Communication teach courses leading to an undergraduate major and a minor in philosophy. The mission of the Philosophy program at Utah State University is to provide a high-quality education leading to an understanding of the major areas of inquiry represented within the discipline of philosophy. Coursework emphasizes the areas of the history of philosophy, logic, ethical theory and applied ethics, and metaphysics and epistemology. The curriculum is designed to meet a wide variety of student interests in pursuing a major in philosophy. It provides a rigorous foundation for students intending to further their education in law school or graduate school in philosophy, and it also provides an exciting and challenging education for those students who enjoy thinking about ideas for their own sake. Coursework is also designed to enrich the education of students majoring in other subjects, by providing them with opportunities to gain an understanding of philosophical perspectives on and philosophical foundations of their chosen fields.

Course Requirements

Bachelor of Arts in Philosophy (30 credits). PHIL 1200 or 2200, 2400 or 2500, 3100, 3120; one of the following courses: PHIL 3500, 3510, 3520, 4500, 4540, or 4610; two of the following courses, at least one of which must be PHIL 4300 or 4400: PHIL 4300, 4310, 4400, 4410, 4420; three other upper-division philosophy courses; other University Studies courses as required by the University; completion of the foreign language requirement for the BA degree (see page 50).

The **Bachelor of Science** degree can be awarded in Philosophy to philosophy majors who have not completed the foreign language requirement for the Bachelor of Arts degree in Philosophy.

Philosophy Minor (18 credits). Six courses in Philosophy, at least four of which must be at the upper-division level, must be completed for a philosophy minor.

Philosophy Course Descriptions

Philosophy (PHIL), pages 457-458

Speech Communication

Speech Communication has been taught continuously at USU almost from the University's founding in 1888. Speech Communication faculty in the Department of Languages, Philosophy, and Speech Communication teach courses leading to a Bachelor of Arts or Bachelor of Science degree in Speech, as well as to minors in Organizational Communication and Speech Communication Teaching.

The **speech major** emphasizes organizational communication. Organizational communication is the study of how communication creates organizations and of how organizations shape communication. Coursework in the program addresses the theories and analytical skills enabling students to identify common communication problems arising in organizational contexts and to develop appropriate communication policies and practices. The program also teaches important aspects of intercultural and interpersonal communication theory.

Students majoring in speech are encouraged to earn a BA degree by completing two years of study in a foreign language. This broadens cultural and social awareness and can increase one's understanding of the nature of language in general.

Admission to the speech major will be limited to 25 students each year. Admission decisions will be based on (1) academic record, (2) realistic career or professional study objective, (3) ability of this program to prepare the student for intended career, (4) satisfactory speaking and writing competencies, and (5) motivation and creativity demonstrated by class performance, work experience, volunteer activities, and other means offered by the student during the application process.

Students not admitted may apply the following year. If not admitted on the second application, the student will be permitted to complete a minor, but will not be considered again for the major.

To obtain guidelines for applying to the speech major, contact the Department of Languages, Philosophy, and Speech Communication.

The minor program in **Organizational Communication** is designed for students who seek communication and human relations competencies, an understanding of human communication behavior, and the critical thinking skills required for success in a variety of careers.

The course of study leading to a minor in **Speech Communication Teaching** is designed to develop the communication competencies and the understanding of communication processes and theory necessary for effective high school speech communication instruction. Prior to student teaching, the program features practicum experience in which students learn how to critique and coach speech communication students.

Course Requirements

Speech Major (30 credits). As many as 15 credits taken at other colleges or universities may be used to partially satisfy these requirements. For more information, students should contact their advisor. *Communication Core (6 credits):* Complete the following: SPCH 1050, 2600. *Capstone Course (3 credits):* SPCH 5100. *Organizational Communication Theory (9-12 credits):* Complete at least three of the following, for a total of 9 credits: SPCH 3250, 3300, 3400, 5000, 5090, 5250, 5280, JCOM 3400. *Organizational Communication Application (9-12 credits):* Complete at least three of the following (at least two having a SPCH prefix), for a total of 9-12 credits: SPCH 2280, 3000, 3050, 3600, 4280, 4800, LING 4900, BIS 4350, 5660, MHR 3710, 3820.

Organizational Communication Minor (15 credits). SPCH 1050 or 2600, 3250, and 9 other credits in Speech Communication courses, selected in consultation with a program advisor. At least 3 of these 9 credits must be from a class offered at the 4000 or 5000 level.

Speech Communication Teaching Minor (19 credits). SPCH 1050, 2600, 3000, 4280, 5100, 5280, and either SPCH 3330 or 5090.

Speech Communication Course Descriptions

Speech Communication (SPCH), page 482

Languages, Philosophy, and Speech Communication Faculty

Professors

Lynn R. Eliason, 19th century Russian and German novels, Russian culture

Charles W. Johnson, philosophy of mind, Wittgenstein, logic, philosophical methods

John E. Lackstrom, linguistics, Spanish applied linguistics, TESL

Mark D. Larsen, Latin American literature, computer applications in languages

Kent E. Robson, ethics, philosophy of language, history of philosophy, philosophy of science, philosophy of religion

Richard Sherlock, medical and environmental ethics, ethical theory, ethical issues in genetics, political philosophy, philosophy of religion

Professors Emeritus

Hans K. Mussler, German literature, Lessing, enlightenment, translation, teaching methodology

Alfred N. Smith, Jr., French, foreign language education, cross-cultural studies

Associate Professors

M. Isela Chiu, Spanish, Portuguese, Latin American literature

María-de Jesús Cordero, colonial Spanish-American literature

Charlie Huenemann, history of modern philosophy, Kant, metaphysics

Harold J. Kinzer, organizational communication

Taira Koybaeva, Russian, linguistics, international marketing and business relationships

Kevin L. Krogh, Spanish Peninsular literature

Renate Posthofen, German language and literature, contemporary culture and film

John S. Seiter, interpersonal communication, intercultural relations, social influence

Gordon Steinhoff, philosophy of science, logic, metaphysics

William H. Wilcox, Jr., ethical theory, applied ethics, philosophy of law, social and political philosophy

Fuencisla Zomeño, Spanish and Luzo-Brazilian literature

Associate Professors Emeritus

Jerry L. Benbow, Peninsular Spanish literature and grammar

Lynne H. Goodhart, 20th century French poetry, women in literature

Ilona Jappinen, German language, literature and culture, Nietzsche/expressionism

Gordon E. Porter, Spanish, Spanish literature, Portuguese

Norman R. Savoie, contemporary French culture, contemporary French detective fiction

Janet C. Stock, French, business French, 20th century French literature, Proust

Assistant Professors

Janette K. Bayles, French

Anne F. Carlson, French

Susan J. Dudash, French

Sarah Gordon, French

Jennifer A. Peeples, speech communication

J. P. Spicer-Escalante, 19th century Latin American literature

Maria Luisa Spicer-Escalante, Hispanic applied linguistics

Felix W. Tweraser, German

Assistant Professor Emeritus

Valentine Suprunowicz, Russian literature

Instructor

Nat Bartels, foreign language education

Principal Lecturer Emeritus

Viva L. Lynn, Spanish literature

Lecturers

Catharina de Jonge-Kannan, second language acquisition

Atsuko Neely, Japanese, second language acquisition

Liberal Arts and Sciences Major

Contact and Advising: Science/HASS Advising Center
Location: Student Center 302
Phone: (435) 797-3883
FAX: (435) 797-2096
E-mail: mleavitt@hass.usu.edu ***or*** lynnes@hass.usu.edu
WWW: http://www.usu.edu/shac/las.html

Degree Offered: Bachelor of Arts (BA) in
Liberal Arts and Sciences

The Liberal Arts and Sciences (LAS) Major offers a broad and challenging course of study in the humanities, sciences, arts, and social sciences. Through a multi-disciplinary but coherent approach to learning, the program meets the needs of students majoring in professional fields, as well as those desiring a general background for adaptability and mobility in employment. LAS offers USU students the training required to be competitive and to contribute effectively in the organizations, professions, and communities of the twenty-first century.

This major allows the student to develop an individualized curriculum in consultation with the program advisor (Student Center 302). This major requires a 2.3 overall GPA for admission and a 2.3 USU Cumulative GPA for graduation.

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

University Studies (30 credits). The University Studies Program (which is required for all students seeking a bachelor's degree) consists of two sets of requirements: General Education Requirements and Depth Education Requirements. Included in the General Education Requirements are Competency Requirements, including Communications Literacy, Quantitative Literacy, and Computer and Information Literacy. General Education also includes Breadth Requirements in the areas of American Institutions, Creative Arts, Humanities, Life Sciences, Physical Sciences, and Social Sciences. To complete the Depth Education Requirements, students must complete two Communications Intensive courses, one Quantitative Intensive course, and two Depth courses. For more information about the University Studies Program, as well as lists of courses approved for meeting University Studies Requirements, see pages 42-49 in this catalog. Students should consult with the program advisor to determine which University Studies courses will best meet their learning goals.

Foreign Language (2 years). All students who receive the Bachelor of Arts degree must have completed two years' training or equivalent in a foreign language approved by the Languages, Philosophy, and Speech Communication Department. One year or equivalent in each of two foreign languages may also satisfy the foreign language requirement for the BA degree. Specifically, the BA language requirement may be completed in one of the following ways:

1. Completion of 16 credits in one foreign language.

2. Completion of 20 credits in two foreign languages.

3. In general, completion of course number 2020 in one of the foreign languages or an upper-division (3000-level or above) foreign language grammar or literature course. Conversation classes generally cannot be considered in satisfying this requirement.

4. Successful completion of the Intensive English Language Institute (IELI) program for international students.

5. TOEFL, Michigan, or IELI placement scores high enough to meet the University admission criteria.

The focus of study for the Liberal Arts and Sciences major is to help students gain a basic understanding of the development of civilization, including historical and cultural traditions, political institutions and processes, an appreciation of arts and literature, and expanded capacities for critical thought. Four learning goals are identified, each requiring a minimum of 9 credits, for a total of 36 credits.

Students plan a multi-disciplinary academic program providing a focus for study, with emphasis in primarily social sciences, humanities, and arts.

Pre-professional and Elective Credits

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

Course Description

Liberal Arts and Sciences (LAS), page 430

Management and Human Resources

Department Head: Gaylen N. Chandler
Location: Business 415
Phone: (435) 797-1789
FAX: (435) 797-1091
E-mail: mhr@b202.usu.edu
WWW: http://www.usu.edu/mhrdept/index.htm

Undergraduate Advisor: Ruth C. Harrison, Business 302A, (435) 797-2272, rharrison@b202.usu.edu

Graduate Program Director: Glenn M. McEvoy, Business 415, (435) 797-2375, glenn.mcevoy@usu.edu

Degrees offered: Bachelor of Science (BS) and Bachelor of Arts (BA) in Management; BS and BA in Human Resource Management; Master of Science (MS) in Human Resources

The department also participates in the College of Business Master of Business Administration (MBA) Degree. A description of the MBA degree and program requirements can be found on pages 153-154. Graduate-level courses offered by the department are included in the plans of study of graduate students in a wide variety of disciplines. Students can specialize in Entrepreneurship or Human Resource Management in the on-campus MBA program.

Undergraduate Programs

Objectives

The programs in the Department of Management and Human Resources are designed to prepare students for administrative and leadership positions in business, government, and other institutions. Specialized training is provided in Management and Human Resource Management, as well as training directed at understanding the broader aspects of business as it functions within a national and international environment. The study of management is approached from an organizational leadership framework.

Management deals with the skills and attributes of organizational leadership. These include the ability to critically assess issues currently facing one's organization or unit; the ability to develop a vision for the organization and translate it into a mission, objectives, and strategies; and the ability to accomplish these through the acquisition and allocation of resources, and organizing, leading, and empowering people.

Human Resource Management deals with those processes which provide, develop, and maintain a productive workforce. Subject areas include recruiting employees, determining what tasks need to be performed, placing the right person in the right position, determining fair benefits and compensation, evaluating performance, determining current and future employment needs, training and development, labor-management relations, and following legal/ethical practices in employment.

Requirements for Majors

College of Business Requirements. All students majoring in management or human resource management must satisfy the College of Business requirements, provided on pages 101-102. Academic advising about these requirements is available in the College of Business Career and Education Opportunities Center, Business 310A.

All students at the University are required to satisfy the University Studies requirements of the University as described on pages 42-49 of this catalog. Additional requirements for Management and Human Resources majors consist of two basic components.

1. College of Business Core. The following courses are required: MHR 2990; ACCT 2010, 2020; BIS 2450, 2550; ECON 1500, 2010; MATH 1050, 1100; STAT 2300; and PSY 1010 or SOC 1010.

2. Department of Management and Human Resources Prespecialization Requirement. The following courses are required for majors in Management and Human Resource Management: MATH 1100; SOC 1010 or PSY 1010; SPCH 2600, 3050, or BIS 2450.

Completion of 20 credits of university work with a minimum GPA of 2.50 is necessary before a student is allowed to enroll in BIS 2550; ACCT 2010, 2020; and MHR 2990.

Access to 3000-level Management and Human Resources courses is restricted. Only those students who have completed a minimum of forty (40) semester credits with a minimum GPA of 2.67 will be allowed to enroll in 3000-level Management and Human Resources courses.

College of Business Enrollment Restrictions. Admission to the college does not ensure access to the courses required for graduation. The following admission requirements must be met by all USU students:

1. An overall GPA (transfer credits included) of 2.50 and 20 semester credits of college-level work are required for admission into ACCT 2010, 2020; MHR 2990; and BIS 2550.

2. All 3000-, 4000-, and 5000-level courses in the College of Business are restricted to students admitted to the College of Business or another USU major with an overall GPA of at least 2.67 and completion of at least 40 credits.

3. An overall GPA of 2.67, admission to the College of Business, and completion of 84 credits are required for admission into MHR 4880 and 4890.

4. To earn a College of Business bachelor's degree, at least 60 semester credits must be from courses outside the College of Business.

5. Many of the courses in the College of Business require prerequisites. Before registering for courses within the College of Business, students should consult with their advisor or refer to the current *General Catalog* to ensure they have completed the necessary prerequisites.

Freshman Admission. Students may be admitted directly into the College of Business and the Department of Management and Human Resources as incoming freshmen if they have less than 24 earned post-high school college credits and if all of the following conditions are met: (1) admitted to Utah State University; (2) designated a Management *or* Human Resource Management major on USU application or submitted a College of Business application to the College of Business Career and Education Opportunities Center; (3) ACT Composite of 24 or higher; and (4) high school GPA of 3.5 or higher.

All admitted freshmen, regardless of declared College of Business major, must first complete the following four courses, or their equivalents, with a *C* grade or better in each course, as prerequisites to College of Business courses numbered 3000 and above: ECON 1500, Introduction to Economic Institutions, History, and Principles; MATH 1100, Calculus Techniques; STAT 2300, Business Statistics; and PSY or SOC 1010, General Psychology or Introductory Sociology.

Non-Freshman and Transfer Admission. USU students and transfer students from other accredited colleges and universities may be admitted directly to any College of Business major if they have met the following conditions: (1) admitted to Utah State University; (2) earned 24 or more post-high school college credits with 3.5 GPA or higher; and (3) designated a College of Business major on USU application (transfer students) or submitted a College of Business application to the College of Business Career and Education Opportunities Center (USU continuing students).

Admission for students not meeting the above conditions is competitive based on available space in the College of Business. Application forms, available at the College of Business Career and Education Opportunities Center, may be submitted after completion of at least 24 credits of coursework, including the pre-business course requirements, or equivalent, with a *C* grade or better. An essay will also be required.

Pre-Business Course Requirements (13 credits). Applicants will be ranked according to an Application GPA that is calculated as follows: one-third weight on 13 credits earned in four required courses (ECON 1500, MATH 1100, STAT 2300, and PSY or SOC 1010); one-third weight on last 24 credits earned; and one-third weight on overall GPA. Essays will be evaluated by the admissions screening committee.

Grades for courses which have been repeated will be discounted one step each time courses are repeated for the College of Business Application GPA (e.g., *A*- to *B*+). Students may not repeat a course *more than twice*, and may have *no more than 10 repeats in total* to earn a degree. (College of Business courses are limited to one repeat.)

Matriculation Requirement. No more than 15 USU College of Business credits (ACCT, BA, BIS, BUS, MHR), numbered 2000 and above, earned as a nonbusiness major (before acceptance into the College of Business) can be applied to a College of Business degree. More than 15 business credits can be transferred from other accredited institutions. However, additional USU credits added to previously earned transfer credits may not exceed 15.

Departmental Core for Both Undergraduate Majors. During the initial portion of the Management and Human Resources upper-division programs, all degree seeking students will be required to take the following core classes, which are designed to provide a broad background in the various areas of business: BA 3400, 3500, 3700; BUS 3250; ECON 3400; MHR 3110, 3710, 3820, 4630; MHR 4880 or 4890. Since MHR 4880 and 4890 are both capstone courses, they should not be taken until near the end of the senior year.

During the latter portion of the program, the student working toward a degree in the Department of Management and Human Resources will be devoting his or her efforts toward fulfilling the requirements in one of the two majors: Human Resource Management *or* Management.

Major in Human Resource Management. In addition to the core requirements, students majoring in Human Resource Management must complete two of the following classes: MHR 3720, 3810; PHIL 3520 or MHR 4730; MHR 5640; BIS 4350 or ECON 5660; ECON 5670 or 5680. It is recommended that students wishing to work in a human resource position, and who are not planning to pursue a graduate degree in human resource management, take MHR 3810, BIS 4350 or ECON 5660, and either ECON 5670 or 5680.

Major in Management. In addition to the core requirements, students majoring in Management must complete two of the following classes: MHR 3720, 3810, 4710, 5640; PHIL 3520 or MHR 4730; BIS 4350 or ECON 5660; ECON 5670 or 5680; or other classes as determined through advisement.

If a College of Business student elects to take a minor, he or she is encouraged to select one from outside the College of Business.

Requirements for Minors

A minor in Management and a minor in Human Resource Management are available, as outlined below. Any deviation from the programs as outlined must be submitted in writing, with justification for the changes, to the department head for approval. A 2.50 GPA in the minor courses is required.

Minor in Management. This minor is for students with **majors outside the College of Business** who want to work in an organization where they will assume leadership or management responsibilities. The Management minor consists of 12 credits. MHR 3110 is required. In addition, three courses must be selected from the following: MHR 2990, 3710, 3720, 3810, 3820, 4630, 4730, 5640; PHIL 3520 or MHR 4730; BIS 4350 or ECON 5660; ECON 5670 or 5680; or other classes as determined through advisement.

Minor in Human Resource Management. This minor is for students with **majors outside the College of Business** who want to work in any human resource function of an organization. The Human Resource Management minor consists of 12 credits. MHR 3110 and 4630 are required. In addition, two courses must be selected from the following: MHR 2990, 3710, 3720, 3810, 3820, 5640; ECON 5670 or 5680; PHIL 3520 or MHR 4730; BIS 4350 or ECON 5660; or other classes as determined through advisement.

Minors for Students with majors within the College of Business. Students with majors within the College of Business may elect to take a minor in either Management *or* Human Resource Management. In such cases, in consultation with the head of the Department of Management and Human Resources, an appropriate minor will be determined based on the student's career objectives. Students will be expected to complete 12 credits of related coursework beyond the College of Business Core Requirements. All such minors must be approved by the head of the Department of Management and Human Resources.

Graduation Requirements

To be recommended by the department for graduation, majors in the Department of Management and Human Resources must have a grade point average of at least 2.50 in their upper-division core and specialization courses, as well as an overall GPA of 2.50. This includes transfer credits. The College of Business requires that at least 60 semester credits be taken in courses taught outside the College of Business. Up to 9 semester credits of economics and 6 semester credits of statistics can be considered as courses taught outside the College of Business. At least fifty percent of the business credits required for a business degree must be taken on the Utah State University campus or at a designated residence center.

Financial Assistance

The Department of Management and Human Resources and the College of Business award scholarships in addition to those available through the University Financial Aid Office. Information and application forms are available from the College of Business Career and Education Opportunities Center, Business 310A.

Student Organization

The department sponsors a student organization. Membership in the organization is open to all students, both undergraduate and graduate, who meet the membership requirements.

Society for Human Resource Management (SHRM) is the professional Human Resource Management organization co-sponsored by the Bridgerland Chapter of SHRM.

Graduate Programs

Master of Science in Human Resources (MS HR)

The MS in Human Resources degree prepares students for professional careers in the field of Human Resource Management. The instruction is designed to teach students to assume a strategic role in helping organizations gain competitive advantage by building employee commitment, competence, and effectiveness. Required subject areas include human resource planning, recruiting, selection, placement, compensation and benefits, performance management, career planning, training and organizational development, labor and employee relations, ethical/legal employment practices, statistical methods, and program evaluation.

Students without sufficient relevant work experience are required to complete an approved internship. The executive in residence in the MHR Department and/or the MS in Human Resources steering committee will serve as facilitators to help secure internship oppotunities. All students are strongly encouraged to take the certification exam of the Human Resource Certification Institute (HRCI).

Students are expected to be admitted to the program as matriculated students before taking coursework leading to the degree.

Degree Requirements. Students are held responsible for meeting requirements as outlined in this catalog. Requirements specific to this degree are outlined below. It is the student's responsibility to be aware of all requirements and initiate the resolution of apparent inconsistencies.

The typical degree option is Plan C, which includes coursework to meet the degree requirements. The student should consult with the graduate program director if the Plan B option is being considered.

The MS in Human Resources degree usually requires 33 credits beyond the Business Core. The total number of credits is 51 for students without an undergraduate business degree or commensurate work experience. Coursework includes MHR 6330, 6360, 6510, 6550, 6620, 6630, 6640, 6650, 6670, 6690, 6760; BUS 6160, 6250; and one 3-credit elective approved by the steering committee. Students with applicable and relevant work experience may waive BUS 6250 (Graduate Internship) on approval of the MS in Human Resources steering committee. Students with an undergraduate degree from an AACSB-accredited business school or equivalent work experience will not be required to take BUS 6160. Students are also strongly encouraged to take the HRCI (Human Resource Certification Institute) exam.

Additional information about the MS in Human Resources degree may be obtained by contacting the Department of Management and Human Resources.

Admission Requirements

See Admission Procedures on pages 90-91. Students are required to submit scores on either the Graduate Record Examination (GRE) or the Graduate Management Admissions Test (GMAT). Prospective students may request information on the expected test performance standards for acceptance. Applicants are expected to have strong written and oral communication skills.

Financial Assistance and Assistantships

A limited number of graduate assistantships, scholarships, and other departmental awards are provided to outstanding on-campus students on a competitive basis. Acceptance to the program does not guarantee financial assistance. Application forms are available from the MHR Department. The deadline for financial aid assistance is March 15.

Master of Business Administration (MBA)

The department also participates with other departments in the College of Business in offering the Master of Business Administration (MBA) Degree. A description of the MBA degree and program requirements can be found on pages 153-154 of this catalog.

Management and Human Resources Faculty

Professors

Caryn L. Beck-Dudley, Dean of College of Business, business law, employment law, and social responsibility

Gaylen N. Chandler, entrepreneurship, management, human resources

Glenn M. McEvoy, human resources, organizational behavior, management

David B. Stephens, business strategy and labor relations

Professors Emeritus

Vernon M. Buehler

Howard M. Carlisle

John R. Cragun

Gary B. Hansen

Leon R. McCarrey

Y. Krishna Shetty

Associate Professors

Ronda R. Callister, management, organizational behavior, international management

David R. Daines, business law, employment law, and social responsibility

Steven H. Hanks, business strategy, management, and entrepreneurship

Ross E. Robson, lean manufacturing, management

Assistant Professors

Dawn DeTienne, entrepreneurship

David L. Dickinson, labor and employee relations, labor economics

James Hayton, management, human resources

Konrad S. Lee, employment law, business law

Troy V. Mumford, organizational behavior, human resource management, compensation

Adjunct Assistant Professor

Shari Tarnutzer, international management

Senior Lecturer

Alan P. Warnick, human resource management

Course Descriptions

Management and Human Resources (MHR), pages 437-439

Mathematics and Statistics

Department Head: Russell C. Thompson
Location: Lund Hall 211
Phone: (435) 797-2809
FAX: (435) 797-1822
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WWW: http://www.math.usu.edu/

Assistant Department Head: Daniel C. Coster, Lund Hall 301, (435) 797-2815, coster@math.usu.edu

Undergraduate Program Coordinator: Ian M. Anderson, Lund Hall 318, (435) 797-2822, anderson@math.usu.edu

Graduate Program Coordinator: D. Richard Cutler, Lund Hall 302C, (435) 797-2699, richard@math.usu.edu

Mathematics Education Program Director:
James S. Cangelosi, Lund Hall 325C, (435) 797-1415, jcang@math.usu.edu

Undergraduate Advisors:
Mathematics: Chris S. Coray, Lund Hall 310, (435) 797-2861, coray@math.usu.edu
Statistics: Christopher D. Corcoran, Lund Hall 202, (435) 797-4012, corcoran@math.usu.edu

Degrees offered: Bachelor of Science (BS), Bachelor of Arts (BA), and Master of Science (MS) in Mathematics; BS and BA in Mathematics Education; BS in Composite Mathematics-Statistics Education; Master of Mathematics (MMath); BS, BA, and MS in Statistics; MS in Industrial Mathematics; Doctor of Philosophy (PhD) in Mathematical Sciences

Graduate specializations: *PhD in Mathematical Sciences*—College Teaching, Interdisciplinary Studies, Pure and Applied Mathematics, and Statistics

Undergraduate Programs

Objectives

The Department of Mathematics and Statistics offers a variety of programs and courses designed to prepare students for careers in teaching and for positions as mathematicians and statisticians in industry and government. The department also provides service courses for students in many other disciplines and contributes to the University Studies program by providing Quantitative Literacy and Quantitative Intensive classes.

Placement of New Students

The mathematics ACT score, on-campus placement tests, and Advanced Placement (AP) calculus and statistics scores are used for placement in 1000-level and 2000-level mathematics and statistics courses. New students and students who are registering for a math class at USU for the first time should have a math ACT score of at least 18 to register for MATH 1010 (Intermediate Algebra), a score of at least 19 to register for STAT 1040, and a score of at least 23 to register for MATH 1030 (Quantitative Reasoning), MATH 1050 (College Algebra), and MATH 1060 (Trigonometry). The alternative to this is to take a placement examination in the Testing Services Office, University Inn 115. **A student who has already taken a math class at USU may register for the next higher level course, providing he or she received a grade of *C-* or better in the prerequisite course. Equivalent transfer courses must also have a *C-* or better grade.** Entering students with math ACT scores of less than 18 should register for MATH 0900 (Elements of Algebra) or take the placement examination to qualify for a higher-level course. The placement exam requires a small fee.

A math ACT score of at least 27 is needed to begin in MATH 1100 or 1210.

Entering students with passing scores on AP calculus or statistics exams will be given 8 semester credits in mathematics for passing either one of the calculus exams, and 4 semester credits for passing the statistics exam. Part of this credit may be for specific USU courses. Students with an AP calculus AB score of 3 will generally be advised to start in MATH 1210 (Calculus I). Students with a score of 4 or 5 on the calculus AB exam or a score of 3 or 4 on the calculus BC exam will be given credit for MATH 1210, and will be advised to begin in MATH 1220 (Calculus II). Students with a score of 5 on the calculus BC exam will be given credit for MATH 1210 and 1220, and advised to begin in MATH 2210 (Multivariable Calculus). Students with a score of 3 or higher on the AP statistics exam will be given credit for STAT 2000. Students may also take a placement test in the USU Testing Center to determine if MATH 1100 (Calculus Techniques) or MATH 1210 (Calculus I) is an appropriate place to start.

The calculus courses MATH 1210, 1220, and 2210 are designed for students in mathematics, the sciences, and engineering. MATH 1100 (Calculus Techniques) is designed primarily for students in business and a few other majors. All students in calculus classes need strong backgrounds in the material covered in MATH 1010 and MATH 1050. In addition, the MATH 1210, 1220, 2210 sequence requires trigonometry (MATH 1060) and a graphics calculator.

Students with outstanding mathematics records in high school and transfer students with some experience in calculus may wish to consult with a departmental advisor prior to registration.

Departmental Admission Requirements

1. New freshmen admitted to USU in good standing qualify for admission to the major.

2. Transfer students from other institutions need a 2.2 transfer GPA, and students transferring from other USU majors need a 2.0 total GPA for admission to this major in good standing.

3. Students may be admitted to the Mathematics Education major by satisfying either of the above conditions. However, in order to be admitted to the Secondary Teacher Education Program (STEP), and to graduate from the Mathematics Education major

(and minor), students must have a cumulative GPA of at least 3.0 in the equivalent of MATH 1210, 1220, and 2210, and an overall GPA of at least 2.75.

University Requirements

All students in the Department of Mathematics and Statistics must satisfy the requirements of USU's University Studies program, described on pages 42-49 of this catalog.

College of Science Requirements

Every bachelor's degree candidate in the College of Science must complete the following coursework or its equivalent:

1. One year of calculus: MATH 1210 and 1220. In some degrees or emphases within degrees, the second semester of calculus may be replaced by STAT 3000. The substitution will be for specific degree programs, not by student choice.

2. One of the following year-long sequences: BIOL 1210, 1220; CHEM 1210, 1220; GEOL 1150, 3200; PHYX 2110, 2120; PHYX 2210, 2220. The chosen sequence must be *outside the student's major department*.

Bachelor of Arts (BA) Degree

For this degree, students must complete the major requirements for the corresponding BS degree, plus the equivalent of two years of training in a foreign language. The Languages, Philosophy, and Speech Communication Department is responsible for approving the foreign language coursework for this degree.

Major Requirements

Major and minor requirements in the Department of Mathematics and Statistics vary from time to time. Students may obtain from the department information about the exact requirements in effect at any given time. All grades for MATH and STAT courses applied toward a departmental major or minor must be *C*- or better. Major and minor requirements in effect at the beginning of Fall Semester 2004 are given below.

Mathematics Major. MATH 1210, 1220, 2210, 2270, 2280, 4200, 4310, 5210, and 5710; any two courses (6 credits) from MATH 5110, 5220, 5270, 5310 (or 5340), and 5510; any three additional courses (9 credits) in mathematics at the 5000-level, excluding Actuarial Mathematics (MATH 5570, 5580). Note: MATH 2250 may substitute for both MATH 2270 and 2280; however, MATH 2270 and 2280 are recommended. Several options in this major exist (e.g., Actuarial Science, Computational Math, and dual Majors with Computer Science, Physics, and Electrical Engineering). Contact the Mathematics and Statistics Department for details.

Mathematics Education Major. STAT 1040; MATH 1210, 1220, 2210, 2250, 3110, 4200, 4310, 4400, 4620, 5500, and 5710; *Secondary Teacher Education Program (STEP):* Level 1—SCED 3100, 3210, MATH 3300, 4500; Level 2—SCED 4200, 4210, SPED 4000, MATH 4300; Level 3—SCED 5500, 5630. Admission to the STEP requires a GPA of at least 3.00 in the equivalent of MATH 1210, 1220, and 2210, and an overall GPA of at least 2.75. Graduation from this major also requires an overall GPA of at least 2.75. No more than three repeats in *all* required courses may be used in GPA computations. The STEP is normally completed during the last three semesters of the degree program, and consequently nearly all the mathematics classes in the Mathematics Education Major must be completed before beginning the STEP.

Composite Mathematics-Statistics Education Major. MATH 1210, 1220, 2210, 2250 or 2270, 3110, 4200, 4310, 4400, 4620, 5500, 5710, STAT 1040, 2000 or 3000, 5100, 5200, 5890; *Secondary Teacher Education Program (STEP):* Level 1—SCED 3100, 3210, MATH 3300, 4500, STAT 4500; Level 2—SPED 4000, SCED 4200, 4210, MATH 4300; Level 3—SCED 5500, 5630. Admission to the STEP requires a cumulative GPA of at least 3.00 in the equivalent of MATH 1210, 1220, 2210 and a cumulative GPA of at least 3.00 in STAT 1040, 2000 or 3000, and an overall GPA of at least 2.75. No more than three repeats in all required courses may be used in GPA computations. The STEP is mostly completed in the last three semesters of the degree program.

Statistics Major. MATH 1210, 1220, 2210, 2270, 4200, 5710 and 5720; CS 1700; STAT 2000 or 3000; STAT 4920, 5100, 5200, 5890; any three additional statistics classes (9 credits) at the 5000-level. One of the three additional classes may be selected from MATH 4630, 5570, 5610, and 5760. Note: MATH 2250 may substitute for MATH 2270.

Emphasis Requirements

Computational Mathematics Emphasis. This emphasis, available in the Mathematics Major, requires the following: MATH 1210, 1220, 2210, 2270, 2280, 3310, 4200, 5210, 5610, 5620, and 5710; two courses (6 credits) in mathematics at the 4000-level or above, not including Actuarial Mathematics (MATH 5570, 5580); CS 1700, 1710, 1720, 2200, and 2370; any two computer science courses numbered above 4000. Note: MATH 2250 may substitute for MATH 2270 and 2280. MATH 4620 *may not* be counted towards the elective mathematics credit requirement. Students who complete the computer science coursework with a GPA of at least 2.5 automatically earn a minor in computer science.

Actuarial Science Emphasis. This emphasis, available in *either* the Mathematics Major *or* the Statistics Major, requires the following for Mathematics majors: MATH 1210, 1220, 2210, 2270, 2280, 4200, 4310, 5210, 5570, 5580, 5710, 5720; STAT 2000 or 3000; STAT 5100; CS 1700; ACCT 2010; ECON 2010; BA 3400; and one business administration course (3 credits) numbered above 4000. Statistics majors should complete STAT 5200 and one 5000-level STAT elective *instead of* MATH 4310 and 5210. Note: MATH 2250 may substitute for MATH 2270 and 2280. Admission to this emphasis requires explicit departmental approval.

Dual Major Requirements

Students who are interested in two or more major areas (in different departments) should consult with a departmental advisor to discuss the possibility of an individually designed degree program. Such programs typically entail completing major requirements in two or more departments, but cooperating departments may agree to waive some requirements in each department to facilitate a dual or triple major.

By meeting requirements for any two separate majors, USU students may earn a **dual major**, meaning *one bachelor's degree* in the *combination* of two approved majors. Students majoring in

Mathematics may benefit from combining their major with a Computer Science, Electrical Engineering, Physics, or Statistics major. Following are the requirements for each of these dual majors.

Mathematics-Computer Science. MATH 1210, 1220, 2210, 2250 (or 2270 and 2280), 3310, 4200, 5210, 5610, 5620, 5710; CS 1700, 1710, 1720, 2200, 2370, 2550, 2560, 3000, 3100, 4700, 5000 or 5050; SPCH 1050; one of PHIL 2400, 2500, 3520, or 4540; 13 credits from the following list: CS 5000, 5050, 5100, 5200, 5300, 5370, 5400, 5450, 5600, 5650, 5700, 5800, 5850, 5890, 5950 (note that CS 5000 and 5050 may not be double counted); SPCH 1050; one of the following sequences: PHYX 2210, 2220 *or* BIOL 1210, 1220, *or* CHEM 1210, 1220, 1230, 1240 *or* GEOL 1150, 3200, plus one additional computer science advisor-approved science course so that the total in this sequence section is at least 13 credits; plus one additional University Studies class (3 credits) from the BAI, BHU, BSS, or BCA approved lists.

Mathematics-Electrical Engineering Major. All courses in the Electrical Engineering major; MATH 1210, 1220, 2210, 2250, 4200, 4310, 5210, 5710; and three additional courses (9 credits) in mathematics numbered above 4600, excluding MATH 5570 and 5580. Note: Only one of MATH 4620 and 4630 may count towards the elective credit in mathematics.

Mathematics-Physics Major. MATH 1210, 1220, 2210, 2270, 2280, 4200, 4310, 5210, 5710; PHYX 2210, 2220, 2710, 3550, 3600, 3650 or 3700, 3870, and 4900; two additional courses in mathematics numbered above 4600; 8 additional credits in physics numbered above 3500, excluding University Studies Depth courses. Note: MATH 2250 may substitute for MATH 2270 and 2280. MATH 4620 *may not* count towards the elective credit in mathematics. PHYX 2110 and 2120 may substitute for PHYX 2210 and 2220.

Mathematics-Statistics Major. MATH 1210, 1220, 2210, 2270, 2280, 4200, 4310, 5210, 5710, and 5720; STAT 2000 or 3000; STAT 5100, 5200, 5890; CS 1700; at least two mathematics courses (6 credits) numbered above 5000; at least two statistics courses (6 credits) numbered above 5000. Note: MATH 2250 may substitute for MATH 2270 and 2280. Either MATH 5570 or 5760 may substitute for one of the statistics elective courses.

Minor Requirements

Mathematics Minor. MATH 1210, 1220, 2210, 2270, 2280; two courses (6 credits) in mathematics numbered above 4000, excluding MATH 4300, 4400, 4500, and 4620. Note: MATH 2250 may substitute for MATH 2270 and 2280.

Statistics Minor. STAT 2000 or 3000; STAT 5100, 5200; two courses (6 credits) from statistics courses numbered above 5000 or from MATH 5710, 5720, and 5760.

Mathematics Education Minor. STAT 1040; MATH 1210, 1220, 2210, 2250, 3110, 4200, 4310, 4400, 4500, 4620, 5500, 5710; Secondary Teacher Education Program (STEP) for the student's Secondary Education major. Admission to the STEP requires a GPA of at least 3.00 in the equivalent of MATH 1210, 1220 and 2210, and an overall GPA of at least 2.75. Graduation from this minor also requires an overall GPA of at least 2.75. No more than three repeats in *all* required courses may be used in GPA computations. The STEP is normally completed during the last three semesters of study, and consequently nearly all the mathematics classes in the Mathematics Education Minor must be completed before beginning the STEP.

Biomathematics Minor. BIOL 1210, 1220; MATH 1210, 1220, 2270, 2280; STAT 3000; MATH/BIOL 4230. (Note: MATH 2250 may substitute for MATH 2270 and 2280.) Biology majors must take one course from the biology electives (listed below), and two courses from the mathematics and statistics electives (listed below). Mathematics and Statistics majors must take two courses from the biology electives, and one course from the mathematics and statistics electives. All other majors must take two courses from each set of electives. *Biology Electives:* BIOL 5170, 5200, 5600, 5620; PUBH 5330; FRWS 3400; BMET 5500. *Mathematics and Statistics Electives:* MATH 4630, 5410, 5420, 5460, 5610, 5620, 5710; STAT 5100, 5110, 5120, 5200, 5300, 5600.

Additional Information

Students who enter the University with AP credit in Mathematics and/or Statistics, and about 30 additional AP or CLEP credits, may be able to complete both a BS and an MS degree within five years or less. Interested students should consult with a departmental undergraduate advisor.

Financial Support

The department offers several one-, two-, and four-year scholarships to qualified students who enroll as full-time Mathematics, Mathematics Education, or Statistics majors. The winner of the Hunsaker Scholarship receives a cash award each semester for two years. This award is given in addition to any four-year scholarship or tuition waiver for which the student is eligible. During the final two years, the recipient is expected to work as a grader or tutor for the department. The department also offers other scholarships (Elich, Ellis, van Vliet, and departmental). The amount of these scholarships varies from year to year. The Ellis Scholarship is awarded to a junior or senior Mathematics Education major, and the recipient is selected by the department. To apply for any of these scholarships (except for the Ellis Scholarship, for which there is no application) send a statement of qualifications, including high school transcripts and SAT or ACT scores, and three letters of recommendation to:

Scholarship Committee
Department of Mathematics and Statistics
Utah State University
3900 Old Main Hill
Logan UT 84322-3900

Applications must be received by April 1.

Graduate Programs

Admission Requirements

See the general admission requirements for graduate programs at Utah State University on pages 90-91 of this catalog. In general, students wishing to pursue graduate studies in mathematics or statistics should have a bachelor's degree in mathematics, statistics, or a closely related field, with extensive coursework in one of the departmental disciplines.

Students entering the Master of Mathematics (MMath) program must either possess a valid secondary school teaching license or be concurrently enrolled in a secondary school teacher licensure program.

Degree Programs

Master of Science (MS). The department offers MS programs in mathematics and statistics. This degree is a terminal degree for most students, but is also a "stepping stone" for students who ultimately wish to pursue a doctorate in mathematics or statistics.

Master of Mathematics (MMath). This program is designed specifically for secondary school teachers of mathematics. The purpose of this degree is to provide students with a broad background in mathematics.

Master of Science (MS) in Industrial Mathematics. The Industrial Mathematics master's degree is designed to broaden the learning experiences and job opportunities for master's students in mathematics. The program of study incorporates fundamental applied mathematics and interdisciplinary coursework in support of an industrial internship experience.

Doctor of Philosophy (PhD) in Mathematical Sciences. This is a terminal degree for mathematics and statistics researchers in academe, government, and industry, as well as for prospective college teachers.

Specializations for PhD in Mathematical Sciences

The **College Teaching Specialization** is designed to prepare students to teach undergraduate mathematics in two- and four-year colleges and in universities. This program is less specialized than the other two options. Students in the College Teaching specialization receive broad training in pure and applied mathematics. The dissertation for this specialization includes exposition of important mathematical theories and their historical relationships in an area of mathematics of the student's choosing.

The **Interdisciplinary Studies Specialization** offers advanced training in mathematics as a research tool. The mathematical component emphasizes areas of applied mathematics. In addition, the student receives graduate-level training in the chosen area of application. The student's course of study and research is directed both by scholars in mathematics and by scholars in the related discipline. The dissertation involves the development and application of mathematics in the context of research problems arising in the chosen interdisciplinary area.

The **Pure and Applied Mathematics Specialization** is a traditional doctoral program in mathematics, offering broad training in the foundations of modern mathematics together with specialized training in an area of mathematical research. The dissertation represents a significant contribution to mathematics research in the chosen area of specialization.

The **Statistics Specialization** offers broad training in theoretical and applied statistics for students seeking careers in academia, industry, or government. The dissertation represents a significant contribution to statistical research.

Course Requirements

Departmental requirements change from time to time. Check with the Department of Mathematics and Statistics for the list of requirements currently in effect. The requirements listed below are in effect for Fall Semester 2004.

Master of Science in Mathematics. This degree requires 30 credits of approved coursework at or above the 5000 level. At least 18 of these credits must be at the 6000 level or above, excluding MATH 6990 and 7990 (Continuing Graduate Advisement) and MATH 7910 (College Teaching Internship). Generally, most of the coursework will be in mathematics, but the student's supervisory committee may approve courses in statistics, physics, engineering, or any other discipline, if it seems such coursework is appropriate for the student's program of study.

The MS in mathematics has three options. The Plan A or the thesis option requires taking 6 credits of MATH 6970 (Thesis and Research) and working with a faculty member on a substantial research project. The research must be presented in a thesis, which must be approved by the student's supervisory committee and the dean of the School of Graduate Studies. An oral defense of the thesis must be arranged through the School of Graduate Studies.

The Plan B or project option requires taking 3 credits of MATH 6970 and working with a faculty member on a smaller research project. A written report of the research must be approved by the student's supervisory committee. An oral defense of the report must be scheduled through the School of Graduate Studies.

The third option of the MS in Mathematics requires only coursework, and is called the Plan C option.

All students in the MS program in Mathematics must pass a written qualifying examination covering the introductory analysis and advanced calculus material presented in MATH 4200, 5210, and 5220. Students may take this exam before beginning formal coursework in the MS program, and must take the exam at the end of the first full year of matriculation. The exam is typically given twice a year, in May and September. Matriculated students who fail on their first try must pass the exam at the next scheduled opportunity. A detailed exam syllabus is contained in the *Graduate Handbook*, available from the department.

Master of Science in Statistics. This degree requires 30 credits of approved coursework at or above the 5000 level. At least 18 credits must be at the 6000 level or above, excluding STAT 6990 and STAT 7990 (Continuing Graduate Advisement). All students must take STAT 6710 and 6720 (Mathematical Statistics I and II). Generally, most of the coursework will be in statistics, but the student's supervisory committee may approve courses in mathematics, biology, economics, or any other discipline if it deems such coursework to be appropriate for the student's program of study.

The MS in statistics has Plan A (thesis), Plan B (report), and Plan C (coursework only) options. The Plan A and Plan B options require students to work with a faculty member on a research project, taking 6 or 3 credits of MATH 6970, respectively, and presenting the results of the research in a written report. For both the Plan A and Plan B options, the report must be approved by the student's supervisory committee. A Plan A report (thesis) must also be approved by the dean of the School of Graduate Studies. Both Plan A and Plan B reports require an oral defense that must be scheduled through the School of Graduate Studies.

Students in all three options of the MS in Statistics must pass a written qualifying examination based on the material presented in STAT 3000 (Statistics for Scientists), MATH 5710 (Introduction to Probability), and MATH 5720 (Introduction to Mathematical Statistics). Students may take the exam before beginning any formal coursework in the MS program. Students must attempt the exam by the end of the first full year of matriculation. The exam is usually given in late May and early August each year. Matriculated students who fail the exam on their first try must pass the exam at the next scheduled opportunity. A detailed exam syllabus is available in the *Graduate Handbook*, available from the department.

Master of Mathematics. This program requires at least 36 credits approved by the Graduate Committee within the Department of Mathematics and Statistics. At least 21 of these credits must come from mathematics classes numbered above 5000. MATH 4620 or an approved substitute must also be included. The GPA for the 36 credits and for the 21 math credits must be at least 3.0.

Master of Science in Industrial Mathematics. This degree requires 36 credits of coursework at or above the 5000 level. At least 15 of these credits must be completed in MATH courses at the 6000 level or above. Additionally, students must complete a total of 9 credits outside of Mathematics which complement their internship and final project. A maximum of 3 of these credits may be taken at the 5000-level (i.e., one 3-credit course in another department). See the departmental website or the *Graduate Handbook* for more detailed information about coursework requirements.

Students are required to pass the Advanced Calculus examination (see the Master of Science in Mathematics examination requirements), *or* the Statistics qualifying examination (see the Master of Science in Statistics examination requirements), *or* an examination based on material presented in four core courses chosen by the student during the first year. The exam, which can be taken before or at the beginning of the student's second year in the program, is usually given in late May or early August. Students are also required to complete a final project based on work done during an internship, either with a company or possibly with another department on campus. The project will include a technical write-up suitable to the industry/field, and presentation to the involved faculty and students in the program. This follows the Plan B option listed for the Master of Science in Mathematics degree.

The Departmental Graduate Committee supervises all MS and MMath students until a supervisory committee for the student is established and approved. Prior to advancement to candidacy, students in Plan A and Plan B options for the MS degree in mathematics and statistics must pass an examination in English writing. This exam is administered by the Department of Mathematics and Statistics.

PhD in Mathematical Sciences. In all the doctoral specializations, a course of study consists of 90 credits beyond a bachelor's degree or 60 credits beyond a master's degree. The minimal course requirements described below assume that the student needs 90 credits. In all specializations, credit may be earned toward a master's degree, as part of the 42 required credits (see below), but coursework cannot be applied to two degrees. The complete course of study must be approved by the student's supervisory committee.

College Teaching Specialization. Seven course sequences (42 credits) in mathematics courses numbered 6000 and above, excluding MATH 7970 and including at least 6 credits in seminars and topics courses in mathematics at the 7000 level and 6 credits of MATH 7910 (College Teaching Internship), are required.

Interdisciplinary Studies Specialization. Forty-two (42) credits in courses numbered 6000 and above, excluding MATH 7970 and including at least four course sequences (24 credits) in mathematics, 6 credits in seminars and topics courses in mathematics at the 7000 level, and approved courses in the student's interdisciplinary area, are required.

Pure and Applied Mathematics Specialization. Seven course sequences (42 credits) in mathematics courses numbered 6000 and above, excluding MATH 7970 and including at least 6 credits in seminars and topics courses at the 7000 level, are required.

Statistics Specialization. Seven course sequences (42 credits) in mathematics or statistics in courses numbered 6000 and above, excluding MATH 7970 and STAT 7970 and including at least 6 credits in seminars and topics courses at the 7000 level, are required.

Common Degree Requirements

For all students in the **Pure and Applied Mathematics**, the **Interdisciplinary Studies**, and the **Statistics** specializations, a maximum of 30 credits of MATH 7970 (Dissertation Research) is allowed. Students in the **College Teaching** specialization are allowed a maximum of 20 credits of MATH 7970.

In addition to completing the coursework requirements, PhD students must:

1. Demonstrate competency in advanced calculus.

2. Pass a written PhD *qualifying* examination. For students in the **College Teaching** and **Pure and Applied Mathematics** specializations, the examination is on Real Analysis. For students in the **Statistics** specialization, the examination will be on Probability and Mathematical Statistics. Students in the **Interdisciplinary Studies** specialization may take the qualifying exam in Real Analysis *or* the exam in Probability and Mathematical Statistics, depending on the emphasis of their coursework within the Department of Mathematics and Statistics.

3. Pass a PhD comprehensive examination that is constructed by the student's committee. This examination may have written or oral components, or both, and may require a student to prepare and defend a report.

4. Successfully complete an examination in English writing skills. Often this exam will be the student's dissertation research proposal.

5. Complete a dissertation.

6. Pass a final oral examination defending the dissertation and demonstrating a general knowledge of core mathematics or statistics.

Research

Mathematics research opportunities within the department are many and varied, and students are urged to contact faculty about mutual interests at as early a stage as feasible. The interdisciplinary option permits and encourages study with a broad spectrum of outstanding nationally recognized University research programs.

Financial Assistance

The department offers full-time teaching assistantships, half-time paper-grading assistantships, research fellowships, and work-study assistance for students in all graduate degree programs. Stipends vary from $6,500 for a half-time paper-grading assistantship to $13,000 for teaching assistants pursing a master's degree. Stipends for PhD students range from $14,000 for incoming students to $16,000 for students who have passed all required comprehensive examinations. Normally, a teaching assistant has responsibility for a single course each semester. Out-of-state tuition waivers are usually given with each full-time teaching or half-time paper-grading assistantship. All tuition is usually waived for PhD students. Applications for teaching assistantships should be mailed by March 1 of each year.

Mathematics and Statistics Faculty

Professors

Ian M. Anderson, differential geometry, global analysis
LeRoy B. Beasley, matrix theory, linear algebra, combinatorics
James S. Cangelosi, mathematics education
Lawrence O. Cannon, topology, mathematics education
Chris S. Coray, numerical analysis
E. Robert Heal, analysis, statistics, mathematics education
Lance L. Littlejohn, differential equations, special functions
James Powell, applied mathematics, mathematical biology
David H. Sattinger, differential equations
Russell C. Thompson, differential equations
Zhi-Qiang Wang, nonlinear differential equations, nonlinear analysis
Stanley C. Williams, measure theory, modern analysis

Professors Emeriti

Ronald V. Canfield, multivariate and industrial statistics
Duane Loveland, geometric topology, continuum theory
Jerry Ridenhour, differential equations
Donald V. Sisson, statistical methods, experimental design
David White, categorical data analysis

Associate Professors

Daniel C. Coster, experimental design, linear models
Adele Cutler, statistical computing
D. Richard Cutler, statistics, computational fluid dynamics
Mark E. Fels, differential geometry
Joseph V. Koebbe, numerical analysis, applied mathematics
Michael C. Minnotte, nonparametric density estimation, statistical visualization
Xiaofeng Ren, partial differential equations, applied mathematics
Emily F. Stone, dynamical systems
Kathryn Turner, numerical analysis, optimization, linear algebra
Dariusz M. Wilczynski, geometric and algebraic topology

Associate Professors Emeriti

Wayne R. Rich, mathematics education
E. Eugene Underwood, matrix theory, linear algebra
James D. Watson, numerical analysis

Assistant Professors

Christopher D. Corcoran, biostatistics and computational statistics
Piotr Kokoszka, probability and time series analysis
Juergen Symanzik, computational and graphical statistics
M. K. Stephen Yeung, dynamical systems, gene network structures

Principal Lecturer

David D. Bregenzer, mathematics, statistics

Senior Lecturer

Eric Rowley, mathematics, mathematics education

Lecturers

Bryan Bornholdt, mathematics, mathematics education
Claudia Mora, mathematics, mathematics education

Course Descriptions

Mathematics (MATH), pages 434-437
Statistics (STAT), pages 487-488

Mechanical and Aerospace Engineering

Department Head: Byard D. Wood
Location: Engineering 419
Phone: (435) 797-2867
FAX: (435) 797-2417
Undergraduate/Graduate E-mail: joan.smith@usu.edu
WWW: http://www.mae.usu.edu/

Undergraduate Advisor: Kathleen E. Bayn, Engineering 310, (435) 797-2705, kathy.bayn@usu.edu

Degrees offered: Bachelor of Science (BS), Master of Engineering (ME), Master of Science (MS), and Doctor of Philosophy (PhD) in Mechanical Engineering

Undergraduate Emphases: *Mechanical Engineering*— Aerospace Engineering, Manufacturing Engineering

Graduate specializations: Aerospace Engineering, Manufacturing Engineering, Mechanical Engineering

Undergraduate Programs

Mission

The Department of Mechanical and Aerospace Engineering provides graduates with a foundation of knowledge and experience upon which to build successful careers in mechanical, manufacturing, or aerospace engineering, or other fields where a strong engineering background is required or desirable. Undergraduate programs emphasize mechanical engineering fundamentals and computer-based problem solving, while teaching students to learn, synthesize, and communicate engineering information. Graduate programs emphasize fundamental and applied research, providing students with enhanced preparation for engineering practice, research, and education. Students, faculty, and staff are committed to excellence in learning, discovery, and engagement in an environment that fosters diversity and mutual respect.

Undergraduate Program Objectives (Mechanical Engineering)

1. Graduates will succeed in entry-level engineering positions with mechanical, manufacturing, or aerospace firms in regional, national, or international industries, as well as with government agencies.
2. Graduates will succeed in the pursuit of advanced degrees in engineering or other fields where a solid foundation in mathematics, science, and engineering fundamentals is required.
3. Graduates will be able to synthesize mathematics, science, engineering fundamentals, and laboratory and work-based experiences to formulate and solve engineering problems in both thermal and mechanical systems areas.
4. Graduates will have proficiency in computer-based engineering, including modern numerical methods, software design and development, and the use of computational tools.
5. Graduates will be prepared to communicate and work effectively on team-based engineering projects.
6. Graduates will recognize the importance of, and have the skills for, continued independent learning.

Undergraduate Program Outcomes (Mechanical Engineering)

Fundamentals

Students will identify, formulate, and solve basic engineering problems utilizing:

1. linear algebra
2. calculus-based statistics
3. multivariable calculus
4. differential equations
5. calculus-based physics
6. chemistry
7. material science
8. solid mechanics
9. fluid mechanics
10. thermal science
11. manufacturing science

Communication

Students will develop and demonstrate the ability to communicate engineering information, including geometry, technical concepts, and results, by:

1. participating in oral presentations.
2. writing proposals and reports.
3. developing engineering drawings and specifications.
4. participating in team-based engineering projects.

Laboratory Experiences

Students will participate in and evaluate laboratory experiences, which:

1. include experimental design, data collection, and data analyses.
2. incorporate the use of modern laboratory and data acquisition equipment.
3. utilize statistical analysis and interpretation of data.
4. develop basic manufacturing skills.
5. may include work-based learning experiences, such as internships.

Computer-based Engineering

Students will demonstrate proficiency in the application of computer technology to engineering problem-solving through:

1. application of modern numerical methods and computational techniques.
2. design and development of engineering software.
3. integration of numerical solutions into the engineering process of design and analysis.
4. use of current commercial engineering software.

Humanities and Social Sciences

Students will acquire significant exposure to the humanities and social sciences, so as to:

1. gain an appreciation for the broad impact of engineering solutions on society.
2. demonstrate an understanding of the fundamentals of the history, principles, form of government, and economic system of the United States.
3. demonstrate a knowledge of contemporary global issues.
4. contribute to the development of the individual as a responsible well-rounded citizen.

Design and Synthesis

Students will participate in the design and realization process, in which they will:

1. develop a set of multidisciplinary engineering requirements.
2. synthesize material from mathematics, science, and engineering fundamentals to solve engineering problems.
3. design, develop, and verify software to solve engineering problems.
4. bring a system from requirements definition to concept development, then specification, prototype and testing, and production or fabrication using significant engineering analysis.
5. demonstrate the links between design, prototyping, testing, manufacturing, and other disciplines.
6. manage a project, including budgeting and detailed planning.

Independent Learning

Students will recognize the importance of, and demonstrate the skills required for, independent learning through:

1. independent study required in the engineering curriculum.
2. exposure to case studies in ethics and professional responsibility.
3. exposure to advanced topics in engineering science.
4. exposure to advanced topics in engineering research.
5. studying for and passing the Fundamentals of Engineering Examination.

Assessment and Quality Improvement

The MAE faculty and staff are committed to excellence and to continuous quality improvement. A responsive assessment and feedback process involving major constituencies, including faculty, students, alumni, and industrial employers of students and graduates, is in place and ongoing.

Options for Undergraduate Study

The **Mechanical Engineering** BS degree provides the broadest background of any discipline in the field of engineering. Mechanical Engineering graduates are prepared to pursue careers in such widely diverse industries as aerospace, agricultural equipment, automotive, biotechnical, chemical processing, composite materials, computer equipment, defense, electrical utilities, food processing, industrial equipment, manufacturing, materials processing, nuclear, petroleum, robotics, and solar energy. Most Mechanical Engineering graduates are prepared for graduate studies and enhanced career prospects in engineering or other areas, such as consulting, law, medicine, business management, or teaching. In addition, students who are preparing to apply for admission to medical school will find that Mechanical Engineering provides an excellent foundation for the increasingly technology-oriented field of medicine.

The **Aerospace Engineering** emphasis within the Mechanical Engineering BS degree serves to focus mechanical engineering fundamentals on the mechanics and dynamics of both flight within the atmosphere and space flight. Included within its scope are studies in aerodynamics, aircraft flight dynamics and control, aircraft design, spacecraft orbital mechanics, spacecraft attitude motion and control, and space systems design. Graduates who complete the aerospace engineering emphasis are prepared to pursue careers in aircraft design and development, aircraft flight testing, spacecraft and space systems design, and spacecraft trajectory design and analysis. As fully qualified Mechanical Engineers, graduates with the aerospace engineering emphasis are also well-prepared to pursue graduate studies or careers in the industries listed above under Mechanical Engineering.

The **Manufacturing Engineering** emphasis within the Mechanical Engineering BS degree prepares students to be proficient in the fundamentals of engineering, as well as in materials and manufacturing processes; process, assembly, and product engineering; manufacturing competitiveness; manufacturing systems design; and laboratory experience. Graduates will understand the behavior and properties of materials as they are altered and influenced by processing in manufacturing; the design of products and the equipment, tooling, and environment necessary for their manufacture; the creation of competitive advantage through manufacturing planning, strategy, and control; the analysis, synthesis, and control of manufacturing operations using statistical and calculus based methods; and how to measure manufacturing process variables and make technical inferences about the process. Graduates will have the necessary background to pass the Certified Manufacturing Technologist and Certified Manufacturing Engineer exams. Graduates who complete the Manufacturing Engineering emphasis are prepared to pursue graduate studies or careers in any industry that manufactures a product. For example, the aerospace, automotive, electronics, machine tool, petroleum, and electronics industries all employ manufacturing engineers as product designers, process designers and managers, maintenance engineers, and quality control engineers.

The first two years of the MAE curriculum are structured to concentrate on the fundamentals of mathematics, chemistry, physics, computer science, and basic engineering science. During the second two years, students apply these fundamentals to more concentrated courses in the essentials of mechanical, aerospace, and/or manufacturing engineering. Laboratory activities and computer usage are integrated throughout the curriculum to give students opportunities for hands-on exposure to modern computer hardware and software, as well as other modern hardware and lab-

oratory facilities. Engineering design activities begin during the first two years and progress in depth as the student's proficiency increases. The engineering design experience culminates in a capstone senior design course, integrating the engineering coursework into a focused, realistic design project.

The Mechanical Engineering degree is accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC/ABET). The Aerospace Engineering emphasis and Manufacturing Engineering emphasis are included within the Mechanical Engineering degree.

Admission and Graduation Requirements

Freshman and transfer students must satisfy the admission policies and entrance requirements of both the University and the College of Engineering. Each new student will be assigned an advisor, who will help plan an educational program fulfilling the student's professional goals. Placement of incoming students will depend on high school and/or prior college coursework. Those who complete a portion of the University Studies requirements by examination (CLEP) and/or by advanced placement (AP) credit may complete the requirements for a Bachelor of Science degree in less than four years.

Curriculum. At the beginning of each school year, each student should obtain a detailed, four-year requirement sheet. This sheet, which lists semester requirements for each of the three curricula (mechanical, manufacturing, and aerospace), may be obtained from the departmental office. All students in the department follow the preprofessional engineering curriculum for the freshman and sophomore years. Prior to the junior year, the student must apply for admission to the professional program and, in consultation with the faculty advisor, select an area of emphasis. Students who are unable to take courses during the semester indicated on the curriculum requirement sheet may develop alternative schedules, consistent with prerequisites and the timing of course offerings.

GPA Requirement. A 2.3 GPA in all technical courses is the minimum standard which preprofessional students must attain in order to be considered for admission to any MAE professional program.

Course Requirements. The specific course requirements for the MAE preprofessional program and the MAE professional programs are quite extensive and may occasionally change. For these reasons, the complete requirements are not listed here. For more information, contact the department or send an Internet e-mail request to **joan.smith@usu.edu**.

A **passing grade on the Fundamentals of Engineering Exam**, the first step in becoming a licensed professional engineer, is required for graduation. Past experience has shown that the USU Mechanical and Aerospace Engineering students are well-prepared for this locally administered, national exam.

For additional information on academic requirements, see the College of Engineering (pages 107-109) and the Undergraduate Graduation Requirements (pages 50-52) sections of this catalog.

Financial Support

Scholarships, assistantships, grants-in-aid, and work-study programs are available to undergraduate students through the University. In addition, the MAE department employs undergraduates to assist in engineering research and development. Aerodynamics, design of instrumentation and payloads for the upper atmosphere and space, buried structures, and manufacturing processes and controls are some of the research programs that involve undergraduate students. Cooperative education and industrial employment opportunities for students are coordinated by the University Placement Office.

Concurrent BS/Master's Program

The concurrent BS/Master's program allows engineering students to begin taking graduate-level classes during their senior year. This permits them to complete requirements for *both* the BS degree *and* the master's degree concurrently during two years. Students in this program have a greater selection of graduate courses, since many graduate courses are taught during alternate years. In addition, the student's senior design project could be a start for a graduate design project or thesis. After completing their BS degree, students in the program can earn a master's degree in only one additional year. Both the BS and the master's degree can generally be earned with 150 total credits, although students should note that a Plan C MS requires 3 extra credits. Finally, students with a master's degree can expect a much higher starting salary following graduation. (For more information, see *College of Engineering* section of this catalog, page 109.)

Graduate Programs

Admission Requirements

All students intending to pursue graduate studies at Utah State University must complete and return an *Application for Admission* to the School of Graduate Studies. In addition to the general graduate admission requirements listed on pages 90-91, the department requires all graduate applicants to have a bachelor's degree from an accredited institution in Mechanical Engineering, Aerospace Engineering, Manufacturing Engineering, or a closely related engineering discipline. A minimum GPA of 3.0 for MS applicants and 3.3 for PhD applicants is required for the last 60 semester or 90 quarter credits earned. All MAE graduate students are expected to be well-acquainted with either the FORTRAN or C programming language. Those students who do not have a BS degree in an appropriate engineering discipline may be admitted with nonmatriculated status and required to complete some remedial requirements. Applicants are also required to submit evidence of potential graduate-level success through GRE scores in the verbal, quantitative, and analytical categories.

Specializations

The Department of Mechanical and Aerospace Engineering offers ME, MS, and PhD degrees in Mechanical Engineering, with specializations in Aerospace Engineering, Manufacturing Engineering, and Mechanical Engineering.

Aerospace Engineering addresses atmospheric and space flight. Included are such disciplines as computational fluid dynamics, experimental fluid mechanics, aerodynamics, aircraft flight dynamics, aircraft design, spacecraft orbital mechanics, spacecraft attitude motion and control, aircraft and spacecraft propulsion systems, space system design, thermal management of space deployed systems, and the space environment. Mechanical Engineering graduates choosing the aerospace engineering specialization may pursue careers in such areas as aircraft design and development, aircraft flight testing, spacecraft and space systems design, and spacecraft trajectory design and analysis, as well as the broader, traditional mechanical engineering fields.

Manufacturing Engineering concentrates on the theory of manufacturing systems, including manufacturing processes, the design of manufacturing systems, product design, productivity, quality, and life cycle analysis. Principal areas of emphasis include manufacturing automation, machining theory, and mold flow analysis, as well as flexible manufacturing systems and computer-integrated manufacturing. Manufacturing engineers are prepared to pursue product and process design careers in any electronics, food processing, and petroleum industries.

Mechanical Engineering deals with the creation of the mechanical systems and machines that serve society. Areas of emphasis include solid mechanics, thermal/fluids, and dynamics and control. The **solid mechanics** emphasis is concerned with the mechanics of displacement and stress analysis combined with material science for selection of an optimum design. Students learn to use the finite element method as well as classical methods for the determination of stresses, strains, and displacements. Included are studies of elasticity, plasticity, and failure in traditional metals and high-tech composite materials. The **thermal/fluids** emphasis is concerned with the transport of mass, momentum, and energy in solids, liquids, and gasses. Included within its scope are the fundamental studies of thermodynamics, heat transfer, and fluid mechanics. The **dynamics and control** emphasis is concerned with describing and controlling the motion of mechanical systems. Included within its scope are the fundamental studies of dynamics, kinematics, vibrations, control theory, hydraulics and pneumatics, electromechanical systems, and machine design. Graduates who select the broad mechanical engineering specialization are prepared to pursue careers in such widely diverse disciplines as aerospace, automotive, building, chemical, defense, electronics, environmental engineering, food processing, heating and air conditioning, heavy equipment, machine tools, manufacturing, nuclear, petroleum, public utilities, and solar energy.

Degree Programs

The **Plan A MS Degree** requires 6 credits of graduate-level coursework in Mechanical Engineering fundamentals; 12 credits of 6000-level (or above) engineering coursework, exclusive of MAE 6930, 6950, 6970, and 6990; a minimum of 3 credits of 5000-level (or above) coursework in approved mathematics; and 9 credits selected from any one of five declared areas of emphasis. A minimum of 30 credits is required beyond the BS, including a 6-credit thesis (MAE 6970). The thesis must meet School of Graduate Studies requirements.

The **Plan B MS Degree** requires 6 credits of graduate-level coursework in Mechanical Engineering fundamentals; 12 credits of 6000-level (or above) engineering coursework, exclusive of MAE 6930, 6950, 6970, and 6990; a minimum of 3 credits of 5000-level (or above) coursework in approved mathematics; and either 12 credits selected from any one of five declared areas of emphasis *or* 15 credits selected from any two of the areas. A minimum of 30 credits is required beyond the BS, which includes a 3-credit report written to thesis standards.

The **Plan C MS Degree** requires 6 credits of graduate-level coursework in Mechanical Engineering fundamentals; 18 credits of 6000-level (or above) engineering coursework, exclusive of MAE 6930, 6950, 6970, and 6990; a minimum of 3 credits of 5000-level (or above) coursework in approved mathematics; and either 12 credits selected from any one of five declared areas of emphasis, or 15 credits selected from any two of the areas. A minimum of 33 credits is required beyond the BS, which may not include a thesis (MAE 6970), but may include up to 3 credits of Design Project (MAE 6950). MAE 6950 requires a report written to thesis standards.

The **Master of Engineering Degree** requires 6 credits of graduate-level coursework in Mechanical Engineering Fundamentals; 15 credits of 6000-level (or above) engineering coursework exclusive of MAE 6930, 6950, 6970, 6990, 7930, 7970, and 7990; a minimum of 3 credits of 5000-level (or above) coursework in approved mathematics; and either 15 credits selected from Group A or at least 9 credits from Group A and the remainder chosen from Group B. A minimum of 30 credits is required beyond the BS, which may not include a thesis (MAE 6970), but may include up to three credits of Design Project (MAE 6950). MAE 6950 requires a report written to thesis standards. Students are not required to defend the report. However, the report must be approved by the major professor.

The **PhD Degree** requires 12 credits of graduate-level coursework in Mechanical Engineering fundamentals; 24 credits of 6000-level (or above) engineering coursework, exclusive of MAE 6930, 6950, 6970, 6990, 7930, 7970, and 7990; a minimum of 6 credits of 5000-level (or above) coursework in approved mathematics; and 18 credits selected from any one of five declared areas of emphasis. A minimum of 90 credits is required beyond the BS, including a dissertation (MAE 7970). The dissertation must meet School of Graduate Studies requirements and be at least 24 credits, but no more than 39 credits. A Qualifying Exam is required and must be passed before completing 18 credits at the PhD level. A paper with the student as author or coauthor, submitted for publication in a refereed journal, is also required.

GPA Requirement. A 3.0 GPA is the minimum acceptable for an ME or MS degree from USU. A PhD degree from USU requires a minimum GPA of 3.3.

Course Requirements. The specific course requirements for the ME, MS, and PhD degrees offered through the department may occasionally change. For this reason, prospective students are advised to seek current details concerning graduate degree requirements and program coursework by contacting the department or sending an Internet e-mail request to: **joan.smith@usu.edu**.

Research

The Department of Mechanical and Aerospace Engineering is conducting research in all three of the areas of specialization listed above. Departmental research projects are funded by both government agencies and private industry. Current research topics include analytical and experimental structural dynamics, computational and experimental fluid dynamics, aerodynamics, plastics

and composite materials, numerical modeling and design of composite structures, buried structures, thermodynamics, heat transfer, cryogenics, intelligent control systems, manufacturing automation, spacecraft control, design and analysis of space systems, orbital mechanics, remote sensing, robotics, life-cycle engineering, design theory and methodology, and production modeling and simulation.

Financial Assistance

A number of teaching and research assistantships are available to graduate students through the department, and are awarded on a competitive basis each year. In addition, scholarships covering the nonresident portion of tuition are available each semester, on a competitive basis, to nonresident students who hold a graduate assistantship paying at least $250 per month. Students interested in working part time as teaching or research assistants should apply to the department by March 31 for the coming academic year.

Acceptance to pursue graduate studies in the Department of Mechanical and Aerospace Engineering does not imply a commitment to any type of financial aid. All awards for financial aid are made on a competitive basis after applicants are admitted to graduate school. All students who receive any type of financial support from the University or who are supplied University space for study or research must carry a minimum of 9 credits of approved coursework for an MS or ME degree or a minimum of 12 credits of approved coursework for a PhD degree each semester while receiving such support.

Mechanical and Aerospace Engineering Faculty

Professors

Alma P. Moser, engineering mechanics, piping systems

Warren F. Phillips, aerodynamics, flight mechanics

Robert E. Spall, thermal/fluids

Byard D. Wood, solar energy for heating and cooling, heat and mass transfer

Trustee Professor Emeritus

J. Clair Batty, thermal science, cryogenics, space systems

Professors Emeriti

P. Thomas Blotter, structural dynamics

Ralph H. Haycock, mechanics, manufacturing

Russell M. Holdredge, heat transfer, fluid mechanics

Owen K. Shupe, nuclear, material science

Carl D. Spear, material science

Edward W. Vendell, Jr., cryogenics, heat transfer, thermal systems design

Associate Professors

Steven L. Folkman, applied mechanics, structural dynamics, space structures

Thomas H. Fronk, mechanics of composites and materials

R. Rees Fullmer, manufacturing, controls, robotics, dynamics, spacecraft

Assistant Professors

Ning Fang, manufacturing

Thomas Hauser, computational fluid dynamics

Leijun Li, manufacturing

Todd J. Mosher, space engineering

Barton L. Smith, thermal/fluids

Brent E. Stucker, advanced manufacturing and materials

Wenbin Yu, advanced structures, solid mechanics, computational solid mechanics (FEM)

Adjunct Assistant Professors

Scott M. Jensen, thermal management of space systems

Paul J. Mueller, thermal science, propulsion

Steven R. Wassom, controls, dynamic spaceflight

Principal Lecturer

Carl G. Wood, design, manufacturing

Adjunct Lecturer

Angie Minichiello, thermal/fluids

Course Descriptions

Mechanical and Aerospace Engineering (MAE), pages 431-434

Military Science

Department Head: Lt. Colonel S. Rand Curtis
Location: Military Science 106
Phone: (435) 797-3637
FAX: (435) 797-3330
E-mail: armyrotc@hass.usu.edu
WWW: http://armyrotc.usu.edu

Undergraduate Programs

Objectives

Military Science (Army ROTC) focuses on leadership development. Students pursue the major of their choice while studying Military Science, and graduate with the ability to function effectively as leaders. Upon completion of Army ROTC and graduation from college, students become commissioned officers in the active Army, Army Reserve, or National Guard.

Instructors, textbooks, uniforms, and equipment are provided at no cost to the student or the University. All contracted students receive between $250-400 per month (up to 10 months per academic year). Army ROTC also covers the cost of tuition and fees for Army ROTC scholarship students and provides a $800-per-year book allowance.

The Margin of Difference

Army ROTC cadets learn to be leaders and receive hands-on experience in managing physical, financial, and human resources. They develop self-confidence and superior decision-making skills. Employers value these leadership qualities and recognize associated potential.

Four-Year Program

The traditional Army ROTC program covers four years consistent with normal undergraduate progression (freshman-senior). The four-year program is divided into two parts: the **basic course** and the **advanced course**. The **basic course** is usually taken during the first two years of college. It covers subjects such as mountaineering, land navigation, wilderness survival, leadership development, small unit tactics, weapons marksmanship, and military history. This program is designed for high-performing students who wish to try Military Science without obligation, while enhancing their leadership skills and self-confidence. Upon successful completion of the basic course, students are eligible to enter the advanced course.

Advanced course requirements are normally completed during the junior and senior years. The advanced course further develops and refines leadership competencies, and qualifies the student for a commission in the United States Army. Advanced course students receive a $350-400 per month tax-free subsistence allowance (up to $3,000-4,000 per year), and attend a paid five-week leader development camp between their junior and senior years.

Two-Year Program

This is a special program for junior and community college transfer students or for students who did not take Army ROTC during their first two years of college. To enter the two-year program, a student must have completed Basic Training in a military service **or** participate in five weeks of basic leadership instruction. This instruction usually takes place between the sophomore and junior year. Students are paid for attending this instruction, have the opportunity to compete for two-year scholarships, and may receive academic credit. Students who qualify for the two-year program are enrolled directly in the **advanced course**.

Scholarships

Army ROTC provides numerous scholarship opportunities. High school seniors may qualify for the **four-year Army ROTC scholarship**. College students may qualify for three- or two-year scholarships. These scholarships pay the cost of tuition and fees, a flat rate for textbooks and classroom supplies, and a monthly cash stipend between $2,500-4,000 per year. The **Green to Gold scholarship** allows soldiers serving on active duty to leave the Army early and attend college/ROTC full time while receiving scholarship benefits. Other scholarship opportunities include: **room and book grants** and the **Western Undergraduate Exchange (WUE) program**. Call or visit the Department of Military Science for details.

Placement Credit For Veterans

Veterans may qualify for advanced course placement based on prior military experience. They can take full advantage of veteran's benefits and receive financial aid from Army ROTC concurrently.

Simultaneous Membership Program (SMP)

This program is available to advanced course cadets who wish to serve in the Army Reserve or National Guard while attending college and pursuing a commission through Army ROTC. SMP students are eligible to receive reserve drill pay, tuition assistance, other monetary incentives, and $350-400 per month (up to $3,000–4,000 per academic year) from Army ROTC. Call or visit the Department of Military Science for details.

Leave of Absence

If students (including scholarship recipients) wish to take a leave of absence to serve a mission for their church, they can do so conveniently between their freshman and sophomore years.

Commission Requirements

In order to qualify for a commission as a Second Lieutenant in the United States Army, each student must:

1. Complete all required Military Science instruction while attending college as a full-time student, and obtain a baccalaureate

or higher degree prior to age 27 (age waiver can be granted for prior military service or other extenuating circumstances).

2. Meet medical and physical fitness standards.
3. Be a U.S. citizen.
4. Successfully complete the advanced summer camp.
5. Be recommended by a professor of Military Science.

Service Obligation

There is no military service obligation for basic course students, unless they have received an Army ROTC scholarship. Advanced course (contracted) and scholarship students incur an obligation to serve in the active Army, Army Reserve, or National Guard.

Minor in Military Science

Grade Requirements. Students must obtain a grade of *C* or better in all courses used toward the minor, as well as maintain a cumulative GPA of 2.5 for these courses.

Credit Requirements. A minimum of 21 credits must be earned in Military Science and related courses, as follows:

Required Courses (15 credits). MS 3010, 3020, 4010, and 4020; HIST 4810 or MS 4610.

Elective Courses (6 credits). These courses must be coordinated with and approved by the department head of the Military Science Department.

Military Science Faculty

Assistant Professor

Captain Reece D. Roberts

Personnel Specialist

Marie Behling

Instructors

Sergeant First Class Scott Womack

Sergeant First Class LaWrell D. Cook

Course Descriptions

Military Science (MS), pages 439-440

Music

Department Head: Bruce M. Saperston
Location: Fine Arts 107
Phone: (435) 797-3036
FAX: (435) 797-1862
E-mail: musicdep@cc.usu.edu
WWW: http://www.usu.edu/music/

Assistant Department Heads:
Gary Amano, Fine Arts 201, (435) 797-3028, gamano@hass.usu.edu
Cindy J. Dewey, Fine Arts 208B, (435) 797-3055, cdewey@hass.usu.edu

Undergradute Advisors:
Music Education/Choral: Lane M. Cheney, Fine Arts 204, (435) 797-3052, lcheney@hass.usu.edu
Music Education/Instrumental: Thomas P. Rohrer, Fine Arts 106, (435) 797-3004, rohrer@hass.usu.edu
Music Therapy:
Elizabeth York, Fine Arts 220B, (435) 797-3009, eyork@hass.usu.edu
Brian Abrams, Fine Arts 219, (435) 797-3030, babrams@hass.usu.edu
Guitar: Michael K. Christiansen, Fine Arts 124, (435) 797-3011, mchristiansen@hass.usu.edu
Percussion: Dennis D. Griffin, Fine Arts 114, (435) 797-3008, dgriffin@cc.usu.edu
Organ: James M. Drake, Fine Arts 210, (435) 797-3029, septerz@yahoo.com
Piano:
Gary Amano, Fine Arts 201, (435) 797-3028, gamano@hass.usu.edu
R. Dennis Hirst, Fine Arts 101, (435) 797-3257, dennis.hirst@usu.edu
Ralph H. van der Beek, Fine Arts 203, (435) 797-3033, rarvdb@aol.com
Strings: Sergio Bernal, Fine Arts 218A, (435) 797-0487, sergio.bernal@usu.edu
Violin:
Jessica Guideri, Fine Arts 104C, (435) 797-0083, jguideri@hass.usu.edu
Rebecca J. McFaul, University Reserve 21, (435) 797-3052, rebeccamcfaul@hass.usu.edu
Viola: Russell Fallstad, University Reserve 21, (435) 797-3092, russellfallstad@hass.usu.edu
Cello/String Bass: Anne Francis, Fine Arts Visual 129, (435) 797-3086, afrancis@hass.usu.edu
Woodwinds: Nicholas E. Morrison, Fine Arts 103, (435) 797-3506, nicholas.morrison@usu.edu
Voice: Cindy J. Dewey, Fine Arts 208B, (435) 797-3055, cdewey@hass.usu.edu
Music (Undecided): Bruce M. Saperston, Fine Arts 107, (435) 797-3036, bsaperston@hass.usu.edu

Degrees offered: Bachelor of Arts (BA) and Bachelor of Music (BM) in Music; Bachelor of Science (BS) and BA in Music Therapy. The Master of Education (MEd) in Secondary Education includes a specialization in Music Education.

Undergraduate emphases: *BM degree in Music*—Music Education, Performance, Piano Pedagogy

Two-year Certificate Programs: Piano, Organ, Guitar, Music Therapy Equivalency

Two-year Diploma Programs: Organ and Church Music, Piano Pedagogy, Guitar

(Certificates and diplomas are issued *directly* through the Music Department.)

Undergraduate Programs

Objectives

The Department of Music provides instruction in music by: (1) offering service courses which contribute to the Liberal Arts and Sciences major in the College of Humanities, Arts and Social Sciences and the College of Science, and to the University Studies Program of the University; (2) offering specific sequences of courses leading to professional preparation in music education, music therapy, and performance/pedagogy; and (3) providing public musical service to the University and the community.

The specific objectives of the programs in music for the music major are fourfold: (1) to prepare licensed music teachers to serve effectively in elementary and secondary schools; (2) to prepare musically talented students for careers as professional performers and/or studio teachers; (3) to prepare board-licensed music therapists to serve in educational and therapeutic settings; and (4) to prepare music students for graduate study in their areas of specialization.

Requirements

Admission Requirements. Admission requirements for the Department of Music include those described for the University in this catalog (see pages 15-18). In addition, transfer students must have a minimum 3.00 GPA in music courses and a minimum 2.75 GPA overall. All students interested in majoring in Music or Music Therapy will be given pre-music major status until they have completed the required audition/interview process, as verified by their area advisor through the *Change of Major Form*. It is strongly recommended that prospective majors complete their audition/interview during the department's scholarship auditions in February preceding matriculation at USU. To schedule an audition/interview, contact the department at (435) 797-3015.

Prospective majors in Music Therapy should complete the audition/interview prior to May 1 of the year of admission.

GPA Requirement. Students majoring in music, music education, or music therapy must maintain a minimum GPA of 3.00 in music courses and a minimum 2.75 GPA overall. All core curriculum classes must be completed with a *C*- or higher in order to progress to the next courses in sequence. A student receiving a grade lower than *C*- is placed on probation, and may repeat the course once to raise the grade to *C*- or higher. If the grade received on the repeat is lower than *C*-, the student is no longer a music, music education, or music therapy major.

Degree Requirements. All majors in the department must complete the music core curriculum. Although it is possible to complete the degree if these courses are begun after the first year of study, the department strongly recommends that students begin the core curriculum during the first year, completing the courses in the following recommended sequence. **Freshman Year:** *fall semester*—MUSC 1110, 1130, 1150; *spring semester*—MUSC 1120, 1140, 1160. **Sophomore Year:** *fall semester*—MUSC 2130, 2150, 2170, 2180; *spring semester*—MUSC 2160, 3110, 3140; **Junior Year:** *fall semester*—MUSC 3120, 3170; *spring semester*—MUSC 3130, 3180. Students should note that MUSC 2180, 3170, and 3180 may be taken during different semesters, if necessary. Also, since MUSC 2160 is *not required* for all music areas, students should contact their advisor to determine whether or not they should enroll in this course. Additional requirements for specific emphasis areas are available from the Music Department Student Services Office, Fine Arts 102.

Recital and Concert Attendance. Recital and concert attendance is required and will be monitored. Students should turn in programs after attending concerts and recitals. A summary of attendance will be kept in the student's file. To graduate, students are required to attend a minimum of 10 concerts and 10 recitals each year.

Individual Performance and Jury Requirements. Music majors enroll in individual instruction each semester and practice regularly outside of lessons. Jury exams are held at the end of each semester to assess individual progress. To determine specific jury requirements for their area, students should contact their advisor.

Recital Participation. Each music education, performance, and pedagogy major is encouraged to appear in a departmental recital each semester. Four such appearances are required for graduation. Since junior and senior recital requirements vary, students should consult program advisors and degree requirement sheets for specific information.

Piano Proficiency Requirements. Music, Music Education, and Music Therapy majors must meet a minimum standard of piano proficiency before graduation. The specific requirements are detailed in the department's *Student Handbook*.

Music Theory Proficiency. Music, Music Education, and Music Therapy majors must meet a minimum standard of theory proficiency before entering third-year core music courses. This theory exam is administered upon completion of the theory sequence and is also required for all transfer students. It serves as a placement exam for those who have not completed the theory sequence at their previous schools. For details, contact the Music Department Student Services Office, (435) 797-3015, Fine Arts 102.

Music Certificates, Diplomas, and Minors. Requirements for two-year certificate programs in piano, organ, guitar, and music therapy equivalency; for two-year diploma programs in organ and church music, piano pedagogy, and guitar; and for minors in music are available in the Music Department Student Services Office, Fine Arts 102. Certificates and diplomas are issued *directly* through the Music Department.

Additional Information and Updates

Degree requirements not listed above are listed on the Music Major Requirement Sheet and the Music Therapy Major Requirement Sheet. Additional requirements, including appropriate sequencing of courses, are listed in the *Department of Music Student Handbook*. For the most recent information regarding degree requirements and course sequencing, contact advisors over specific programs. Further information can also be obtained by contacting the Music Department Office, Fine Arts 102, or by visiting the department's website.

Financial Support

Scholarships, grants, and work-study programs are available through the University. Information about these programs can be obtained by calling the Admissions Office, (435) 797-1129 or 1-800-488-8108. In addition, the Department of Music offers talent-based scholarships to undergraduate students and employs students as part-time workers. For scholarship information or to arrange an audition, contact the department at (435) 797-3015 or visit the department's website.

Music Faculty

Professors

Gary Amano, piano

Michael L. Ballam, opera

Michael K. Christiansen, guitar program

James M. Drake, organ program

Todd L. Fallis, instrumental music education, student advising, low brass

F. Dean Madsen, music theory, twentieth century music, composition

Nicholas E. Morrison, clarinet, associate director of bands

Adjunct Professor

Michael Martin Murphey, songwriting, American studies

Professors Emeriti

Warren L. Burton, introduction to music

Max F. Dalby, bands, woodwind, conducting

Glen A. Fifield, elementary music, cornet and trumpet

Larry G. Smith, jazz program, musicianship program, staff arranger, saxophone, jazz piano

Alvin Wardle, music education, low brass

Associate Professors

Cindy J. Dewey, voice, opera, pedagogy

Mark A. Emile, string performance and pedagogy, violin/viola

Dennis D. Griffin, percussion, electronic music, composition

Lynn Jemison-Keisker, opera coach

Bruce M. Saperston, music therapy

Leslie Timmons, elementary music education, flute

Elizabeth York, director of music therapy

Associate Professor Emeritus

Mildred Johnson, music history and literature, musicianship program, viola

Assistant Professors

Brian Abrams, music therapy

Sergio Bernal, orchestra conductor, string program

Jon Gudmundson, jazz, saxophone

R. Dennis Hirst, piano, Youth Conservatory

Thomas Rohrer, director of bands

Ralph van der Beek, piano, Youth Conservatory

Assistant Professor Emeritus

Betty Beecher, piano

Temporary Instructors

Lane Cheney, choral music education

R. Cory Evans, choral music

Lecturers (Fry Street Quartet)

Russell Fallstad, viola

Anne Francis, cello

Jessica Guideri, violin

Rebecca McFaul, violin

Course Descriptions

Music (MUSC), pages 440-446

National Environmental Policy Act (NEPA)

Director: Joanna Endter-Wada,
Department of Environment and Society
Location: Natural Resources 355B
Phone: (435) 797-2797
FAX: (435) 797-3526
E-mail: joanna.endter-wada@usu.edu
WWW: http://www.cnr.usu.edu/policy/nepa.html

Program Administrator: Judith A. Kurtzman,
Natural Resources 322, (435) 797-0922

Graduate Program Description

The Natural Resource and Environmental Policy Program (NREPP) at Utah State University and the Shipley Group, Inc. have formed a partnership to provide a graduate-level certificate program that offers training related to the National Environmental Policy Act (NEPA). NEPA is an important environmental law that requires analysis of impacts, alternatives, and mitigation measures for all major federal actions affecting the environment, both within the territorial boundaries of the U.S. and at foreign military installations. Government agencies, private businesses, public interest organizations, and other groups involved in the NEPA process need individuals who have been trained in decision-making, analysis, and documentation aspects of NEPA, as well as in the accompanying Council on Environmental Quality (CEQ) regulations and various agencies' NEPA implementing procedures.

The NEPA Certificate Program was designed to prepare natural resource and environmental professionals to meet the challenges of complying with the act and working effectively on NEPA documents. Participants who successfully complete the program should have a solid understanding of both the spirit and the letter of the law, and will be more effective members of interdisciplinary teams responsible for developing NEPA documents.

Certificate

Students who complete the program will receive a graduate-level certificate in the National Environmental Policy Act. Their Utah State University transcript will list the courses they attended to complete the program.

Admission Requirements

To apply and gain acceptance into the program, a person must complete and submit a NEPA Certificate Program application form to the Natural Resource and Environmental Policy Program (NREPP) at USU, as well as provide a transcript documenting the completion of a bachelor's degree. Students pursuing the NEPA Certificate are not required to be enrolled in a graduate degree program. However, credits obtained from the program may be applied toward a graduate degree.

Course Requirements

To receive the certificate, a participant must complete the following set of requirements:

1. apply and be accepted into the NEPA Certificate Program;
2. register for and successfully complete seven graduate-level courses taken for grades (four required courses and three elective courses);
3. undertake an individual capstone experience for graduate credit that involves a negotiated project;
4. maintain a minimum 3.0 GPA for program courses (grades below *C* will not be accepted);
5. abide by the *Code of Policies and Procedures for Students at Utah State University*.

NEPA Certificate Program Courses

Courses for the program will be offered at USU and at other locations around the country. Courses will be offered on a short-course basis through Continuing Education. A two-credit course requires a minimum of three full days in class; a one-credit course requires two full days in class. To receive graduate credit that can be applied toward completion of the certificate, all NEPA courses must be taken for a letter grade, which requires completion of a written examination in addition to class attendance. All courses offered as part of the NEPA Certificate Program may be taken for University graduate credit, whether or not a participant in the course is enrolled in the NEPA Certificate Program.

Curriculum

Students must complete four core courses (2 credits each), three elective courses (1 credit each), and a capstone experience (1 credit) in order to fulfill the requirements for the NEPA Certificate.

Core Courses

Participants are required to take four of the following courses. The first three listed are required. However, participants may choose between the last two courses to fulfill the core course requirements.

NEPA 6200	How to Manage the NEPA Process and Write Effective NEPA Documents	(2)
NEPA 6210	Clear Writing for NEPA Specialists	(2)
NEPA 6220	Reviewing NEPA Documents	(2)
NEPA 6230	Risk Communication for NEPA Specialists: Strategies and Implementation	(2)
NEPA 6260	Cultural and Natural Resource Management	(2)

Elective Courses

Participants are required to take three courses of their choosing from the following list.

NEPA 6270	Environmental Compliance Overview	(1)
NEPA 6280	Interdisciplinary Team Building	(1)
NEPA 6300	Effective Environmental Contracting	(1)
NEPA 6310	NEPA Writing for Technical Specialists	(1)
NEPA 6320	NEPA: Cumulative Impacts	(1)
NEPA 6330	Conflict Management in the NEPA Process	(1)
NEPA 6340	Content Analysis and Public Response Management	(1)
NEPA 6350	Socio-economic Imact Analysis for NEPA Specialists	(1)
NEPA 6360	Overview of the Endangered Species Act	(1)

Capstone Experience

After completing the coursework, participants are required to complete a NEPA Capstone Experience (NEPA 6370) before being awarded the NEPA Certificate. This experience will be individualized for each participant, will consist of a project that has been negotiated between the participant and the program faculty, and may be subject to oversight from the NEPA Certificate Program Advisory Board.

Course Descriptions

National Environmental Policy Act (NEPA), page 447

Natural Resources and Environmental Education (NREE)

Director: Steven W. Burr, Environment and Society
Location: Biology-Natural Resources 289
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Program Office: Department of Environment and Society
Location: Natural Resources 201
Phone: (435) 797-1790
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WWW: http://www.cnr.usu.edu/envs

Graduate Program Description

The Natural Resources and Environmental Education (NREE) Program offers an Interdisciplinary Graduate Certificate Program to provide graduate students with a comprehensive educational foundation for understanding and communicating natural resources and environmental information, and for developing the analytical skills needed to effectively implement appropriate environmental education and communication techniques for varying audiences. The NREE Certificate Program is administered by the Department of Environment and Society, College of Natural Resources. The certificate program consists of three components, for a total of 15-17 credits: (1) the NREE Core that includes two foundation courses, a NREE graduate seminar, and an "integrating" capstone experience; (2) one Human Dimensions of Natural Resources/Environment course; and (3) one Natural Resources/Environmental Management course.

The purpose of the certificate is to meet an identified need expressed by graduate students with interests in working professionally in the field of natural resources and environmental education and interpretation. The certificate program provides an interdisciplinary perspective on environmental education, and provides graduate students with the ability to teach people how to think critically and creatively in understanding, interpreting, and dealing with environmental issues and challenges. This approach enables students to focus on a broad spectrum of issues and content related to natural resources and the environment.

The structure of the certificate program emphasizes: (1) processes and skills necessary to present and integrate information across a broad spectrum of delivery systems; (2) interdisciplinary information and technical content across many areas, including natural resources, ecology, human resources, history, education, sociology, etc.; and (3) development of an interest area of personal/professional inquiry. The program provides a mechanism to support graduate student project development and research, emphasizing scholarship, discovery, and application of findings in applied settings in order to contribute to the professional field of natural resources and environmental education and interpretation.

Completion of the certificate program will provide graduate students with a working knowledge of the depth and breadth of the professional field of environmental education and interpretation. Moreover, it will prepare them for a job market demanding innovative and creative approaches for incorporating environmental education and interpretation in natural resource management agencies, in both formal (K-12 school-based) and nonformal (youth, community, and outdoor) education programs, in nonprofit organizations, and in the for-profit commercial sector. Although professionals working in natural resources and environmental education may work in a wide range of settings, they share one objective: to help people appreciate and understand the relationship between humans and the natural world around them. Thus, the value of the NREE Certificate Program goes far beyond more traditional approaches associated with education-oriented certificate programs.

Certificate

Students who complete the program receive a certificate in Natural Resources and Environmental Education. Notification of this certificate appears on the student's transcript.

Admission Requirements

To apply for admittance into the NREE Interdisciplinary Graduate Certificate Program, a graduate student must: (1) be accepted by the School of Graduate Studies at Utah State University for graduate study (current or provisional), (2) complete an NREE Interdisciplinary Graduate Certificate Program Application, and (3) submit a resume with references, along with a narrative describing personal interest in completing the NREE Certificate Program with respect to his or her professional goals. The NREE Program Director reviews the application and makes a recommendation for admittance into the certificate program, if appropriate, to the NREE Certificate Advisory Committee.

Student Advisement

An NREE Certificate Advisory Committee, comprised of the NREE Program Director, NREE Program Associate, and two NREE-affiliated faculty from participating departments and colleges, will assist in reviewing graduate student applications for admission into the certificate program, identifying major advisors, identifying funding opportunities, recommending courses to meet the NREE Certificate requirements, and advising graduate students. Graduate students accepted into the NREE Certificate Program will work with their major faculty advisor, as well as with the NREE Certificate Advisory Committee, to support them in understanding and meeting the requirements of the NREE Graduate Certificate Program.

Course Requirements

The NREE Interdisciplinary Graduate Certificate Program consists of three curriculum components, for a total of 15-17 credits: (1) the NREE Core, (2) one Human Dimensions of Natural Resources/Environment course, and (3) one Natural Resources/Environmental Management course. Many of the identified courses in the latter two categories will also satisfy the

requirements for a specific degree program in different departments. Therefore, students can select courses in these two categories to complete their specific degree requirements, while at the same time satisfying the requirements of the NREE Certificate Program.

I. Natural Resources and Environmental Education Core Courses (10 credits)

For the NREE Interdisciplinary Graduate Certificate Program, students are required to take the following two foundation courses, participate in the Graduate Seminar, and complete an "integrating" capstone experience, for a total of 10 credits, to fulfill the requirements of the NREE Graduate Certificate Program Core.

NREE Graduate Core:		**Credits**
Foundation Courses		
ENVS 5110	Environmental Education (Sp)	(3)
ENVS 6600	Advanced Natural Resource Interpretation (F)	(3)

The Environmental Education course and the Advanced Natural Resource Interpretation course serve as Foundation Courses. Environmental Education covers teaching about the environment, as well as using the environment and natural world to teach other subjects, with a strong emphasis on participation and on practicing techniques. Advanced Natural Resource Interpretation examines the planning processes, techniques, and evaluation procedures for using information and education to influence human behavior and increase benefits to visitors in natural settings, and also focuses on the leadership of teams involved in producing interpretive plans and materials.

Graduate Seminar

ENVS 6800	Environment and Society Departmental Seminar (F or Sp)	(1)

The Graduate Seminar requires student attendance at a number of different speaker seminars, occurring during the fall or spring semester, that are related to NREE, along with occasional meetings with NREE affiliated faculty to discuss connections and relevance of the seminars to NREE.

Capstone Experience

Students must complete 3 credits in a capstone experience, developed in consultation with a faculty advisor. Credits may be completed in the following types of courses:

Graduate Internship/Co-op
Graduate Special Topics
Graduate Directed Study
Thesis Research
Dissertation Research

The Capstone Experience requirement may be fulfilled in a number of ways, based on each student's interest, through an internship/co-op/special field experience, an investigation of a special topic and/or development of a project, directed readings/study, or a research project. In meeting this requirement, it will be important for students to be able to demonstrate they are getting an "integrating" capstone experience in natural resources and environmental education. Depending on the topic and its relationship to natural resources and environmental education, the completion of a student's Plan A thesis or Plan B project at the master's level may also fulfill this requirement. A student's doctoral dissertation research may qualify as a Capstone Experience. The student's graduate advisor, graduate committee, and NREE Advisory Committee will approve the "capstone" experience. A final "integrative" paper or thesis/dissertation will be the product for the "capstone" experience, emphasizing scholarship and discovery, as well as application of findings in applied settings in natural resources and environmental education.

II. Human Dimensions of Natural Resources/ Environment Courses (2-3 credits)

For the NREE Interdisciplinary Graduate Certificate Program, students are required to take **one** of the following courses, in order to gain a human dimensions' orientation toward natural resources and the environment, and help place natural resources and environmental education in a broader context of human-environment relationships.

ECON 5560	Natural Resources and Environmental Economics	(3)
ENVS 5150	Conflict Management in Natural Resources	(2)
ENVS 5300	Natural Resources Policy and Law	(2)
ENVS 5320	Water Law and Policy in the United States	(3)
ENVS 6000	Theoretical Foundations in Human Dimensions of Ecosystem Science and Management	(3)
ENVS 6110	Fisheries and Wildlife Policy and Administration	(3)
ENVS 6350	Wildlife Damage Management Policy	(3)
HIST 6460	Seminar in Environmental History	(3)
PHIL 5510	Ethics and the Environment	(3)
POLS 5180	Natural Resource Policy	(3)
POLS 5200	Global Environment	(3)
SOC 6620	Environment, Technology, and Social Change	(3)
SOC 6630	Natural Resources and Social Development	(3)

There may be another course that can satisfy this requirement, but the course will need to be approved by the student's graduate advisor and the NREE Advisory Committee.

III. Natural Resources/Environmental Management Courses (3-4 credits)

For the NREE Interdisciplinary Graduate Certificate Program, students are required to take **one** of the following courses in order to gain a management perspective toward natural resources and the environment.

ADVS 5030	Sustainable Agricultural Production Systems with Animals	(3)
AWER 5150/6150	Fluvial Geomorphology	(3)
AWER 5330/6330	Large River Management	(3)

AWER 5640/7640	Riparian Ecology and Management	(3)
AWER 5660	Watershed and Stream Restoration	(2)
AWER 6530	Water Quality and Pollution	(3)
AWER 6650	Principles in Fishery Management	(3)
ENVS 5000	Collaborative Problem-Solving for Environment and Natural Resources	(3)
FRWS 5000	Predator Ecology and Management	(3)
FRWS 5070/6070	Range Wildlife Relations	(3)
FRWS 5300/7300	Wildlife Damage Management Principles	(3)
FRWS 7000	Theory and Applications of Rangeland Ecosystem Management	(3)
PLSC 5550/6550	Weed Biology and Control	(4)
SOIL 5350/6350	Wildland Soils	(3)

There may be another course that can satisfy this requirement, but the course will need to be approved by the student's graduate advisor and the NREE Advisory Committee.

IV. Personal/Professional Inquiry

Although not formally required, a number of courses exist that can support students' interest in natural resources and environmental education, and support student efforts in completing individual degree requirements. These courses include the following:

ASTE 5260/6260	Environmental Impacts of Agricultural Systems	(3)
ASTE 6070	Program and Curriculum Development in Applied Technology Education	(3)
ASTE 6110	Applied Technology Education Program Planning and Evaluation	(3)
ASTE 6170	Supervision and Administration of International Extension Programs	(3)
ASTE 6240	Strategies for Teaching Adults	(3)
BIOL 5550	Freshwater Invertebrates	(3)
BIOL 5560	Ornithology	(3)
BIOL 5570	Herpetology	(3)
BIOL 5580	Mammalogy	(3)
BIOL 6510	Insect-Plant Interactions	(2)
ELED 6400	Multiple Talent Approach to Teaching	(2)
ELED 6700	Improvement of Science Instruction	(3)
ENGL/HIST 6610	Seminar on the American West	(3-4)
ENGL/HIST 6620	Seminar in Native American Studies	(3-4)
ENGL/HIST 6700	Folklore Theory and Method	(3)
ENGL/HIST 6720	Folklore Fieldwork	(3)
ENGL/HIST 6730	Public Folklore	(3)
ENGL/HIST 6740	Folk Narrative	(3)
ENGL/HIST 6760	Cultural and Historical Museums	(3)
GEOG 5650/6650	Developing Societies	(3)
GEOG 5810/6810	Geography Education Inservice Workshop	(3)
GEOG 5970	Classroom Technology in Geography Education	(3)
GEOG 6800	Teaching Geography	(3)
HIST 6460	Seminar in Environmental History	(3)
LAEP 5400/6400	Low Water Landscaping	(3)
LAEP 6110	Landscape Planning for Wildlife	(3)
MHR 6620	Training and Organizational Development	(3)
MHR 6650	Team and Interpersonal Effectiveness	(3)
PLSC 5100/6100	Landscape Irrigation Management	(3)
POLS 5180	Natural Resource Policy	(3)
POLS 5200	Global Environment	(3)
PSY 6660	Cognition and Instruction	(3)
PSY/EDUC 7670	Literature Reviews in Education and Psychology	(1)
PSY 7700	Grant Writing	(3)
SCED/ELED 6150	Foundations of Curriculum	(3)
SCED/ELED 6310	Content Area Reading and Writing	(3)
SPCH 5250	Environmental Rhetoric	(3)
THEA 6030	Storytelling	(3)

NREE Affiliated Faculty

Professors

Clifford B. Craig, Environment and Society

Melody Graulich, English

Leona K. Hawks, Environment and Society

Jack M. Payne, Environment and Society, and Vice President for University Extension

Terry L. Sharik, Environment and Society
Gary S. Straquadine, Agricultural Systems Technology and Education
Richard E. Toth, Environment and Society

Associate Professors
James J. Barta, Elementary Education
Dale J. Blahna, Environment and Society
Mark W. Brunson, Environment and Society
Steven W. Burr, Environment and Society
Christopher A. Call, Forest, Range, and Wildlife Sciences
Christopher A. Conte, History
Michael R. Kuhns, Forest, Range, and Wildlife Sciences
Rebecca M. Monhardt, Elementary Education
Jan E. Roush, English
Robert H. Schmidt, Environment and Society

Assistant Professors
Christopher Cokinos, English
Nancy O. Mesner, Aquatic, Watershed, and Earth Resources
Jennifer A. Peeples, Languages, Philosophy, and Speech Communication
Bonnie L. Pitblado, Sociology, Social Work and Anthropology

Senior Lecturer
Michael F. Butkus, Environment and Society

Lecturers
Barbara Middleton, Environment and Society
Susan K. Morgan, Geology

Other Affiliated Individuals
David T. Anderson, Project Director, Utah Botanical Center
John Haskin, Director of Education and Dean of Faculty, Teton Science School
Darren J. McAvoy, Extension Program Associate, Forest, Range, and Wildlife Sciences
Kay Rhees, Principal, Edith Bowen Laboratory School
Jack Shea, Director, Teton Science School
Debra M. Spielmaker, Director, Utah Agriculture in the Classroom
Karla VanderZanden, Director, Canyonlands Field Institute
Douglas G. Wachob, Research Director, Teton Science School

Natural Resource and Environmental Policy

Coordinator: Michael S. Lyons
Location: Main 330D
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Lead Department: Political Science
Location: Main 320
Phone: (435) 797-1306
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Graduate Program Description

The Natural Resource and Environmental Policy Certificate is designed to prepare resource and environmental professionals to meet current public policy challenges. Many of the problems confronting natural resource and environmental managers are social, as well as technical, in nature. Public involvement in decision making, equity concerns, and conflict management is becoming a critical issue. Resource professionals are increasingly challenged to design management strategies and public policies that maximize human well-being, environmental quality, and ecological integrity. The policy certificate is an interdisciplinary program to train students for careers in government, education, consulting, and conservation.

The Certificate Program provides students with a comprehensive educational framework for understanding complex natural resource and environmental concerns and to develop the critical thinking and analytical skills needed to address these issues. Students develop familiarity with both disciplinary and interdisciplinary concepts and principles of the social, natural, and physical science approaches to natural resource policy. Students engage in educational activities and thesis projects designed to apply this training to current policy issues. The primary objective is to prepare students to develop innovative, creative, and feasible natural resource and environmental policies and management strategies.

All seven colleges, as well as fifteen departments, at Utah State University participate in the Natural Resource and Environmental Policy Program and are represented on the Policy Program Advisory Committee.

Certificate

Students who complete the Policy Program receive a certificate in Natural Resource and Environmental Policy. Notification of this certificate appears on the student's transcript.

Admission Requirements

Admission to the Certificate Program is open to students accepted into a Plan A (thesis) master's degree program or a doctoral degree program at Utah State University who have satisfied the prerequisites outlined in the next paragraph. Admission is also available for students accepted into Plan B or Plan C master's degree programs, provided their degree program requirements include development of a written research paper or project report that will be presented to and defended before the student's graduate committee. In all cases, the thesis, research report, or dissertation must contain a significant component addressing natural resource or environmental policy dimensions of the research.

Prerequisites for acceptance into the Natural Resource and Environmental Policy Graduate Certificate Program are (1) undergraduate or other experience in the natural and social sciences; and/or (2) demonstrated understanding of general ecological principles, earth processes, and social systems. A standing Admissions Subcommittee of the Policy Program Advisory Committee reviews graduate student requests for admission to the program to determine whether prerequisites have been met.

To meet the natural sciences prerequisite, students must have taken an upper-division course focusing on the operation of natural systems, such as a course in ecology, biological systems, ecosystem management, or earth processes. Professional experience equivalent to such a course is also considered as having met the natural sciences prerequisite. Students without sufficient natural science backgrounds are required to take an equivalent course at USU to fulfill the prerequisites prior to certificate coursework. Students should contact the Natural Resource and Environmental Policy Program coordinator for a current list of suggested courses.

To meet the social sciences prerequisite, students must have taken an upper-division course focusing on the operation of social systems, such as a course from the fields of economics, political science, sociology, or anthropology. Professional experience equivalent to such a course may also be considered as having met the social sciences prerequisite. Students should contact the Natural Resource and Environmental Policy Program coordinator for a current list of suggested courses.

Graduate Committee

The student's graduate committee must include one faculty member affiliated with the Policy Program to advise the student on meeting the program requirements and in selecting core courses.

Course Requirements

The Graduate Certificate Program draws on a variety of courses to provide an integrated, interdisciplinary program. An integrative cornerstone seminar offered every other year as a team-taught course (NR 6430, Natural Resource and Environmental Policy Cornerstone Seminar), is normally taken in the student's first year. Students are expected to take at least nine credits from the core policy courses listed below to gain perspective on different disciplinary approaches to natural resource policy. Another program activity is the Natural Resource and Environmental Policy Seminar, NR 6440, which features invited speakers and must be attended by students for credit. In another required seminar,

NR 6450, graduating students make a presentation on the policy dimensions of their thesis or dissertation.

The following are the Natural Resource and Environmental Policy Certificate core courses. Other courses may be included in the list of core courses by action of the Policy Program Faculty Advisory Committee.

ASTE 6260	Environmental Impacts of Agricultural Systems
AWER 6330	Large River Management
BA 6540	ST: Sustainable Marketing
ECON 6500	Introduction to Natural Resource Economics
ECON 6510	Introduction to Environmental Economics
ENVS 5150	Conflict Management in Natural Resources
ENVS 5300	Natural Resources Law and Policy
ENVS 5320	Water Law and Policy in the United States
ENVS 6000	Theoretical Foundations in Human Dimensions of Ecosystem Science and Management
ENVS 6110	Fisheries and Wildlife Policy and Administration
ENVS 6130	Policy Aspects of Wildland Recreation
ENVS 6350	Wildlife Damage Management Policy
ENVS 6440	Stegner Center Annual Symposium
ENVS 6530	Natural Resources Administration
ENVS 6550	Environment, Resources, and Development Policy
ENVS 6900	ST: Natural Resources Partnerships
FRWS 6900	ST: Restoration and Rehabilitation Economics
HIST 6460	Seminar in Environmental History
LAEP 6900	Special Problems: NEPA Course
POLS 5180	Natural Resource Policy
POLS 5200	Global Environment
SOC 6620	Environment, Technology, and Social Change
SOC 6630	Natural Resources and Social Development
SOC 7620	Sociology of Environmental Hazards and Risks
SPCH 5000	Studies in Speech Communication: Protest and the Environment

Approved core courses may be part of a student's departmental requirements; however, only one core course taught in the student's home department may be applied toward the certificate.

Master of Natural Resources (MNR)

Degree Coordinator: Todd A. Crowl

Location: Natural Resources 108

Phone: (435) 797-7565

FAX: (435) 797-2443

E-mail: facrowl@cc.usu.edu

WWW http://www.cnr.usu.edu

Degree offered: Master of Natural Resources (MNR)

Objectives

The Master of Natural Resources (MNR) is a professional degree designed to prepare students to work in the interdisciplinary context of the 21st Century. It is a nonthesis program, intended for students and practicing professionals with a career orientation in natural resource management.

Admission Requirements

All MNR students are admitted through one of the three College of Natural Resources departments, following School of Graduate Studies standard procedures and policies (see pages 90-91). As with other USU master's degrees, each student must be accepted by a faculty member (major professor) who agrees to guide the student in the MNR program.

Undergraduate prerequisites include courses in chemistry, physics, botany, zoology, ecology, economics, political science, algebra, and statistics; and at least three courses in natural resources disciplines. Students without undergraduate degrees in natural resources or similar majors will be required to make up deficiencies in undergraduate preparation prior to beginning MNR degree coursework.

Course Requirements

The degree program includes two required core courses, courses in specified topic areas, and elective courses. The specific coursework required for each student will be determined by the major professor and the two other members of the student's graduate supervisory committee.

Nursing Program

Weber State University/Utah State University

Coordinator: Joanne Duke
Location: Lundberg Building 201
Phone: (435) 797-1515
FAX: (435) 797-3649
E-mail: jduke@cc.usu.edu
WWW: http://colleges.weber.edu/chp/programs/nursing.asp

Advisor: Susan L. Haddock, Biology-Natural Resources 101, (435) 797-2577, susanlh@biology.usu.edu

Undergraduate Programs

Associate Degree Program Objectives

Weber State University and Utah State University jointly offer an Associate of Science degree or an Associate of Applied Science degree in Nursing at Logan.

All nursing theory, University Studies, and laboratory practice classes are offered on the Utah State University campus and in health service agencies within Box Elder and Cache Counties.

Weber State University admits the prospective student and grants the Associate of Science degree or the Associate of Applied Science degree upon the student's completion of the course. The student participates in pinning ceremonies held on the Utah State University Campus and graduation ceremonies held on the Weber State University campus.

Departmental Admission Requirements for Associate Degree Program

Students apply for admission to the Cooperative Nursing Program by contacting the coordinator of the program, Lundberg Building, Room 201, 3250 Old Main Hill, Utah State University, Logan UT 84322-3250.

The student's application is handled through the Office of Nursing Admissions, Weber State University, Ogden UT 84408. Applicants have until February 1 to complete their application process. All application forms must be completed and sent to the Nursing Program admissions advisor at Weber State University. Notifications of status are sent to applicants around April 15.

A graduate of this program is eligible to write the State Board licensing examination to become a registered nurse. The program is accredited by the Utah State Board of Nursing and the National League of Nursing Accrediting Commission.

Students admitted to the program have the prerogative of taking the licensing examination for Practical Nursing upon an equivalency basis with the completion of the first year's course of studies.

Curriculum for Associate Degree Program

The curriculum for the associate degree is planned over a six-semester period, using two academic years plus two summer semesters. It is planned to include a broad University Studies program concurrently with courses in Nursing. A grade of *B* or higher is required for all lower-division nursing courses, and a grade of *C* or higher is required for all support classes.

Nursing Program Faculty

Assistant Professors

Joanne Duke
Debra Haas
Lori Hart
Jonny Kelly
Joyce Murray
Julie O'Brien
Kelly Shoell

Course Descriptions

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Nutrition and Food Sciences

Department Head: Charles E. Carpenter
Location: Nutrition and Food Sciences 213
Phone: (435) 797-2126
FAX: (435) 797-2379
E-mail: nfs@cc.usu.edu
WWW: http://www.usu.edu/nfs

Undergraduate Advisor: Marianne I. Rich,
Nutrition and Food Sciences 321, (435) 797-2131,
maring@cc.usu.edu

Degrees offered: Bachelor of Science (BS), Master of Science (MS), and Doctor of Philosophy (PhD) in Nutrition and Food Sciences; Master of Food Microbiology and Safety (MFMS); Master of Dietetics Administration (MDA)

Undergraduate emphases: *BS*—Food Science, Nutrition Science, Biotechnology, Food Technology Management, Culinary Arts/Food Service Management, and Dietetics

Graduate specializations: *MS, PhD*—Dietetics, Food Biotechnology, Food Chemistry, Food Engineering, Food Microbiology, Food Processing, Human Nutrition, and Nutrient Metabolism

Undergraduate Programs

Objectives

The Department of Nutrition and Food Sciences has the following three objectives:

1. To provide students with the scientific/academic background necessary to function well in further academic pursuits or future work environments.

2. To provide students with the critical thinking and problem solving skills necessary to enhance further academic pursuits or future work environments.

3. To provide students with practical application and work experience credentials to provide personal and employment satisfaction.

Dietetics. The Dietetics emphases prepare students to become registered dietitians. To become a registered dietitian, a student must complete a bachelor's degree program, complete a supervised internship, and pass a national registration exam. Registered dietitians, who have professional skills in clinical nutrition, community/public health nutrition, and food service management, are in great demand in the job market.

USU offers two programs in dietetics: the **Coordinated Program in Dietetics (CPD)** and the **Didactic Program in Dietetics (DPD)**. The CPD and the DPD are both accredited by the Commission on Accreditation for Dietetics Education of The American Dietetic Association, 20 South Riverside Plaza Suite 2000, Chicago IL 60606-6995, (312) 899-0040.

Coordinated Program in Dietetics (CPD). The CPD includes coursework *and* supervised internship experience. The graduate is eligible to take the national registration exam upon completion of the BS degree. Students must complete prerequisites and make application to the CPD by March 15 of the sophomore year. Ten to twelve students are accepted annually into the junior-level coursework and clinical work. Students are required to complete 1,000 hours of internship experience during their junior and senior years. Senior students must relocate to Salt Lake City during fall semester, in order to obtain extensive internship experiences in clinical and community settings.

Didactic Program in Dietetics (DPD). The DPD is a four-year academic program meeting all requirements enabling the graduate to apply for a supervised internship following graduation. Internships are located throughout the USA. USU Extension also sponsors an internship.

Food Science. Students receive an excellent background in chemistry, engineering, food processing, statistics, sensory evaluation, and microbiology. The Food Science program is approved by the Institute of Food Technologists. Graduates are in demand by industry for positions in research, quality control/assurance, product development, and processing. Government laboratories and regulatory agencies also hire food science graduates. With a food science degree, students can also qualify to enter graduate school.

Nutrition Science. The Nutrition Science emphasis is for students who are interested in studying the molecular and cellular bases of human health and disease. This is a multi-disciplinary program in which students learn to apply techniques from the fields of molecular and cellular biology, physiology, genetics, and biochemistry to issues in nutrition. Students will gain experience in laboratory, clinical, and epidemiological methods, and may have the opportunity to gain laboratory research experience in nutrition studies being conducted by faculty members. The undergraduate Bachelor of Science degree qualifies a student with the Nutrition Science emphasis to find employment in industry or academic laboratories, as well as in government agencies. It can also be used as preparation for medical or graduate school.

Biotechnology. The Biotechnology emphasis gives students a specialized background in biotechnology with depth training in either Food Science or Nutrition Science. Graduates of the program will be well-qualified to pursue biotechnology-related positions related to their depth area of choice.

Food Technology Management. The Food Technology Management program gives students a broad background in basic food science and in business administration to be applied to the business-oriented aspects of the food industry. Students also qualify for a Business Production Minor. Graduates are sought by private food industry and public institutions in management positions.

Culinary Arts/Food Service Management. This emphasis prepares students in the art and science of culinary arts, and provides the management principles needed to effectively manage a

food service operation, including human resource management, financial management, time management, communications, etc. Students are required to obtain a minor in BA Marketing, MHR Management, or MHR Human Resource Management.

Completion of courses required for the Food Science Emphasis, Nutrition Science emphasis, or Dietetics emphasis may be suitable preparation for students planning to apply to medical school.

For more emphasis information about course sequences and requirements for admission, see major requirement sheet, available from the Department of Nutrition and Food Sciences, or visit the departmental home page at:
http://www.usu.edu/nfs.

Requirements

Departmental Admission Requirements. Admission requirements for the Department of Nutrition and Food Sciences are the same as those described for the University on pages 15-18. Students in good standing may apply for admission to the department. Students planning to major in Nutrition and Food Sciences should take algebra, chemistry, and biology in high school.

Graduation Requirements. All graduates from the department must have completed one of the six emphasis areas in the department and must meet the following minimum requirements:

1. Grade point average (GPA) must be 2.5 or higher in all courses required for the major.

2. A grade of *C* or better must be received in all courses required for the major.

3. Courses required for the major may be repeated only once to improve a grade.

4. Courses required for the major may not be taken as *Pass-D-Fail* credits.

Minor in Food Sciences. Students with majors outside of the Nutrition and Food Sciences Department may graduate with a minor in Food Sciences by completing NFS 1020, 3110, 4070, 5020 (or 5030), and 5510.

Bachelor of Science Requirements

Specific requirements for each emphasis are listed below. Requirements change periodically, and sequence of courses is important. Current course requirements and the order in which they should be taken can be obtained from the Department of Nutrition and Food Sciences.

Food Science. The following courses are required: BIOL 1210, 3300; CHEM 1210, 1220, 1230, 1240, 2300, 2330, 3700, 3710; MATH 1050, 1060, 1210; NFS 1000, 1020, 1250, 3100, 3110, 3250, 4070, 4440, 4990, 5020, 5030, 5110, 5500, 5510, 5560, 5920; PHYX 2110; PLSC 4600; SPCH 3330; STAT 3000, 5300.

Nutrition Science. The following courses are required: BIOL 1210, 1220, 2000; CHEM 1210, 1220, 1230, 1240, 2300, 2330, 3700, 3710; ECON 1500; ENGL 1010, 2010; MATH 1050, 1060, 1210; NFS 1000, 1020, 2020, 3110, 3250, 4020, 4070, 4550, 4990, 5210, 5220, 5300, 5370; STAT 2000; USU 1320, 1330, 1340; 20 elective credits (see Nutrition and Food Sciences Department for list of approved electives).

Biotechnology (Depth Training in Food Science). The following courses are required: ADVS 3200; BIOL 1210, 3200, 3300; CHEM 1210, 1220, 1230, 1240, 2300, 2330, 3700, 3710; ECON 1500; ENGL 1010, 2010; MATH 1050, 1100; NFS 1000, 1020, 2040, 3100, 3110, 3250, 4990, 5020 (or 5030), 5110, 5160, 5240, 5260, 5370, 5500, 5510, 5560, 5920; PHIL 4410; PHYX 2110; PLSC 4600; SPCH 3330; STAT 3000, 5200; USU 1320, 1330, 1340.

Biotechnology (Depth Training in Nutrition Science). The following courses are required: ADVS 3200; BIOL 1210, 1220, 3200, 3300, 5150, 5210, 5260; CHEM 1210, 1220, 1230, 1240, 2300, 2330, 3300, 3700, 3710; ECON 1500; ENGL 1010, 2010; MATH 1050, 1060, 1100; NFS 1000, 1020, 2020, 2040, 4020, 5160, 5200, 5220, 5240, 5260, 5370; PHYX 2110; STAT 3000; USU 1320, 1330. In addition, select one University Studies course from each of the following areas: Breadth Social Sciences (BSS), Depth Humanities and Arts (DHA), and Depth Social Sciences (DSS).

Food Technology Management. The following courses are required: ACCT 2010; BA 3500, 3700, 4720, 4790, 5730; BIOL 1110; CHEM 1110, 1120, 1130; MATH 1050, 1100; MHR 3110; NFS 1000, 1020, 1240, 1250, 3100, 3110, 3250, 4070, 4990, 5020, 5030, 5110, 5500, 5510, 5560, 5920; PHYX 1200; SPCH 2600; STAT 3000, 5300.

Culinary Arts/Food Service Management. The following courses are required: ACCT 2010; BA 3500; CHEM 1010; ECON 1500; ID 1750; MATH 1030 (or 1050); MHR 2350, 2990, 3110, 3710; NFS 1000, 1020, 1240, 1250, 2030, 2050, 3000, 3030, 3060, 3110, 3500, 3510, 4250, 4810, 4990; SPCH 2600. Students are required to complete a minor in BA Marketing, MHR Management, or MHR Human Resource Management.

Dietetics (Coordinated Program). The following courses are required: BIOL 2000, CHEM 1210, 1220, 2300, 3700, 3710; ECON 1500; MATH 1050; MHR 3110; NFS 1020, 1240, 1250, 2020, 3020, 3600, 4020, 4050, 4060, 4070, 4420, 4480, 4550, 4560, 4570, 4580, 4660, 4710, 4720, 4730, 4740, 4750, 4780, 4990, 5210, 5300, 5750; PSY 1010 (or SOC 1010); STAT 2000 (or 3000).

Dietetics (Didactic Program). The following courses are required: ACCT 2010; BA 3500; BIOL 2000; CHEM 1210, 1220, 2300, 3700, 3710; ECON 1500; MATH 1050; MHR 3110; NFS 1020, 1240, 1250, 2020, 3020, 3600, 4020, 4050, 4060, 4070, 4480, 4550, 4560, 4710, 4720, 4750, 4780, 4990, 5200, 5210, 5300, 5750; PSY 1010 (or SOC 1010); STAT 2000 (or 3000).

Financial Support

The Department of Nutrition and Food Sciences and the College of Agriculture award scholarships in addition to those available through the University Financial Aid Office. Information and application forms may be obtained from the department office. Students may also contact the department for assistance in finding employment that will enhance their academic studies. Many students are employed by the department and by private firms near the University.

Graduate Programs

Master of Food Microbiology and Safety (MFMS)

The MFMS degree is a professional degree designed to provide students with depth training in food safety assurance and the use of management systems such as HACCP. The degree is primarily intended for individuals planning careers in food quality assurance or other food safety-related positions in the food industry.

MFMS Admission Requirements

Students seeking entry into the MFMS program must satisfy the minimum admission requirements of the USU School of Graduate Studies and the NFS Department, and must also achieve a score of 3 (equivalent to the 40th percentile) or higher on the newly administered GRE Written Examination. Applications will be reviewed by the MFMS Advisory Committee, which is responsible for accepting students into the MFMS program and assigning them an advisor. The advisor will then consult with the student to select two additional graduate committee members.

MFMS Program of Study

The MFMS program of study has been tailored for students with undergraduate training in (1) food science or (2) microbiology or biology. Students who lack prerequisite competencies in food science, microbiology, or biology will be required to address those deficiencies during the MFMS program of study. Course requirements to meet specific deficiencies will be designated by the student's advisory committee and, in accordance with School of Graduate Studies policy, may or may not count toward course requirements for the MFMS program of study.

The MFMS program of study, outlined below, requires a minimum of 32 semester credits, including (1) 10 semester credits of core coursework in food safety assurance, microbiology, and epidemiology; (2) at least 19 semester credits of coursework based on the student's career goals and undergraduate competencies; and (3) the written preparation and oral presentation of a substantive literature review on a food safety topic.

MFMS Program Requirements (32 credits minimum). Students must complete all of the following courses (12 credits): NFS 6170, 6200, 6900 (2 credits), 7800 (2 credits); BIOL 6810 (or 6890); and PUBH 5010. During NFS 6900 (Special Problems), students will prepare a substantive written literature review of a food safety topic. NFS 7800 (Seminar) must be taken during two semesters; during the final seminar, students must make an oral presentation on the food safety topic used for their literature review.

Students with a **BS degree in Food Sciences** must demonstrate competency equivalent to a USU BS degree in Nutrition and Food Sciences with a Food Science emphasis. These students must also select a minimum of 10 credits from the following: ADVS 6400; BIOL 5150 (offered biennially), 5300, 5330. The remaining credits should generally be selected from the following, although additional course substitutions may be made with approval of the student's advisory committee: NFS 6020, 6030, 6120, 6140 (offered biennially), 6210, 6500, 6510, 6600 (offered biennially), 6610; ASTE 6260; CHEM 6730.

Minimum program prerequisites for students with a **BS in biology, microbiology, or an equivalent degree** include the following (the USU equivalent course is listed in parentheses): biochemistry (CHEM 3700), general microbiology (BIOL 3300), microbial physiology (BIOL 5300), and statistics (STAT 3000). In addition, these students must complete *both* NFS 6110 and 6500, and must take *at least one* of NFS 6020 and 6030. The remaining credits should generally be selected from the following, although additional course substitutions may be made with approval of the student's advisory committee: NFS 6120, 6140 (offered biennially), 6210, 6510, 6600 (offered biennially), 6610; ADVS 6400; ASTE 6260; BIOL 5150 (offered biennially); CHEM 6730.

Master of Dietetics Administration (MDA)

The MDA degree is a professional degree designed to provide dietitians with in-depth training in management and leadership in food and nutrition program administration. The skills emphasized in the MDA program will enhance career options and pathways for graduates. Nationwide, there is a need for professionally trained managers at local, district, state, and federal levels in food and nutrition programs, including school, university, and hospital food services; public health programs; and clinical management. This program provides expertise in financial management, human resource management, marketing, entrepreneurship, employment laws, and more.

MDA Admission Requirements

Candidates for the MDA program must qualify for one of the following categories: *Option 1:* Must have completed the USU Extension Dietetics Internship; **or** *Option 2:* Must be currently registered as a dietitian with at least two years of work experience. Students seeking entry must also satisfy: (1) admission requirements of the USU School of Graduate Studies; and (2) admission requirements of the NFS Department.

The MDA Advisory Committee is responsible for reviewing applications, accepting students into the MDA program, and assigning students to an advisor.

MDA Program of Study

Option 1 is tailored for applicants who have completed the USU Extension Dietetics Internship. Students must complete a minimum of 41 credits and a Plan B thesis. The completed USU Extension Dietetics Internship provides 26 of the 41 credits. Following the internship, 15 additional credits are required including: NFS 6780, 6900 (3 credits), 6970 (2 credits), 7800 (1 credit), and two elective courses to be determined by the MDA candidate and the Advisory Committee.

Option 2 is tailored to the registered dietitian with at least two years of work experience. A minimum of 30 credits is required for this Plan B option. Students must complete 18 credits from the NFS Department and a minimum of 6 credits each in two of the three related disciplines. These disciplines include overall management, financial management, and human resource management. Coursework will be based on the student's career goals and competencies. The following courses are required: NFS 4750, 5200, 5210, 5510, 6750, 6780, 6900 (3 credits), 6970 (2 credits), and 7800 (1 credit). The remaining courses must be selected from the following: ACCT 6010; BA 3400, 6350, 6440, 6520; INST 6490; MHR 6350, 6370, 6410, 6500, 6510, 6550, 6630, 6760.

MS and PhD Admission Requirements

Candidates for graduate study in the Department of Nutrition and Food Sciences need a background in chemistry, physics, mathematics, bacteriology, and physiology. Prior coursework in food science or nutrition is desirable. If deficient in these areas, a student may be accepted with the understanding that the supervisory committee will require competence equivalent to a BS degree in nutrition and food sciences in the preliminary (MS) or comprehensive (PhD) examination.

Students must meet some departmental requirements in addition to requirements of the School of Graduate Studies. A minimum score at the fortieth percentile in Verbal, Quantitative, and Analytical Writing on the Graduate Record Examination is required for admission.

One year of general chemistry, one semester of organic chemistry, and math at least equivalent to college algebra must be completed before matriculation. If taken as a graduate student, these courses will not be counted as graduate credit.

Before being accepted to work toward a PhD degree, a student must have obtained an MS degree or have a manuscript reporting original research accepted for publication in a refereed journal.

Before being accepted into the department, potential graduate students must be accepted by a faculty member who is willing to add them to his or her research team.

MS and PhD Procedures

Progress toward an advanced degree is outlined in the School of Graduate Studies section (pages 94-97). Students are responsible to see that all requirements are fulfilled, and should read these procedures *carefully*.

Graduate students in the Department of Nutrition and Food Sciences should complete the following steps:

1. Choose Major Professor. Students are accepted into the department with a temporary advisor. Although this person must guarantee, at the time of acceptance, that the student may work in his or her research program, students may choose as their major professor any faculty member who can and is willing to accommodate them.

2. Establish Supervisory Committee. Faculty members who may serve on the student's supervisory committee should be considered in consultation with the major professor. A minimum of three members (at least two from the department), including the major professor, must be suggested for the MS program. At least five (three or more from the department and one or more from outside the department) must be suggested for a PhD program.

When the student and major professor have agreed on the committee members, a *Supervisory Committee Assignment* form must be prepared. The department head must approve the committee and may add members. It is the student's responsibility to meet with proposed committee members to make certain they are able and willing to serve. The *Supervisory Committee Assignment* form is then forwarded to the dean of the School of Graduate Studies for final approval.

The committee should be selected and the *Supervisory Committee Assignment* form submitted to the School of Graduate Studies no later than the second semester of an MS program or the third semester of a PhD program.

3. Select and Define Research Program. In consultation with the major professor, the student must choose a research area suitable for the MS thesis or PhD dissertation and prepare a Thesis or Dissertation Proposal. The proposal should include the following:

a. Title

b. Description of the problem based on the most current literature

c. Statement of the purpose of the intended research

d. Research plan

e. List of the references cited in a form acceptable for publication in a scientific journal in the student's field

4. Define Course Schedule. Students must decide, in consultation with their major professor, the courses they will take that will be on their Program of Study. They must fulfill the following minimum requirements for all graduate students in Nutrition and Food Sciences and take other courses to provide the background necessary to conduct their research.

a. **Biochemistry (CHEM 5700, 5710)—**3 credits required for MS; 6 credits required for PhD.

b. **Statistics (STAT 5100, 5120, 5200, 5600)—**3 credits required for MS; 6 credits required for PhD.

c. **Graduate-level NFS courses—**PhD students must include 3 credits from NFS 6200, 6210, 6220, 6300, 6370; and 3 credits from NFS 6020, 6030, 6110, 6560.

d. **Additional graduate-level courses (from NFS or elsewhere)—**3 credits required for MS; 10 credits required for PhD.

e. **Graduate Seminar (NFS 7800)—**2 credits required for MS; 4 credits required for PhD.

f. **Graduate seminars in other departments—**1 credit required for MS; 2 credits required for PhD.

g. **Teaching experience (NFS 6900)—**2 credits required for PhD.

h. **Research (NFS 6970, 7970; assigned at discretion of the major professor)—**6-12 credits required for MS; approximately 30 credits required for PhD.

The PhD program includes 30 Master of Science credits. For more information, see the School of Graduate Studies requirements in this catalog.

5. Meet with Supervisory Committee. Before the first meeting of the supervisory committee, the student must complete the *Program of Study* form. A copy of the form and the research proposal should be given to each committee member several days before the meeting. The purpose of this meeting is to:

a. Secure the committee's approval of the Program of Study. Deficiencies in academic background will be discussed and plans made to resolve them.

b. Obtain the committee's approval of the research plan.

c. Discuss regulated aspects of the research (hazardous materials, experimental animals, or human subjects).

d. Allow the committee to determine the topic areas listed on the *Program of Study* form as other requirements of the program. All members of the committee and the department head must sign the *Program of Study* form before it is sent to the School of Graduate Studies.

6. Begin Research and Continue Courses. Students must take the approved courses and conduct the research as outlined in the approved research proposal.

7. Take Oral Preliminary (MS) or Comprehensive (PhD) Examination. The oral examination tests general knowledge that the student should have at this stage of academic training, as well as the student's ability to synthesize information in relation to nutrition and food science. Material to be included is determined by the committee, but emphasis is on knowledge applicable to the research.

8. Complete Application for Candidacy Forms. PhD candidates must submit the *Application for Candidacy* form to the School of Graduate Studies. It must be signed by all members of the committee at the end of the comprehensive examination, and then signed by the department head. This form must be received by the School of Graduate Studies at least three months before the dissertation defense.

9. Complete Research and Write Thesis or Dissertation.

10. Departmental Seminar. Each student must present a seminar in the department to report the results of his or her research. This must be done before the defense, but is typically given on the day of the defense.

11. Final Examination (Thesis or Dissertation Defense). When both the student and the major professor are satisfied that the thesis is editorially correct, copies are given to the members of the committee. This should be done several weeks before the examination. Students must realize that committee members will review the thesis only as their schedules permit. Students should plan adequate time for thesis review and revision before their defense, so as to meet the deadlines. The final examination is scheduled with the School of Graduate Studies. The signed appointment form must be submitted to the School of Graduate Studies at least ten business days before the defense, by all committee members, verifying that they have read the thesis or dissertation and it is ready to be defended at the scheduled day and time.

The dean of the School of Graduate Studies will appoint one committee member, usually from outside the department, to serve as chair of the final examination. The School of Graduate Studies will also provide forms to be signed by the committee and returned to the School of Graduate Studies at the end of the defense.

12. Submit Thesis or Dissertation. After all changes suggested during the defense have been made, the thesis or dissertation is submitted to the departmental thesis reviewer, who will check to ensure that the thesis is in the correct format. The thesis or dissertation is submitted to the School of Graduate Studies for review by the thesis coordinator only after all corrections suggested by the departmental reviewer have been made.

Registration Requirements for Graduate Students

Once admitted, students are required to maintain enrollment as follows: at least 3 credits to use University facilities and receive direction (including thesis or dissertation direction) from their major professor; at least 6 credits if on a Graduate Teaching or Research Assistantship (9 credits if employed less than 15 hours per week); at least 9 credits if on a Research Fellowship or unsupported; at least 6 credits if receiving tuition waivers, student loans, or other University-administered financial aid; and no more than 6 credits if employed full time by the University.

Financial Assistance

Some teaching assistantships and research fellowships and many research assistantships are available to graduate students in the Department of Nutrition and Food Sciences. Teaching assistantships are used to cover the teaching needs of the department. Research fellowships and research assistantships are available through individual faculty members. Most research assistantships are tied to specific research projects.

The Gandhi Scholarship is available, on a competitive basis, to support outstanding students during their graduate education in food science. Each incoming student may select any advisor who fits his or her area of interest in food science. Awards are available for entering master's degree students, as well as for PhD candidates. Applications are due February 1. To obtain an application, visit the Department of Nutrition and Food Sciences website or contact the departmental staff.

Career Opportunities

There is a continuing shortage of MS and PhD graduates in nutrition and food sciences. Many MS graduates go on to obtain a PhD, but all graduates have a wide choice of career opportunities.

Additional Information

Additional information and updates may be obtained by writing or telephoning the Department of Nutrition and Food Sciences directly or by checking out the departmental website at: **http://www.usu.edu/nfs**.

Graduation requirements described in this catalog are subject to change. Students should check with the Department of Nutrition and Food Sciences concerning possible changes.

Nutrition and Food Sciences Faculty

Professors

Jeffery R. Broadbent, food science, microbial genetics

Charles E. Carpenter, food science, muscle biochemistry and physiology, meat processing

Daren P. Cornforth, food science, meat and muscle chemistry

Conly L. Hansen, food science, food engineering

Deloy G. Hendricks, nutrition, food storage

Donald J. McMahon, food science, dairy chemistry and technology

Ronald G. Munger, nutrition, epidemiology, and public health

Ann W. Sorenson, nutrition

Bart C. Weimer, food science, microbial physiology

Adjunct Professors

Gary M. Chan, pediatrics

Michael J. Glass, microbial detection

Craig J. Oberg, microbiology

Distinguished Professor Emeritus

R. Gaurth Hansen

Professors Emeritus

Georgia C. Lauritzen

Von T. Mendenhall

Gary H. Richardson

D. K. Salunkhe

Bonita W. Wyse

Associate Professors

Charlotte P. Brennand, food science, food flavor and sensory evaluation

Nedra K. Christensen, nutrition, dietetics

Ilka Nemere, nutrition, molecular nutrition

Marie K. Walsh, food science, dairy chemistry

Clinical Associate Professors

Janet B. Anderson, dietetics, food science management, food safety

Noreen B. Schvaneveldt, dietetics, clinical nutrition

Adjunct Associate Professors

Barbara Chatfield, pediatric pulmonology

Wayne G. Geilman, dairy processing and technology

Paul A. Savello, dairy processing and food science, food laws and regulations, milk ultra high temperature and whitening

Adjunct Research Associate Professor

Laurie J. Moyer-Mileur, pediatric nutrition

Research Assistant Professors

Dong Chen, molecular structure and biochemistry

Heidi J. Wengreen, nutrition, clinical dietetics, epidemiology

Clinical Assistant Professors

Ann M. Mildenhall, dietetics

Tamara S. Vitale, dietetics, community nutrition

Assistant Professor Emeritus

Frances G. Taylor

Adjunct Assistant Professors

Deborah R. Gustafson, nutrition

Bradley J. Haack, molecular pathogenesis

Robert Miceli, molecular assay development, biosensor development, infectious disease, antibody engineering, immune regulation

Adjunct Clinical Assistant Professor

W. Daniel Jackson, pediatrics

Clinical Instructor

Kim McMahon, dietetics/food service management

Adjunct Instructors

Catherine McDonald, pediatric nutrition, clinical dietetics

Rachel T. Rood, nutrition, registered dietitian

Lecturers

Randall T. Bagley, dairy processing

Virginia C. Bragg, culinary arts

Erik T. Burlile, culinary arts/food service management, chef

Grace B. Harvell, culinary arts

Marianne I. Rich, clinical dietetics

John L. Simpson, culinary arts/food service management, chef

Dick R. Whittier, meat processing

Adjunct Clinical Lecturer

Rebecca S. Cole, dietetics/food service management

Course Descriptions

Nutrition and Food Sciences (NFS), pages 447-451

Physics

Department Head: W. John Raitt
Location: Science Engineering Research 250A
Phone: (435) 797-2848
FAX: (435) 797-2492
E-mail: physics@cc.usu.edu
WWW: http://www.physics.usu.edu/

Assistant Department Head: David Peak,
Science Engineering Research 240, (435) 797-2884,
david.peak@usu.edu

Departmental Advisor: Deborah Reece,
Science Engineering Research 250D, (435) 797-4021,
deborah.reece@usu.edu

Degrees offered: Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), and Doctor of Philosophy (PhD) in Physics; BS and BA in Physics Teaching; BS and BA in Composite Teaching—Physical Science (Physics)

Undergraduate emphases: *BS*—Professional Emphasis or Applied Emphasis

Graduate specialization: *MS*—Upper Atmospheric Physics

Undergraduate Programs

Objectives

The Physics Department embraces undergraduate students from all quarters of the University—in introductory courses required for majors by various departments, in courses for more general audiences that are part of the University Studies Program, and in upper-level courses designed primarily to fulfill bachelor's degree requirements in Physics. These courses, and the degree programs offered, are strongly impacted by the department's central goals:

1. to communicate the beauty and utility of the fundamental principles of the physical universe and the power of describing nature in quantitative terms,

2. to create new knowledge,

3. to foster critical and creative thinking,

4. to enhance the ability of citizens to participate in a technological democracy,

5. to assist in the preparation of elementary and secondary school teachers,

6. to provide opportunities for students to sharpen their communication and interpersonal skills, and

7. to develop new tools and texts to improve physics pedagogy.

The degree programs of the department are constructed to be rigorous, yet flexible, and are intended to help students prepare for careers in academia, government and industrial laboratories, medicine, law, teaching, and business. Required course and laboratory work in these programs carefully balances theory and experiment. Because the department believes that one must participate in discovery to understand science, undergraduates are encouraged to engage in departmental research early in their studies, and a formal research experience is integral to most departmental programs. The department's Get Away Special activities provide excellent opportunities for students of all backgrounds to participate in space related research.

Requirements

Departmental Admission and Graduation Requirements. New freshmen admitted to USU in good standing qualify for admission to the degree programs in Physics. Admission in good standing for students transferring from another institution requires a minimum transfer GPA of 2.2, while students transferring from another USU major are required to have a minimum total GPA of 2.0. Students wishing to complete the Teaching Major in Physics must apply for admission to the Secondary Education program as well. Requirements for admission to the **Secondary Teacher Education Program (STEP)** include a minimum GPA of 2.75 in either PHYX 2110 and 2120, or PHYX 2210 and 2220; and at least 60 total credits completed with a minimum GPA of 2.75. A Composite Teaching Major in Physical Science is available through either the Physics or the Chemistry and Biochemistry departments. Students applying for admission to the STEP with the Composite major must satisfy the latter requirements, plus a minimum GPA of 2.75 in CHEM 1210, 1220, 1230, and 1240.

Students may use no more than one course with the *P-D-F* option to satisfy a major or minor requirement in Physics. All other courses used to satisfy major or minor requirements must be completed with at least a *C-* grade, and the total GPA in all required Physics courses must be at least 2.3. The Teaching Major and Teaching Minor in Physics and the Composite Teaching Major in Physical Science require a 2.75 minimum GPA in Physics courses and a minimum 2.75 overall GPA for graduation.

College of Science Requirements. The College of Science requires a year of mathematics (8 credits) and a year sequence in science (6-8 credits) for all of its majors. For Physics majors, the College of Science requirements are MATH 1210 and 1220; and one of the following pairs of courses: BIOL 1210 and 1220, CHEM 1210 and 1220, or GEOL 1150 and 3200.

Bachelor's Degrees and Core Requirements. The Physics Department awards the following degrees: BS in Physics, BA in Physics, BS in Physics with a Professional Emphasis, BS in Physics with an Applied Emphasis, BS in Mathematics and Physics Dual Major Option, BS in Physics Teaching, and BS in Composite Teaching—Physical Science.

Except for the two Teaching Majors, all degrees require a **common core**: College of Science requirements; MATH 2210; PHYX 2210 and 2220 (preferred) or PHYX 2110 and 2120; PHYX 2500, 2710, 3550, 3600, 3870, and 4900. The specific requirements beyond this core for the various bachelor degrees are:

1. Bachelor of Science in Physics: MATH 2250; PHYX 3650 or 3700; 8 credits in Physics at the 3500 level and above (excluding USU Depth courses).

2. Bachelor of Arts in Physics: University language requirements; MATH 2250; 6 credits in Physics at the 3500 level and above (excluding USU Depth courses); PHIL 4310, 4320.

3. Bachelor of Science in Physics with a Professional Emphasis: MATH 2250; PHYX 3650, 3700, 3750, 3880, 4550, 4600, 4700, 4710, 4900.

4. Bachelor of Science in Physics with an Applied Emphasis: MATH 2250; PHYX 3650, 3700, 3880; 12 credits in other technical departments at the 3000 level or above (excluding USU Depth courses). The latter courses must have a coherent theme and must be approved by the Physics advisor.

5. Mathematics and Physics Dual Major Option: MATH 2270, 2280, 4200, 4310, 5210, 5710; 6 credits in Mathematics above the 4600 level, excluding MATH 5570 and 5580 (Actuarial MATH I and II); PHYX 3650 or 3700; 8 credits in Physics at the 3500 level and above (excluding USU Depth courses).

Minor in Physics. Majors in other departments may obtain a minor in Physics by successfully completing PHYX 2110 and 2120, or PHYX 2210 and 2220; plus 10 additional credits selected from PHYX courses at the 2500 level and above (not to include PHYX courses designated as USU Depth courses). Note that MATH 1100 or 1210 is a prerequisite for PHYX 2110, MATH 1210 is a prerequisite for PHYX 2210, and MATH 1220 is a prerequisite for PHYX 2710.

Bachelor of Science in Physics Teaching. Courses required for the Bachelor of Science in Physics Teaching are: College of Science requirements; MATH 1210, 1220, 2250; STAT 3000; PHYX 2210 and 2220 (preferred) or PHYX 2110 and 2120; PHYX 1000, 2500, 2710, 3550, 3870; 5 credits in Physics above the 3000 level (including USU Depth courses); SCI 4300; and 6 credits in science, with 3 in each of the two areas not covered by the College of Science science sequence requirement. Students seeking this degree must complete the requirements for the **Secondary Teacher Education Program (STEP).**

Teaching Minor in Physics. Students who complete the Secondary Teacher Education Program (STEP) are eligible to obtain a Teaching Minor in Physics by successfully completing PHYX 2110 and 2120, or PHYX 2210 and 2220; PHYX 1000; 6 additional credits in Physics chosen from PHYX 2500 and/or courses above the 3000 level (including USU Depth courses); SCI 4300 or, if SCI 4300 is required by the student's major, 2 credits in science (not including Physics) not required by the major. Note that MATH 1100 or 1210 is a prerequisite for PHYX 2110, MATH 1210 is a prerequisite for PHYX 2210, and MATH 1220 is a prerequisite for PHYX 2710.

Bachelor of Science in Composite Teaching–Physical Science. Courses required for the Bachelor of Science in Composite Teaching—Physical Science are: MATH 1210, 1220; STAT 3000; PHYX 2210 and 2220 (preferred), or PHYX 2110 and 2120; PHYX 1000, 1030 or 3030; 5 credits in Physics from PHYX courses at the 2500 level and above (including USU Depth courses); CHEM 1210, 1220, 1230, 1240, 2300 or 2310, 2330; BIOL 1010; GEOL 1150; BMET 2000; and SCI 4300. Students seeking this degree must complete the requirements for the **Secondary Teacher Education Program (STEP).**

Additional Information

Information concerning degree programs, recommended schedules of courses, career opportunities, and opportunities to participate in the Get Away Special activities and in other areas of undergraduate research may be obtained by consulting the Physics advisor in SER 250. Also see the department's website at: **http://www.physics.usu.edu/**.

Financial Support

The Physics Department has several small scholarship funds available for physics majors with excellent academic records. In addition, there are a number of Get Away Special (GAS) scholarships for students interested in designing and constructing experiments to be flown on the Space Shuttle and in participating in other GAS activities. Inquiries should be made with the Physics advisor in SER 250.

Graduate Programs

Admission Requirements

In addition to the general requirements for admission established by the School of Graduate Studies (see pages 90-91), the department admission committee bases its decisions for offering admission on the following criteria: review of applicants' undergraduate records, letters of recommendation, performance in graduate courses (if any), performance in research (if any), and scores on the General portion of the Graduate Record Examination. Students whose native language is not English are strongly encouraged to submit to the School of Graduate Studies results of the Test of Spoken English (TSE). Regardless, nonnative English speakers must submit a score for the Test of English as a Foreign Language (TOEFL). If a satisfactory score on the TSE is not provided, such students will be required to take a test given by the Intensive English Language Institute (IELI) at USU. The purpose of this test is to guide the selection of remedial language courses, if needed, to help with physics coursework comprehension. (See also *Financial Assistance*, page 289.)

Placement

Prior to registering for graduate courses for the first time, each student will consult with the Graduate Student Tracking Committee and the departmental advisor. Based on these discussions, the student will be advised to register for courses in either the Physics Department standard curriculum or advanced curriculum. Continuing advisement concerning courses will be provided by the Graduate Student Tracking Committee, the departmental advisor, and the student's graduate supervisory committee.

Qualification Requirements

Each student enrolled in the PhD program will be evaluated for qualification for PhD work. Consideration of qualification will occur no later than the end of the second semester after the student has been admitted for study in the PhD program and has taken a first graduate course in physics. Evaluation will be based on whatever relevant information the student wishes to have presented on his or her behalf (coursework, research, TA performance, subject GRE, etc.), but must include a faculty evaluation

of coursework in physics for courses taken at USU. Normally, the student should present the results of at least four physics courses. Students admitted to the PhD program with considerable coursework from another institution, who have not taken at least four courses in physics at USU, must present a qualification seminar to the Department of Physics on research he or she has done during the preceding year at USU. Based on the various pieces of information presented on behalf of the student, the department will judge whether or not the student is qualified to continue in the PhD program. If not, a student already having an MS in physics from USU will be asked to leave. A student without an MS in physics from USU will be invited to finish his or her MS degree. Upon completion, the student can reapply to the PhD program, but acceptance will be contingent on the evaluation of the student's graduate work to that point.

Degree Programs

Master of Science. In addition to the above general requirements, students completing a Plan A MS degree must complete four of the nine required PhD courses listed below (see Doctor of Philosophy). Plan B MS students must complete five of the nine courses, and Plan C MS students must complete six of the nine courses. Each student is required to pass PHYX 5800 (Physics Colloquium) for four consecutive semesters, beginning with the first semester after matriculation. The student must also submit and orally defend either a thesis (Plan A) or a research report (Plan B) at the discretion of the student's supervisory committee. Plan A and Plan B MS candidates must present a colloquium to the department on the research topic during the time the thesis or research report is being written. The department also accepts Plan C, which has no research component. For Plan C, the student must complete 33 credits of graduate-level classwork, the composition of which shall include the required courses listed above. In addition, the student must present a seminar and a paper to his or her supervisory committee on a topic related to educational or managerial aspects of physics graduate education, which is chosen by his or her supervisory committee.

Master of Science (Upper Atmospheric Physics Specialization). The department offers a specialization in Upper Atmospheric Physics for MS students. This degree is a Plan A MS. In consultation with his or her advisor, the student selects a minimum of 18 credits of classwork from the following courses: PHYX 4600, 6240, 6310, 6320, 6330, 6340, 7210, 7500; 3 to 6 additional credits may be chosen from courses in electrical engineering, computer science, mathematics, and biometeorology. The student may gain from 6 to 12 credits by research, to be written up as a thesis that must be defended orally. In addition, the student must present a colloquium on the topic of his or her research.

Doctor of Philosophy. In addition to the general requirements, a total of nine courses (27 credits) are required for all PhD students. The required courses are: PHYX 5340, 5350, 6010, 6110, 6210, and 6410; one State of Matter course; and two courses in Advanced Topics. The State of Matter requirement can be fulfilled by taking any one of PHYX 6330, 6530, or 6930. These courses must be completed no more than one year after PhD qualification. Each student is required to pass PHYX 5800 (Physics Colloquium) for four consecutive semesters, beginning with the first semester after matriculation. The student must also take an oral candidacy examination, consisting of a presentation made by the student, then followed by questions from departmental faculty. The presentation and questions will be based upon a research topic set by the student's supervisory committee. The candidacy oral examination will normally occur no later than the fifth semester after the student begins graduate coursework. The student will have at least two months to prepare for the examination.

The student must also complete a research dissertation and give an oral defense of the dissertation. Furthermore, the PhD candidate is expected to give two colloquia to the department. The first of these will normally be given at the time of submission of the research proposal, with the other given at the time the dissertation is completed.

Research

Space Science. The Physics Department is active in the field of atmospheric and space science, in close association with the interdisciplinary Center for Atmospheric and Space Sciences and the Space Dynamics Laboratory. Atmospheric and space science involves many areas of physics, in addition to such disciplines as engineering, chemistry, and meteorology. At USU, these groups enjoy a strong cooperative relationship and, as a result, the atmospheric and space science program has flourished for many years. Once the departmental requirements have been met, students may select courses from the offerings of the associated departments suited for their particular interests and needs while they gain research experience on challenging problems in atmospheric and space science. Opportunities are available for students in both experimental and theoretical projects. These include participation in instrument development and data analysis related to rocket, satellite, and space shuttle projects and projects in experimental design and data analysis related to incoherent-scatter and coherent radars, ground-based magnetometer, and ground-based optical instruments including a LIDAR system. Opportunities also exist in theoretical modeling of physical processes occurring in both the neutral atmosphere and in the plasma in the solar-terrestrial environment.

Plasma Theory and Confinement. Research in the field of magnetic confinement fusion at Utah State University includes the theoretical development and experimental realization of minimum-energy confinement configurations possessing substantial electric fields. These configurations hold promise as neutron and energy sources and are being developed as a collaborative effort between Dr. Farrell Edwards and Dr. Eric Held. In addition, Dr. Held is involved in developing improved hybrid fluid/kinetic models for terrestrial and astrophysical plasmas. This work provides theoretical support for next-step fusion experiments such as the International Thermonuclear Experimental Reactor (ITER).

Surface Physics. The surface physics group has an active experimental research program studying the structure, growth, dynamics, electronic properties, and optical properties of surfaces, interfaces, and adsorbed layers. The group has expertise in the interactions of electrons, ions, and photons with materials. Experimental techniques used within the group include atomic force microscopy (AFM), Auger electron spectroscopy (AES), infrared spectroscopy, ion scattering spectroscopy, ion implantation, low-energy electron diffraction (LEED), photoemission spectroscopy, scanning electron microscopy (SEM), scanning tunneling microscopy (STM), secondary ion mass spectroscopy (SIMS), thermal deflection spectroscopy, ultrafast femtosecond laser spectroscopy, vapor pressure adsorption isotherms, and x-ray diffraction. This interdisciplinary research brings together the fields of solid-state physics, surface physics and chemistry, optics, physical chemistry, and electrochemistry through active collaborations between Physics, Chemistry and Biochemistry, Mechanical and Aerospace Engineering, and other departments. It includes both basic and applied research.

Physics of Quantum Devices. The rapid advance of technology has made quantum physics an indispensable foundation of the nanoscale devices. The Physics Department is positioned to explore this new field with two complementary research themes. The first theme is to study the growth of novel electronic/photonic materials involving group III-V elements using a commericial, state-of-the-art molecular beam epitaxy machine. Also, novel semiconductor quantum nanostructures are studied using an *in-situ* scanning tunneling microscope directly attached to the machine. The second theme is to use the most advanced surface science techniques to fabricate nanoscale structures on semiconductor surfaces. The interdisciplinary nature of this field provides a stimulating research environment for faculty and students with backgrounds in physics, electrical engineering, material sciences, and chemistry.

Theoretical Physics. The department maintains an active research program in theoretical physics via its Field Theory Group. The principal focus of this group is on unified field theories, gravitational theory, classical and quantum field theory, and geometric methods in mathematical physics. Current research projects include: conformal and scale invariant gravity theories and unified field theories, Weyl-geometric quantization, exact solutions in Gauss-Bonnet extended gravity, classical and quantum dynamics of the gravitational field, symmetries and conservation laws in relativistic field theories, Lagrangian and Hamiltonian formulation of field theory, and application of geometrical methods in physics. Weekly seminars and ongoing collaborations with members of the USU Mathematics and Statistics Department and the University of Utah Physics Department provide an active research environment that allows for substantial interaction between students and faculty.

Physics Education. The USU Physics Department is engaged in the study of how to improve the teaching and learning of physics. The program currently emphasizes introductory and general education courses and involves development of hands-on, inquiry-based curricula for lecture and laboratory, development of associated laboratory and multimedia equipment and modules, preparation of new texts and workbooks, sponsorship of undergraduate research, and outreach to the pre-college community.

Complex Materials and Dynamics. Current work at USU in the interdisciplinary area of complex systems includes theoretical and experimental studies of the physical properties of granular materials, liquid flow in fractured media, and development of new data analysis techniques for uncovering evidence for determinism and computation in biological systems.

Financial Assistance

Financial assistance in the form of teaching assistantships and fellowships is awarded by the department. Research assistantships are available from research groups or individuals. Some support for teaching laboratory sections or grading papers is available. To be eligible for a teaching assistantship (TA), a student must successfully complete a graduate TA workshop. Nonnative English-speaking students must pass a test of spoken English (or submit a satisfactory TSE score) administered by the Intensive English Language Institute before being admitted to the TA workshop. The MS specialization in Upper Atmospheric Physics is a Western Regional Graduate Program (see page 89).

Career Opportunities

Master's degree holders in physics are generally employed by industrial or government laboratories as either physicists or engineers. Some are hired as teachers by high schools and by two-year colleges. Holders of the PhD in physics will generally be hired as research and development physicists by industrial or government laboratories and as professors in universities (though usually only following an appointment as a postdoctoral fellow for one to three years).

Additional Information

Regularly updated information about Physics Department activities and programs may be obtained via the Web at: **http://www.physics.usu.edu/**.

Physics Faculty

Professors

J. R. Dennison, surface physics
W. Farrell Edwards, electromagnetic and plasma theory
Bela G. Fejer, space plasma physics
David Peak, nonlinear dynamics, complex materials
W. John Raitt, space plasma physics
Robert W. Schunk, space plasma physics
Jan J. Sojka, atmospheric and space physics
Charles G. Torre, mathematical physics and general relativity
Vincent B. Wickwar, atmospheric and space physics

Research Professors

F. Tom Berkey, atmospheric and space physics
Kent L. Miller, atmospheric physics
Thomas D. Wilkerson, atmospheric and space physics

Adjunct Professors

Stephen E. Bialkowski, nonlinear optics and laser spectroscopy
Yeaton H. Clifton, mathematical physics
Leonard F. Hall, structure forming systems
Allen Q. Howard, electromagnetic theory
R. Gilbert Moore, space physics
David Rees, atmospheric physics
Ray W. Russell, astronomy
Neal D. Shinn, surface interface physics
John R. Tucker, device physics and super conductivity

Professors Emeriti

Wilford N. Hansen, reflection spectroscopy, surface physics
Eastman N. Hatch, nuclear physics
Don L. Lind, space physics
V. Gordon Lind, medium energy nuclear physics
William R. Pendleton, Jr., atomic and molecular physics
John K. Wood, spectroscopy

Associate Professors

D. Mark Riffe, surface physics

Tsung-Cheng Shen, surface physics, nanotechnology

Michael J. Taylor, atmospheric and space physics

James T. Wheeler, mathematical physics and general relativity

Research Associate Professors

Abdallah R. Barakat, space plasma physics

Howard G. Demars, space physics

J. Steven Hansen, image processing

Lie Zhu, space physics

Adjunct Associate Professors

K. S. Balasubramanian, solar physics

I. Lee Davis, condensed matter physics

Hugo deGaris, artificial intelligence

James S. Dyer, space contamination and outgassing

Ti-Ze Ma, space plasma physics

Jill A. Marshall, physics education

Joseph W. Moody, astrophysics

David J. Vieira, nuclear physics

Vladimir Zavyalov, condensed matter physics

Associate Professor Emeritus

Robert E. McAdams, nuclear physics

Assistant Professors

Eric D. Held, plasma physics

Haeyeon Yang, surface physics, nanotechnology

Adjunct Assistant Professors

Jeremy R. King, astrophysics

Greg M. Swain, surface chemistry

Lecturer

Tonya B. Caldwell, physics education

Course Descriptions

Physics (PHYX), pages 458-461

Plants, Soils, and Biometeorology

Department Head: Larry A. Rupp
Location: Agricultural Science 322C
Phone: (435) 797-2233
FAX: (435) 797-3376
E-mail: larry.rupp@usu.edu
WWW: http://www.psb.usu.edu

Undergraduate Advisor: M. Cathryn Myers-Roche, Agricultural Science 322, (435) 797-5560, cmyers@mendel.usu.edu

Undergraduate Off-Campus Advisor: Donna B. Minch, Farmington, (801) 451-4604, minch@sisna.com

Graduate Program Coordinator: Janis L. Boettinger, Agricultural Science 354, (435) 797-4026, jlboett@cc.usu.edu

Degrees Offered: Bachelor of Science (BS) and Bachelor of Arts (BA) in Crop Science, Horticulture, Environmental Soil/Water Science; Master of Science (MS), and Doctor of Philosophy (PhD) in Biometeorology, Plant Science, Soil Science, and Ecology; Master of Professional Studies in Horticulture (MPSH)

Undergraduate emphases: *Crop Science BS, BA*—Agronomy, Research/Biotechnology; *Horticulture BS, BA*—Ornamental Horticulture, Landscape Maintenance and Construction, Turfgrass Management, Business, Science; *Environmental Soil/Water Science BS, BA*—Soil, Water, Plant

Graduate specializations: *Biometeorology MS, PhD*—Agricultural Meteorology, Climatology, Micrometeorology, Remote Sensing, Turbulence in Plant Canopies; *Plant Science MS, PhD*—Crop Physiology, Crop Production and Management, Mollecular Biology, Plant Breeding and Cytology, Plant Biotechnology and Tissue Culture, Plant Nutrition, Space Biology, Weed Science; *Soil Science MS, PhD*—Molecular Biology, Soil and Water Chemistry, Soil Biochemistry and Ecology, Soil Conservation Systems, Soil Fertility and Plant Nutrition, Soil Physics, Soil-Plant-Water Relations, Soil Taxonomy and Genesis, Soils and Irrigation; *Master of Professional Studies in Horticulture (MPSH)*—Water Efficient Landscaping

Certificate and Associate Degree Program:
Ornamental Horticulture

Undergraduate Programs

Objectives

The departmental curricula emphasize understanding the physical, chemical, and biological mechanisms that operate in the continuum of the soil, plants, and the atmosphere; and how they impact management of a wide range of agricultural and natural systems.

The undergraduate teaching program facilitates the acquisition and application of knowledge, understanding, and skills by students within their chosen field of study. The program also prepares students to develop lifelong learning skills, understand and appreciate diversity, be productive citizens of the world, and be professionals in their vocations.

The department also provides training of undergraduates for graduate school and maintains a strong graduate program in biometeorology, plant science, and soil science. The research that underlies the graduate program is conducted in biometeorology (micro- and meso-scale), crop biotechnology, crop ecology, crop physiology, crop science, horticulture (general and ornamental), plant breeding, soil microbiology, pedology, soil chemistry, soil physics, soil fertility, environmental soil and water science, and arid landscaping.

A major effort is directed at extending research and teaching programs to all citizens of the State of Utah.

Departmental Facilities

To support these objectives, departmental facilities include well-equipped laboratories and greenhouses on campus. The University has significant acreage for field research at strategic locations throughout the state. In addition, the University is developing a botanical garden, which will offer opportunities to a broad spectra of clientele. The department maintains state-of-the-art analytical equipment for the measurement of critical soil, plant, and climatic variables.

Requirements

Departmental Admission Requirements. Persons meeting the admission requirements for the University (see pages 15-18) are admitted to the Department of Plants, Soils, and Biometeorology by listing the department major code on the University admission application form. A change of major form is used when students in good standing wish to transfer from another department to the Department of Plants, Soils, and Biometeorology.

ARCPACS Certification. Students who meet specific requirements are eligible, after five years of work experience, for professional certification as an Agronomist, Crop Scientist, Crop Specialist, Horticulturist, Soil Scientist, Soil Specialist, Soil Classifier, or Weed Scientist through the American Registry of Certified Professionals in Agronomy, Crops, and Soils (ARCPACS). General information about ARCPACS certifications can be found at **http://www.agronomy.org/certification**. Students interested in becoming certified should inform their advisor of their intent.

Applied Ornamental Horticulture Certificates and AAS Degree. This program provides practical training in greenhouse and nursery management, turf production, floral design, and maintenance of home and commercial grounds. Coursework encompasses pest control, plant identification, construction of landscapes, small business management, and the operation and maintenance of equipment, including small engines. As an integral part of their training, students are required to complete an internship in the industry. Students may work toward a **one-year certificate** or an **Associate of Applied Science Degree.**

Bachelor of Science Degree. The department offers the Bachelor of Science Degree in three areas: (1) **Crop Science,** which deals with agronomic (commonly called field) crops, such as forages, grains, corn, pasture, etc.; (2) **Horticulture**, which deals with tree fruits, berries, vine fruits, vegetables, and ornamental plants (**ornamental** includes all aspects of floriculture and landscape plant production and use); and (3) **Environmental Soil/Water Science**, which deals with soil and water in relation to plant growth and environmental quality. In all three majors, there are science-oriented emphases intended to prepare students for research or professional studies, and degree emphases that emphasize a practical, applied approach to application of information. All courses used to fill major requirements must be taken on an *A-B-C-D-F* basis. A minimum 2.5 GPA is required for courses used for the major. Transfer students are required to take at least 18 credits of major subject courses in residence at USU. **A minor** may be earned in Agronomy, Crop Biotechnology, Horticulture, Ornamental Horticulture, and Soil Science. A minimum of 16 approved credits are required (see lists below). All courses must be taken on an *A-B-C-D-F* basis and passed with a grade of *C-* or better. For information about receiving a Bachelor of Arts degree, consult the departmental undergraduate advisor.

The course requirements for the **Crop Science Major** are designed to prepare students for a career related to the production of agronomic crops. These courses allow students to function well in a rapidly changing technological environment and to acquire new skills and understanding as their career evolves. Each of the emphases within this major has been designed to allow students the flexibility to add courses or a minor to meet their own goals. The **Agronomy Emphasis** is designed for students interested in learning more about the applied aspects of crop production. Some courses emphasize production techniques and systems, while others provide the student with an understanding of the principles underlying crop production. The **Research/Biotechnology Emphasis** is designed for students who wish to participate in the development of plant-oriented technologies at any level of employment, and for those who intend to pursue a career in private or public research requiring graduate degrees. Courses provide the fundamental tools for a twenty-first century career in agriculture.

The **Horticulture Major** prepares students for production of fruits, vegetables, turf, or ornamentals and for landscape construction and maintenance. Course topics include biology, chemistry, and control of insects, diseases, and weeds. The **Ornamental Horticulture Emphasis** adds courses in production management techniques, such as pruning, spraying, and landscaping (materials, design, and maintenance); and greenhouse management. In the **Landscape Maintenance and Construction Emphasis**, students learn design, construction, and maintenance through a joint program with the Landscape Architecture and Environmental Planning Department. In the **Turfgrass Management Emphasis**, students complete courses in turfgrass management to prepare them for careers in golf course, park, athletic field, and landscaping management. The **Science Emphasis** prepares students for graduate study and for employment in technical occupations. The **Business Emphasis** joins courses necessary for a minor in Business with those necessary for obtaining expertise in horticulture.

The **Environmental Soil/Water Science Major** is intended to provide each student with a fundamental understanding of the basic sciences and mathematics, as well as a strong background in both soil and water sciences. Preparatory requirements include chemistry, physics, mathematics, biology, geology, and statistics. The core courses for Environmental Soil/Water Science emphasize the interactive soil/water processes in the soil's plant-rooting zone—from the microscopic to the landscape perspective. From this base, each student can design his or her own program of specialization in one of the many aspects of soil science, water science, or the integration of both soil and water sciences. Students may choose complementary classes in the **Soil Emphasis**, **Water Emphasis**, or **Plant Emphasis** in preparation for a variety of career opportunities. The Environmental Soil/Water Science Major is complementary to existing undergraduate programs at Utah State University in Geology, Environmental Studies, Watershed and Earth Systems, and Environmental Engineering.

Course Requirements

Crop Science Major

Agronomy Emphasis. Students must complete the following courses: BIOL 1210, 1220, 4400, CHEM 1110, 1120, 1130, ECON 1500, MATH 1050, PHYX 1200, PSB 1050, 4890 (two semesters), SOIL 3000. In addition, students must select at least 36 credits from the following crop-related courses, including at least 9 credits selected from pest management courses identified with an asterisk (*): BIOL 3200, 4410, 4500*, 5410*, FRWS 5100*, PLSC 2650, 3500, 3700, 3800, 4280, 4300, 4320, 4600, 5200, 5210, 5550*, 5700, 5750, PSB 4250, 5200. Students must also select at least 11 credits from the following soils-related courses: SOIL 4000, 4700, 5050, 5130, 5310, 5320, 5550, 5560, 5650.

Research/Biotechnology Emphasis. Students must complete the following courses: BIOL 1210, 1220, 3200, 4400, CHEM 1210, 1220, 1230, 1240, 2310, 2320, 2330, 2340, 3700, 3710, ECON 1500, MATH 1050, 1060, PHYX 1200, PLSC 5200, 5210, 5750, PSB 1050, 4890 (two semesters), SOIL 3000, 5550. In addition, students must select at least 18 credits from the following crop-related courses: PLSC 2650, 3700, 4280, 4300, 4320, 4600, 5550, 5700, PSB 5160, 5240, 5260, SOIL 5560. The following courses are also recommended: BIOL 4200, 4410, 4500, 5410, MATH 1210, PHYX 2110, PLSC 4300, 5440, 5450.

ARCPACS Certification. For general information, students should refer to the American Society of Agronomy website at:
http://www.agronomy.org *or*
http://www.agronomy.org/certification

For specific course information, contact the departmental undergraduate advisor.

Horticulture Major

Core Courses. BIS 1400, CHEM 1110 or 1210, FRWS 2200, MATH 1050, PLSC 2250 (or PSB 4250), 2650, PSB 1050, 4890 (two semesters), SOIL 3000, and one departmental elective.

Ornamental Emphasis. In addition to the Core courses, select 36 credits from the following. Those marked with an asterisk (*) are required. ASTE 3080, BIOL 1210*, 1220*, 3200, PLSC 2600*, 2610*, 2620*, 3050, 3300, 3400, 3700, 3800, 4400*, 4500*, SOIL 5550*. Select two courses from the following: BIOL 4500, 5410, FRWS 5100, PLSC 5550. Select two of the following courses: BIOL 4400, 4410, CHEM 1120, 1130, PLSC 3500, 5200, 5210.

Landscape Maintenance and Construction Emphasis. In addition to the Core courses, students must complete all of the following: BIOL 1210, LAEP 1200, 2600, 3500, 3610, PLSC 2200, 2600, 2620, 3400, 3500, 3800, 4400 or 4500, 5550, SOIL 4700. Suggested electives include: ASTE 3200, PLSC 2100, 2610, 3700, 4800, 5200, SOIL 5550.

Turfgrass Management Emphasis. In addition to the Core courses, students must complete all of the following: BIOL 1210, 1220, 3200, PLSC 2620, 3400, 3800, 4400, 4500, 4800. In addition, students must complete two horticulture courses, two science courses, and two business courses, selected from those listed on the *Horticulture Major Requirement Sheet*, which is available from the department.

Business Emphasis. In addition to the Core courses, select 24 credits from the following. Those marked with an asterisk (*) are required. BIOL 1210, PLSC 2200*, 2600, 2620, 3050, 3300, 3400, 3500*, 3700, 3800, 4400*, 4500*, 5200, 5210, 5550*, SOIL 4700, 5550. The following courses are required for a **Business Minor:** ACCT 2010, BA 3460, 3500, ECON 2010, MHR 2990 or BIS 3100, MHR 3110.

Science Emphasis. In addition to the Core courses, select 41 credits from the following. Those marked with an asterisk (*) are required. BIOL 1210*, 1220*, 2220, 3200, 4400, 4410, 5400, CHEM 1120, 1210, 1220, 1230, 1240, 2310, 2320, 3700, 3710, MATH 1060, 1100*, PHYX 1200, PLSC 3700, 4400*, 4500*, any ornamental horticulture class*, PLSC 5200*, 5210, 5760, SOIL 5550*, Stat 3000. Select one of the following: BIOL 4500, 5410, FRWS 5100, PLSC 5550.

Environmental Soil/Water Science Major

Core Courses. BIOL 1210, 1220; CHEM 1110, 1120, 1130, *or* CHEM 1210, 1220, 1230, 1240, 2300; FRWS 2200 or BIOL 2220; GEOL 1150; MATH 1050, 1060, 1210, *or* MATH 1210, 1220; PHYX 2110, 2120, *or* PHYX 2210, 2220; Stat 2000 or 3000.

Professional Core Courses. SOIL 3000, 5050, 5130; SOIL 5310 or 5550 (SOIL 5550 is required for the plant emphasis); SOIL 4600, 5560, 5650, 5750, PSB 4890 (two semesters). **Emphases:** Students must select 12 credits from one or a combination of the following emphases:

Soil Emphasis. AWER 4750, 4930, 5930; BMET 5250; CEE 5190; CHEM 3600; FRWS 5750; GEOL 3500, 3550, 3600, 5410, 5600, 5630; PSB 5200; SOIL 3100, 4000, 5310, 5320, 5350, 5550.

Water Emphasis. ASTE 5260; AWER 3700, 4500, 4510, 4530, 5330, 5660; BIE 5010, 5110, 5150; BMET 4300, 5250, 5500, 5700; CEE 3430; CHEM 3600; GEOL 5150, 5510, 5520; PLSC 5200, 5210; SOIL 4000, 4700.

Plant Emphasis. BIOL 2410, 3400, 4400, 4410, 5400; BMET 5500; FRWS 3220, 3250, 3600, 3700, 3710, 4450; PLSC 2600 and 2610, or 2620; PLSC 2100, 3400, 3800, 4280, 4300, 4320, 4400, 4500, 5200, 5210, 5430, 5550, 5760; SOIL 4700.

Applied Ornamental Horticulture Certificate and AAS Degree

One-Year Certificate (27 credits required). PLSC 2600 and 2620 are required; 18.5-20 additional PLSC credits must be completed from applied core courses emphasizing floriculture or landscape horticulture; and 3-5 credits from approved electives.

Associate of Applied Science degree (64 credits required). Students must complete all applied core courses; 11-19 credits of approved electives; and 14-16 credits of University Studies, including ENGL 1010 and 2010; 5-7 credits Breadth Social Sciences (BSS)/Breadth Humanities (BHU) courses; 3-5 credits Breadth Life Sciences (BLS)/Breadth Physical Sciences (BPS) courses.

Applied Core Courses. BIS 1400, PLSC 2200, 2250, 2600, 2610, 2620, 2650, 3050, 3300, 3400, 3700, 3800, PSB 1050.

Approved Electives. Choose any courses that are part of a BS degree in horticulture or PLSC 2900, 3010, 3020 (11-19 credits required).

Minors

Crop Biotechnology Minor (16 credits required). The following courses are required. PLSC 3700, 5750. Select the balance of credits from the following courses. At least one of the production courses, marked with an asterisk, (*) is required. PLSC 3500, 4280*, 4300*, 4320*, 4400*, 4500*, 5200, 5550, 5700, PSB 5160, 5240, 5260.

Agronomy Minor (16 credits required). A minimum of 6 credits of Soil Science courses must be taken, including SOIL 3000. A minimum of 6 credits of Plant Science courses must be taken, including at least two of the following three courses: PLSC 4280, 4300, 4320. Select the balance of credits from the following courses: SOIL 4000, 4700, 5130, 5310, 5550, 5560, 5650, PLSC 2200, 3800, 4400, 5200, 5550, 5700.

Soil Science Minor (16 credits required). The following course is required: SOIL 3000. Select 12 credits from the following courses: SOIL 4000, 4700, 5050, 5130, 5310, 5350, 5550, 5560, 5650, 5750.

Ornamental Horticulture Minor (16 credits required). The following courses are required: SOIL 2000, PLSC 2200. Select the balance of credits from the following courses: PLSC 2100, 2600, 2610, 3050, 3300, 3400, 3700, 3800, 4400, 4500.

Horticulture Minor (16 credits required). SOIL 2000 is required. Select 6 credits from the following courses: PLSC 2100, 2200, 4400, 4500, one ornamental horticulture course. Select the remaining credits from the following: PLSC 2650, 3050, 3300, 3800, SOIL 3000.

Additional Information

For more information about Bachelor of Science requirements and the sequence in which courses should be taken, see major requirement sheets available from the Plants, Soils, and Biometeorology Department.

Graduate Programs

Admission Requirements

See general admission requirements, pages 90-91. Departmental admission committees and potential graduate student advisors (major professors) consider previous work experience, undergraduate and graduate records and curriculum, and formal recommendations in their decisions concerning acceptance of applicants. Students without an undergraduate or graduate degree in plants, soils, biometeorology, or a closely related field may be required to complete selected undergraduate courses prior to admission as fully matriculated graduate students in the Plants, Soils, and

Biometeorology Department. Qualified applicants are occasionally denied admission because faculty members in the applicant's area of interest do not have the time or funds to advise additional students. The serious applicant is encouraged to discuss his or her goals with appropriate members of the graduate faculty prior to preparing an application.

Graduate student candidates must have scores on the verbal and quantitative portions of the Graduate Record Examination (GRE) at or above the 40th percentile. TOEFL scores of 550 or higher are required for candidates from abroad. International students with a prior degree from an English-speaking university are exempted from the TOEFL exam.

Degree Programs and Specializations

The Master of Science and Doctor of Philosophy degrees are offered as follows: (1) **Plant Science** with specializations in crop physiology, crop production and management, molecular biology, plant breeding and cytology, plant biotechnology and tissue culture, plant nutrition, space biology, and weed science; (2) **Soil Science** with specializations in molecular biology (interdepartmental program), soil and water chemistry, soil biochemistry and ecology, soil conservation systems, soil fertility and plant nutrition, soil physics, soil-plant-water relations, soil taxonomy and genesis, and soils and irrigation; (3) **Biometeorology** with specializations in agricultural meteorology, climatology, micrometeorology, remote sensing, and turbulence in plant canopies; and (4) **Ecology**. A **Master of Professional Studies in Horticulture (MPSH)** is also offered.

Course Requirements

Course requirements leading to MS or PhD degrees are developed jointly by the student and the student's advisory committee. Course selections reflect areas of specialization. There are, however, specific departmental requirements regarding physical sciences, biological sciences, and mathematics courses, which differ depending on the area of specialization.

Research

Research projects vary over time, depending on funding and other factors. Students are encouraged to visit the home page websites of the graduate faculty to determine research interests and lists of recent publications. Some of the research interests in the department include (1) the control of diseases, nematodes, weeds, and other hazards to fruit, vegetable, ornamental, and field crops; (2) physiological and genetic improvement of fruit, vegetable, ornamental, and field crops (breeding and biotechnology); (3) the evolution, genetic regulation, and utilization of apomixis and other developmental phenomena of higher plants; (4) management of agronomic and horticultural production systems; (5) horticultural landscape water management; (6) soil formation and landscape evolution; (7) soil, plant, water, and nutrient relationships; (8) management of saline and sodic soils; (9) alternative land uses; (10) improved management of animal wastes and biosolids; (11) management of soil microbial processes; (12) drainage and irrigation systems; (13) adaptations to weather and weather modification; (14) analyses and modification of large-scale surface evaporation from atmospheric boundary layer measurements; (15) spatial and temporal properties of sun flecks in plant canopies; and (16) spatial variation in surface fluxes of heat and water vapor in semiarid regions.

Financial Assistance and Assistantships

The financial awards provided by the School of Graduate Studies are listed on pages 89-90 of this catalog. The Department of Plants, Soils, and Biometeorology does not have a formal application form for financial assistance. Most monies used to assist students in the department come from research grants controlled by individual faculty members. Negotiations for financial assistance (research assistantships or part-time employment) are made between faculty members and students. The department provides a few part-time teaching assistantships (a semester at a time). Graduate teaching assistants are responsible to their major professor and to the instructor whom they assist. The MS and PhD in Biometeorology are Western Regional Graduate Programs (see page 89).

Career Opportunities

A broad range of career opportunities exists for students completing the MS or PhD degree from the Department of Plants, Soils, and Biometeorology. Graduate students specializing in the plant sciences may expect to find employment as consulting scientists, or in the private sector as plant breeders, weed scientists, etc. Graduate students specializing in the soil sciences may expect to find employment as soil scientists with government agencies or in the private sector, where they may pursue careers in environmental consulting, fertilizer retail, irrigation system design, waste management, mineland reclamation, or related environmental or agricultural pursuits. Graduate students specializing in biometeorology may expect to find employment with government agencies, as consulting scientists, or with the private sector. Graduate students specializing in ecology may expect to find employment as research scientists, as consulting ecologists, or with environmental agencies. Graduate students completing the PhD may also find career opportunities in academia.

Additional Information and Updates

Additional information and updates concerning graduate faculty and graduate student opportunities can be obtained from the web at: **http://www.psb.usu.edu**.

Plants, Soils, and Biometeorology Faculty

Professors

Bruce G. Bugbee, crop physiology
John G. Carman, plant reproduction and development
Steven A. Dewey, weed science
Lynn M. Dudley, soil physical chemistry
John O. Evans, weed science
Lawrence E. Hipps, biometeorology
H. Paul Rasmussen, horticulture
V. Philip Rasmussen, sustainable agriculture
Larry A. Rupp, ornamental horticulture
Schuyler D. Seeley, pomology
Ralph E. Whitesides, agronomy

Research Professor

Stanford A. Young, seed production

Adjunct Professors
Michael C. Amacher, soil chemistry
Gail E. Bingham, micrometeorology
N. Jerry Chatterton, forage/range physiology/biochemistry
Wilford R. Gardner, soil physics
Henry F. Mayland, soil science
Charles W. Robbins, soil science
Edward J. Souza, plant breeding and genetics
Dale R. Westermann, soil science
Raymond M. Wheeler, plant physiology
James L. Wright, soil science

Professors Emeriti
Rulon S. Albrechtsen, plant breeding
Keith R. Allred, forage physiology
J. LaMar Anderson, pomology
Gaylen L. Ashcroft, biometeorology
William F. Campbell, crop stress physiology
Paul D. Christensen, soil science
Wade G. Dewey, plant breeding
Alvin R. Hamson, horticulture
R. John Hanks, soil physics
Anthony H. Hatch, horticulture
David W. James, soil fertility
Donald T. Jensen, climatology
Jerome J. Jurinak, soil chemistry
R. Paul Larsen, horticulture
DeVere McAllister, plant breeding
Frank B. Salisbury, plant physiology
John J. Skujins, soil microbiology
R. L. Smith, soil science
Alvin R. Southard, soil classification
James H. Thomas, international agronomy
H. Grant Vest, Jr., vegetable breeding
David R. Walker, pomology

Associate Professors
Janis L. Boettinger, soil genesis, classification and mineralogy
Daniel T. Drost, vegetable production
Robert R. Gillies, biometeorology
Paul R. Grossl, biogeochemist
David J. Hole, cereal breeding
Roger K. Kjelgren, urban horticulture
Jennifer W. MacAdam, forage production and physiology
Jeanette M. Norton, soil microbiology

Research Associate Professor
Esmaiel Malek, biometeorology

Adjunct Associate Professors
Ari M. Ferro, phytoremediation
Kevin B. Jensen, forage breeding
John M. Stark, microbial ecology and biogeochemistry
Helga Van Miegroet, forest soils

Assistant Professors
David G. Chandler, surface hydrology
Thomas C. Griggs, agronomy
Paul G. Johnson, turfgrass science
Kelly L. Kopp, water conservation/turfgrass science
Dominique J. P. Roche, small grains, breeding/genetics
Yajun Wu, plant stress physiology, cell wall proteins

Research Assistant Professors
Raymond L. Cartee, soils and irrigation
Scott B. Jones, soil physics

Adjunct Assistant Professors
Jayne Belnap, biological soil crusts
Richard T. Lamar, environmental microbiology
Steven R. Larson, research geneticist
Michael Peel, plant breeding
Blair L. Waldron, research geneticist

Senior Lecturer
D. Craig Aston, ornamental horticulture

Lecturer
M. Cathryn Myers-Roche

Research Associates
Susan Buffler, irrigated pasture production
Shyrl M. Clawson, plant breeding
Robert L. Newhall, soil conservation and sustainable agriculture

Director, Utah Botanical Gardens
William A. Varga, ornamental horticulture

Director, Soil Testing Lab
Janice Kotuby-Amacher, soil chemistry

Course Descriptions

Plant Science (PLSC), pages 461-463
Soil Science (SOIL), pages 479-481
Biometeorology (BMET), page 357
Plants, Soils, and Biometeorology (PSB), page 467

Political Science

Department Head: Randy T. Simmons
Location: Main 320A
Phone: (435) 797-1310
FAX: (435) 797-3751
E-mail: rsimmons@hass.usu.edu
WWW: http://websites.usu.edu/politicalscience

Assistant Head and Graduate Program Director:
Peter McNamara, Main 320D, (435) 797-1318, peterm@hass.usu.edu

Undergraduate Advisors:
Political Science: Randy T. Simmons, Main 320C, (435) 797-1310, rsimmons@hass.usu.edu
Political Science Teaching: Peter F. Galderisi, Main 324D, (435) 797-1313, peterg@hass.usu.edu
Law and Constitutional Studies: Anthony A. Peacock, Main 341, (435) 797-1314, apeacock@hass.usu.edu
Certificate in International Relations: Veronica Ward, Main 324E, (435) 797-1319, vward@hass.usu.edu

Degrees offered: Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), and Master of Arts (MA) in Political Science; BS and BA in Law and Constitutional Studies; Administers BA in International Studies; Participates in a pilot program of Master of Social Sciences (MSS), with an emphasis in Public Administration, administered through Continuing Education.

Undergraduate Programs

Objectives

The Department of Political Science offers a flexible program to accomplish the following objectives:

1. to provide students with theoretical and factual understanding of government, politics, and political philosophy, nationally and internationally;

2. to develop students' analytic ability, communication skills, and facility with political research methods;

3. to prepare students for effective participation in civic affairs, careers in government and the teaching of government, and graduate study in political science, law, and other fields related to the public sector; and

4. to further the liberal arts education mission of the University and to enrich the educational experiences of students in all programs of study.

Admission and Prerequisite Requirements

Departmental Admission Requirements. Admission requirements for the Department of Political Science include a minimum 2.0 GPA for Political Science majors and a minimum 3.0 GPA for Law and Constitutional Studies majors. Students in good standing may apply for admission to the department.

Prerequisites. It is assumed that students registered for upper-division political science courses have acquired the basic knowledge and information taught in the lower-division courses required for the major. Anyone who wishes to take an upper-division course, but has not had the appropriate prerequisites, should consult with the instructor before registering. Faculty members reserve the right to drop from upper-division courses students who do not meet these requirements.

Graduation Requirements

Political Science Major. Students must have at least 36 semester credits in the field. These must include POLS 1100; POLS 2100 or 2200; POLS 2350, 3000, and 4990. POLS 4990 is a senior seminar and may be taken as early as the final semester of the junior year. In addition, students must take a minimum of 6 upper-division credits in each of two depth areas (U.S. Government, Comparative Politics, International Relations, or Political Theory). Internship credit does not count toward the depth requirement. A minimum 2.5 GPA in political science courses and a minimum 2.0 overall GPA are required.

Law and Constitutional Studies Major. This is a rigorous program designed for students interested in leadership roles in business, public communications, government, education, or the study or practice of law. Students must have at least 36 credits in political science. These must include POLS 1100, 2350, 3120, 3170, 4120, and 5130, as well as one of POLS 3320, 4130, or 4140. A minimum 3.0 GPA in political science courses and a minimum 3.0 overall GPA are required.

Minor. Students can obtain a minor in political science by completing a total of 18 credits in the field. POLS 1100; POLS 2100 or 2200; and POLS 2350 must be included. The remaining credits must be from upper-division courses.

Teaching Major. This program is intended exclusively for students seeking careers in *secondary* education. Students must have at least 36 credits in political science courses chosen from a list available from the department and in the *Guide to the Undergraduate Program in Secondary Education at USU*, available at the USU Bookstore. A minimum 2.5 GPA in political science courses and a minimum 2.75 overall GPA are required.

Teaching Minor. This minor is designed specifically for students seeking careers in *secondary* education. Students must have at least 18 credits in political science chosen from a list available from the department and in the *Guide to the Undergraduate Program in Secondary Education at USU*, available at the USU Bookstore.

International Studies Major. The Political Science Department administers the International Studies Major. Students enrolled in this major select *either* a **Breadth Option** *or* a **Depth Option**. The **Breadth Option** is intended for students who want to have a broad exposure to international studies. Students must take 24 credits of core and elective international studies courses, complete a departmental minor, complete three years of foreign language study, spend at least eight weeks living in a foreign country or countries, and complete a 3-credit senior thesis or project. The **Depth Option** is intended for students who want to tie their disciplinary skills to an in-depth study of a particular area of the world. This track of the International Studies major would be pursued as a dual major. The student's disciplinary program (first major) must be an approved major at USU other than the International Studies major. Courses may ***not*** be double-counted between the primary major and the International Studies major. Further information about this major is on page 236. For assistance with course selection, program planning, and meeting graduation requirements, contact the Political Science Department (Main 320A, 797-1306).

Certificate in International Relations. Certificates are intensive programs of study similar to majors, but involving courses in more than one academic discipline. Political science, economics, and business, for example, may be combined. The Political Science Department participates in the International Relations certificate program. It is designed for those planning careers in international business or diplomacy. Information on this certificate is available from Veronica Ward, Main 324E, (435) 797-1319.

Internships

The department places approximately 40-45 students in government or related internships each year. Most of these interns work with a member of the Utah delegation to the U.S. Congress in Washington, D.C., a member of the Utah Legislature in Salt Lake City, a political campaign, a state or local administrative agency, or a lobbying group. Students in any major, of at least junior class standing, and having a minimum GPA of 3.0 are eligible to apply.

Pi Sigma Alpha

Pi Sigma Alpha is the national honorary political science society. A member must have at least 15 credits of political science with a minimum 3.0 GPA and a minimum 3.0 GPA overall.

Financial Support

The Political Science Department offers a number of scholarships yearly to students. Contact the College of Humanities, Arts and Social Sciences dean's office for applications (usually available around the first week of January and due back the first week of March) at (435) 797-1195 or visit the college office in Main 338.

Graduate Programs

Departmental Admission Requirements

Applicants must have a BS or BA degree. An undergraduate GPA of 3.0 or better, **or** a GPA of 3.5 or better over the last 90 semester credits of undergraduate coursework is required. Students must have quantitative, verbal, and analytical GRE scores at or above the 50th percentile. Applicants with very high GPAs and other exceptional supporting materials may petition for admission with deficient GRE scores. The graduate admissions committee will review petitions individually.

International students must receive a score of 550 or better on the TOEFL exam.

Due to limited space, acceptance into Political Science graduate programs is not guaranteed, even for students who meet admission requirements. Moreover, all students are expected to perform at high levels throughout their program. Any student receiving a *C* grade or lower for any course at any level **or** a grade point average below 3.0 for a given semester will be placed on academic probation. Receipt of two grades of *C* or lower or a grade point average below 3.0 for two semesters will result in termination from the program. In addition, students must meet the requirements of the School of Graduate Studies. Applicants not meeting minimum requirements may be allowed to correct deficiencies concurrently with graduate coursework.

Applications will be considered throughout the year. However, students who wish to be considered for financial aid outside of the department must submit applications by **March 15** for the coming academic year.

No application will be considered until all required information arrives in the office of the School of Graduate Studies.

Assistantships

The department appoints a number of teaching assistants, each with a $7,000 annual stipend. Appointments are for one year, but are renewable for a second year. Research assistantships and government internships are sometimes available as well. Applications are available from the Political Science Department and are due on March 1.

Course Requirements

Students must choose between two tracks: (1) **Public Choice and Public Policy** or (2) **Comparative and International Change.** Course requirements differ according to the track chosen. All students, however, must take POLS 6010, which is the foundation course for the program.

Public Choice and Public Policy. Students in this track must complete the following courses: POLS 6030 and 6040. In addition, students must complete 3 credits chosen from the following list: POLS 5110, 5130, 5180, and ECON 5500. Students must also take at least one course from the **Comparative and International Change** track.

Comparative and International Change. Students in this track must complete POLS 6220. In addition, students must complete 6 credits chosen from the following list: POLS 5200, 5210, 5230, 5270, 5290, 5350, and 6030. Students must also take at least one course from the **Public Choice and Public Policy** track.

For both tracks, the remaining 15 credits needed for the graduate degree may be comprised of: (1) up to 6 credits of POLS 6910 (subject to approval); (2) up to 3 credits of POLS 6920 (subject to approval); (3) up to 3 credits of approved graduate courses outside of Political Science; and (4) other Political Science graduate courses. No more than 15 semester credits of 5000-5990 coursework may be used for a graduate degree.

Political Science Faculty

Professors

William L. Furlong, Latin America, Central America, democratization, development

Amal Kawar, comparative politics, Middle East, women and politics

Carolyn Rhodes, international relations, comparative politics, European union, trade

Randy T. Simmons, environmental politics and policy, public choice

Adjunct Professors

Larry Boothe, national security policy

Charles E. Kay, environmental policy ecology

James L. Waite, European policy, comparative European government, methodology, public opinion

Professor Emeritus

Stanford Cazier, U.S. government, public law

Associate Professors

Peter F. Galderisi, parties, elections, interest groups, research methods, statistics

David B. Goetze, human cooperation and conflict, ethnic conflict, evolutionary theory

Roberta Q. Herzberg, public choice, health policy, public policy

Jing Huang, Asian political thought, comparative politics, development

Michael S. Lyons, U.S. government, Congress, public policy, elections

Peter McNamara, political theory

Anthony A. Peacock, public law

Veronica Ward, international relations, social choice, global environmental issues, conflict and cooperation

Assistant Professor

Patria D. Julnes, public administration, organization theory, information technology management, quantitative and statistical methods

Lecturers

Jeannie L. Johnson, international relations, the Balkans

Carol L. McNamara, political theory, presidency

Shannon Peterson, international relations, foreign policy

Course Descriptions

Political Science (POLS), pages 463-465

Psychology

Department Head: David M. Stein
Location: Emma Eccles Jones Education 487E
Phone: (435) 797-1460
Department Mailing Address: Department of Psychology, Utah State University, 2810 Old Main Hill, Logan UT 84322-2810
FAX: (435) 797-1448
E-mail: psydept@cc.usu.edu
WWW: http://www.coe.usu.edu/psyc/

Graduate Program Coordinators:
Combined Clinical/Counseling/School PhD: Susan L. Crowley, Education 479, (435) 797-1251, susanc@cc.usu.edu
Research and Evaluation Methodology PhD: Karl R. White, Education 430, (435) 797-3013, karl.white@usu.edu
School Psychology MS: Gretchen A. Gimpel, Education 490, (435) 797-0721, ggimpel@cc.usu.edu
School Counseling MS: Camille J. Odell, Education 434, (435) 797-5576, codell@usu.edu

Undergraduate Program Faculty Coordinator:
Tamara J. Ferguson, Education 499, (435) 797-3272, tjferguson@cc.usu.edu

Undergraduate Advisors:
Karen R. Ranson, Education 475, (435) 797-1456, karen.ranson@usu.edu
Tressa M. Haderlie, Education 477, (435) 797-0097, thaderlie@cc.usu.edu
Pat Preston, Education 477, (435) 797-1456, pat.preston@usu.edu

Degrees offered: Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), and Doctor of Philosophy (PhD) in Psychology

Graduate specializations: *MS*—School Psychology, School Counseling; *PhD*—Combined Clinical/Counseling/School Psychology, Research and Evaluation Methodology

Undergraduate Programs

Objectives

Psychologists endeavor to scientifically understand the thought processes, emotions, and behavior of both humans and animals. Psychologists specialize in diverse areas. Some psychologists seek to better understand the interactions among genetic, biological, social, and psychological determinants of behavior. Other psychologists are concerned with how the body and brain create emotions, memories, and sensory experiences, and how these are perceived and interpreted. Still others are concerned with how we learn observable responses and how we process, store, and retrieve information. Additionally, psychologists focus their careers on the causes, assessment, and/or treatment of emotional and behavioral disorders. Psychologists utilize research methods to understand the causes of behavior, emotion, and thought processes.

The Department of Psychology at USU offers a rich undergraduate program in psychology with the primary objectives being:

1. To provide students with substantive knowledge in the basic discipline of psychology, such as history/systems, basic behavior processes, biological bases of behavior, development, personality, learning and cognition, social influences on individuals, research methods, and psychological disorders and treatment.

2. Teaching students how to critically analyze and solve problems pertaining to human interaction, communication, and relationships.

3. Student mastery of principles relating to the causes of behavior, basic learning processes, and the measurement and analysis of behavior.

4. Training students to use scientific and quantitative methods to better understand and apply social science research.

5. Preparing students to compete successfully for entry into nationally and internationally recognized graduate programs in the social sciences.

6. Preparing majors and minors to compete successfully for postbachelor employment opportunities in private/public education, human services, government, and corporations.

The courses in Psychology and the electives available in related departments allow students to tailor their education to meet specific career goals. Some students who major in psychology may qualify for admission to unique specialty tracks: (1) **the (secondary education) Teaching Major**; (2) **Behavior Analysis Skill Track**; (3) **Interpersonal Relationships Skill Track**; and (4) **Graduate School Preparation Track**. A human services/caseworker training option may also be available to majors.

Students can complete the major or minor in psychology either on-campus (Logan), or through the USU Distance Education system (all required courses and selected electives are offered every 1-2 years) available throughout the State of Utah. The specific requirements for the skill tracks, the Apprenticeship, the on- and off-campus (distance education) options, and for how psychology electives can be used to advance students' career goals can be obtained from the **Psychology Advisement Office, Eccles-Jones Education Building, Room 475, (435) 797-1456**.

Requirements

Departmental Admission Requirements. Students are admitted to the Department of Psychology as Prepsychology majors by meeting the Utah State University admission requirements (see pages 15-18). To be a Psychology major, a student must make written application to the department, after meeting the following prerequisites: (1) completion of at least 40 semester credits with a cumulative GPA of 2.75 or higher; (2) completion of at least 18 credits of the University Studies requirement with a GPA of 2.75

or higher; and (3) completion of PSY 1010, 1100, 1400, and 1410 with a GPA of 3.0 or higher. Application to the department should be made during the semester in which these prerequisites will be completed.

General Undergraduate Psychology Major:
Required Courses (22 credits), plus
Primary Electives (16 credits),
Secondary Electives (3 credits), and
Apprenticeship (6 credits)

Requirements for a psychology major consist of a broad preparation of 22 credits of specified coursework, plus a minimum of 19 credits of approved Psychology elective courses, and 6 credits of an apprenticeship, which allows for integration of coursework knowledge (theory) through application, for a total of 47 credits. At least 20 Psychology credits must be upper-division, 12 of which must be taken at USU. The specific courses required are: PSY 1010, 1100, 1400, 1410, 2800, 3500, 5100, 5330 (22 credits). Primary electives are: PSY 3510, 4210 (choose 3 credits); PSY 3450 or 3460 (choose 3 credits); PSY 3400, 4420/4430 (choose 4 credits); PSY 3110, 3120, 3210, 5200 (choose 6 credits). Secondary electives are: PSY 1210, 2100, 3660, 4230, 4240, 4510, 5020, PSY/PEP 4000, PSY/PEP 5050, PSY/COMD 4790, PSY/SPED 5720 (choose 3 credits). Required Apprenticeship courses are: PSY 5950, 5960 (6 credits). A minor in another area is required. A minimum overall USU GPA of 2.75 is required for graduation, with a minimum GPA of 3.0 in Psychology. Students must receive a grade of *C*- or higher in all psychology courses (USU and transfer) in order to have them counted toward major requirements. (Students desiring licensure for teaching in secondary schools must also meet the requirements of the Secondary Education Department.)

To graduate with a major in psychology, students must meet a minimum end-of-level competency in all of the Psychology courses that they have been required to (or have elected to) take to fulfill the requirements of the psychology major. Students' end-of-level competencies are demonstrated by verifying how much information they have actually retained in given subject areas *later* in their college careers. Currently, students demonstrate their end-of-level competency by completing appropriate area tests within the context of PSY 5950 and 5960. It is recommended that students enroll for PSY 5950 the semester immediately following admission to the psychology major.

Undergraduate Psychology Minor:
Required Courses (10 credits), plus
Elective Courses (8 credits minimum)

For a Psychology Minor, students must complete the following courses (10 credits): PSY 1010, 1100, 1400, 1410. Also, at least 8 credits must be selected from courses listed as required or primary electives for the Psychology Major. The student's grade point average for all psychology courses, USU or transfer, must average 3.0 or above to qualify for credit toward the minor. At least 12 credits of the 18 required credits must be completed at USU. Students must receive a grade of *C*- or higher in all psychology courses (USU and transfer) in order to have them counted toward minor requirements.

Psychology Teaching Major:
Required Psychology Courses (27 credits), plus
Elective Psychology Courses (16 credits)

Requirements for a Teaching Major in Psychology broadly consist of 27 credits of specified psychology coursework and 16 credits of elective psychology coursework, for a total of 43 credits in psychology. Only 16 of these 43 psychology credits may be taken in lower-division courses. The remaining 27 credits must be received in 3000- or 4000-level psychology courses. At least 12 of the upper-division credits must have been earned in courses completed at USU. A minor in another field of study is also required. Prospective teachers must complete 35 credits of the Secondary Teacher Education Program (STEP) in the Department of Secondary Education. Required GPA for psychology courses is 3.0. Students must receive a grade of *C*- or higher in all psychology courses (USU and transfer) in order to have them counted toward major requirements.

Undergraduate Psychology Teaching Minor
Required Psychology Courses (15 credits), plus
Elective Psychology Courses (3 credits)

Students who choose to pursue a psychology teaching minor must complete PSY 1010, 1100, 1400, 1410, 2100, and 3660, for a total of 15 semester credits. At least 12 credits of the 18 required credits must be completed at USU. In addition, they must select at least one 3-credit class from the list of courses required for or serving as primary electives for the psychology major. Required GPA for psychology courses is 3.0. Students must receive a grade of *C*- or higher in all psychology courses (USU and transfer) in order to have them counted toward minor requirements. Finally, they need to fullfill the 35-credit requirement for the Secondary Teacher Education Program (STEP) in the Department of Secondary Education.

Skill Tracks for Undergraduate Majors in Psychology

The following skill tracks can be completed as part of a student's major in Psychology. A skill track represents a cluster of courses that help provide more comprehensive knowledge and practical skill in particular areas. After admission as a major in Psychology, students may apply for admission to a skill track. Completing a skill track requires careful planning, so that skill track courses and all other required and elective courses for the major are fulfilled. Enrollment in a skill track is entirely optional for majors.

Behavior Analysis Skill Track. The following cluster of courses will provide psychology majors with a basic foundation in experimental and applied behavior analysis: PSY 1400, 1410, 3400, 4910, 5720; SPED 5010, 5050; BIOL 3010; and PHIL 4320 or 4900.

Interpersonal Relationships Skill Track. The following cluster of courses will assist psychology majors in systematically developing a broad range of interpersonal relationship skills, such as listening, assertiveness, negotiation, conflict resolution, anger management, etc.: PSY 1210, 3210, 3510, 4210, 4510, 5200; MHR 3710.

Graduate School Preparation Track. The major in Psychology has been designed so that students take classes that will help them compete in applying for graduate school. Students completing the graduate school track need to become actively involved with faculty research, form an association with Psi Chi, and enroll in independent research and readings courses. Students should also take a course covering use of statistical software (e.g., SPSS), offered through FCHD or Sociology. Furthermore, it is recommended that students take at least one upper-division course in statistics from Psychology, FCHD, or Sociology.

Psychology Courses Fulfilling University Studies Requirements

The following Psychology courses may be used to fulfill University Studies requirements, in the areas indicated:

Breadth Social Sciences (BSS): PSY 1010.

Depth Social Sciences (DSS): PSY 3120, 3210, 3400, 3500, 3510, 4210, 4230, 4240, 4420.

Communications Intensive (CI): PSY 4510, 5200, 5950, 5960.

Quantitative Intensive (QI): PSY 2800.

Although these courses may be applied toward fulfilling the University Studies breadth, depth, communications intensive, and quantitative intensive requirements, students must be prepared to complete additional writing or library assignments, as required for University Studies.

Important Contingencies for Psychology Courses

Prerequisites for Psychology courses are *strictly enforced*. The prerequisites are indicated, at the end of course descriptions, within the Psychology course listings (see pages 467-472).

A student must be admitted as a psychology major *or* must complete *at least* 45 semester credits with a GPA of 3.0 or higher prior to taking psychology courses numbered 3000 or above. However, students who have been admitted to the Teacher Education program may take PSY 3660, provided they have met the prerequisites. A student must be admitted as a psychology major *or* must complete *at least* 60 semester credits with a GPA of 3.0 or higher prior to taking psychology courses numbered 4000 or above.

Students desiring to receive credit for courses taken previously at other institutions will need to assure the Undergraduate Advising Office that the substitute class contained the requisite laboratory experience (where applicable).

Students who can complete a baccalaureate degree within seven years of enrollment at USU can qualify for graduation by meeting (1) the General Education/University Studies requirements in effect when they initially enrolled and (2) the major requirements in effect when they officially declared their major, even though there may have been changes in General Education/University Studies and major requirements since that time. Students who have not completed the baccalaureate requirements within seven years of their initial enrollment at USU must have their General Education/University Studies and major requirements evaluated and approved by their department head and dean. However, exceptions to this seven-year policy may be necessary for mandated changes in degree requirements.

Undergraduate psychology coursework (USU or transfer) that is *more than eight years old* may *not* be used toward meeting the specific psychology coursework requirements for a psychology major or psychology minor. However, the Psychology Department Undergraduate Committee may allow revalidation through testing. Testing arrangements may be made by contacting Karen Ranson at karen.ranson@usu.edu.

Graduate Programs

Admission Requirements

Admissions requirements vary somewhat across Psychology graduate programs. However, applications submitted to the School of Graduate Studies must include the following: (1) transcript showing completion of undergraduate course prerequisites, plus any recommended coursework; (2) report of (GRE) test scores from ETS; (3) GPA of at least 3.2, covering the last 60 semester credits; (4) three letters of recommendation; and (5) a statement of professional goals and intent. The department requires a minimum GRE combined (Verbal and Quantitative) score of at least 1,100 for all programs.

The deadline for submitting applications for the Combined Clinical/Counseling/School Psychology PhD program is **January 15**. Applications for the Research and Evaluation Methodology PhD program are reviewed throughout the year. The application deadline for the MS School Psychology program is **March 1**. Applications for the MS program in School Counseling must be submitted by **June 1** during odd-numbered alternate years (e.g., 2003, 2005, etc.). With the exception of the PhD program in Combined Clinical/Counseling/School, applications for programs may be accepted after these dates if openings still exist.

Students are admitted to Psychology master's degree programs, including School Psychology and School Counseling, following completion of a bachelor's degree. Prospective PhD program students can compete for admission to the Combined Clinical/Counseling/School program or the Research and Evaluation Methodology program if they possess either a bachelor's *or* a master's degree.

Prerequisites for Admission to Graduate Programs

Applicants to the Master of Science (MS) and Doctor of Philosophy (PhD) program are advised that they should possess a broad base of knowledge at the undergraduate level in *a substantive subgroup* of the following: general psychology, human development, learning theory, cognition, personality theory research, psychometrics, elementary statistics, history and systems, physiological, sensation and perception, and social psychology. The absolute prerequisites for each graduate program are outlined below, along with a listing of graduate program course requirements for each program.

Psychology MS Programs

School Psychology, NASP-accredited

USU's nationally accredited program in school psychology emphasizes child development issues, assessment and treatment of emotional and behavioral disorders, and traditional psychoeducational assessment and consultation activities appropriate to school settings. The program is approved by the Utah State Office of Education for licensure of school psychologists. Students are required to complete either a research thesis (Graduate School Plan A option), or a major literature review/synthesis paper (Plan B).

Absolute undergraduate course prerequisites for admission to the MS in School Psychology are as follows: (1) *Elementary Statistics*; (2) *Theories/Research in Learning* or *Applied Behavior Analysis*; (3) *Abnormal Psychology*; and (4) *Theories/Research in Personality*.

The MS in School Psychology requires a **minimum of 60 semester credits**. The following courses are required: PSY 6150, 6220, 6270, 6290, 6310, 6330 or 6600, 6340, 6350, 6360, 6380, 6410, 6450, 6460, 6530, 6570, 6660, 6880, 6890, 6950; and PSY 6970 (2-6 credits).

School Counseling

This program has been designed to help students earn an MS degree in psychology, with appropriate coursework for certification as a school counselor. School counselors are commonly employed by public and private elementary and secondary schools to provide educational/vocational guidance and counseling services. The program is approved by the Utah State Office of Education. It is offered via a live, video distance education system (EDNET). This program is not designed to meet the requirements for the Professional Counselor license (mental health).

Absolute undergraduate course prerequisites for admission to the MS in School Counseling are as follows: (1) *Developmental Psychology*; (2) *Abnormal Psychology*; (3) *Theories/Research in Personality*; and (4) *Psychological Statistics (or equivalent)*.

The MS in School Counseling requires **40 total semester credits**. The following courses are required: PSY 6150, 6220, 6240, 6250 (10 credits), 6260, 6290, 6330, 6350, 6370, 6460, 6660.

PhD Programs

Combined and Integrated (C-I) Clinical/Counseling/ School Psychology, (APA-accredited)

This program integrates the theory and practice of psychology common to the disciplines traditionally denoted as clinical, counseling, and school psychology. It subscribes to the scientist-practitioner model, and students completing the program will commonly enter professional practice in VA hospitals, mental health centers, hospitals, clinics, and academic settings. The program provides an excellent balance of research and practitioner skill training. Entering BS students can opt to earn an MS degree in either counseling psychology or school psychology prior to the PhD. A research thesis and dissertation are required of all students. The combined program provides generalized training, along with three areas of specialization. The emphasis areas are designed for students to begin systematically developing a specialty area in line with their future career goals. The three areas of specialization, which mirror faculty interest and expertise, are health psychology/neuropsychology, child clinical (with or without a school psychology emphasis), and rural and minority psychology. The program is also affiliated with the American Indian Support Project, one of the nation's most successful programs for training and mentoring American Indian PhD psychologists.

Complete information on accreditation guidelines and principles is available through the Committee on Accreditation (CoA) at Education Directorate, American Psychological Association, 750 First Street NE, Washington DC 20002-4242, (202) 336-5979, or on the web at:
http://www.apa.org/ed/accreditation/.

Absolute undergraduate prerequisites for admission to the PhD program in Combined Clinical/Counseling/School are as follows: (1) *Elementary Statistics*; (2) *Theories/Research in Learning*; (3) *Abnormal Psychology*; and (4) *Theories/Research in Personality*.

The Combined Clinical/Counseling/School Psychology PhD requires **107 total semester credits**, including the following: (1) *MS counseling psychology degree curriculum:* PSY 6290, 6310, 6320, 6350, 6360, 6570, 6600, 6880, 6970; and (2) *PhD program courses:* PSY 6220, 6510, 6530, 6610; PSY 6650 or 6660; PSY 7100, 7250, 7270, 7350, 7360, 7370, 7670, 7910, 7950, 7970; 6 credits of electives. **Note:** The MS counseling psychology degree is available *only* to students matriculated into the PhD Clinical/Counseling/School program.

Research and Evaluation Methodology (REM)

The department offers a PhD program in research and evaluation methodology. The program is designed to produce specialists in research and evaluation methodology capable of contributing to the knowledge base in psychology and education, and of evaluating programs, products, and processes employed in these two fields. While satisfying the department's general requirements, students may design their programs to become specialists in a variety of areas, such as program evaluation, applied research, psychometrics, statistics, or similar areas. A research thesis and/or dissertation are required of all students.

Absolute undergraduate prerequisites for admission to the PhD program in Research and Evaluation Methodology are as follows: (1) *Elementary Statistics*; (2) *Psychometrics*; and (3) *History and Systems of Psychology*.

The Research and Evaluation Methodology PhD requires a **minimum of 64 total credits** past the MS degree, including the following: (1) **REM MS degree curriculum:** PSY 6010, 6570, 6600, 6660; PSY 6970 (8 credits); (2) **REM PhD degree curriculum:** EDUC 6770; PSY 7020, 7030, 7050, 7060, 7070, 7080, 7090, 7610, 7670, 7700; PSY 7970 (12 credits).

Additional Requirements for Psychology PhD Programs

All PhD candidates must meet the following general core requirements, regardless of specialty emphasis: (1) submission of an article for publication in a recognized journal; (2) presentation of research findings at a regional or national convention or professional meeting; (3) completion of the doctoral dissertation; (4) a comprehensive literature review; (5) completion of the research core; and (6) completion of an apprenticeship or internship. Students in the combined PhD program must also complete a formal case presentation, and compete nationally for admission to an APA-approved, 2,000-hour predoctoral internship. The REM program has an additional requirement of a grant proposal.

Research Opportunities for Students

Departmental faculty are heavily involved in basic and/or applied research. A sampling of the diverse research interests of tenured and tenure-track faculty available to students includes: *Ascione*—prosocial, moral development, domestic violence, relation between cruelty to animals and psychopathology; *Bates*—adolescent problem behavior prevention, community-level prevention, higher education teaching and learning; *Cheney*—behavioral pharmacology, basic operant learning; *Crowley*—anxiety, depression, supervision and training; *DeBerard*—health psychology, behavioral medicine, spinal surgery outcome and technique efficacy; *Domenech Rodriguez*—Latino family dynamics, parent training programs; *Ferguson*—social skills, guilt/shame development, social cognition; *Galliher*—social and dating relationship processes and dymanics in adolescence and rural mental health

service delivery; *Gilbertson*—early intervention and prevention of behavior problems, school psychology; *Gimpel*—ADHD, behavioral disorders of children; *Julnes*—evaluation theory, human service delivery, family; *Lehman*—Web/Internet learning variables and efficacy, educational psychology; *Masters*—exercise and health, health psychology, therapy outcome, religion and health; *Odum*—experimental analysis of behavior, behavior pharmacology; *Osborne*—experimental and applied behavior analysis; *Roberts*—early intervention with families of young children, community-based systems of services; *Schroder*—sexual risk behavior, models of health behavior, stress and coping; *Shahan*—experimental analysis of behavior, drug self-administration, behavior momentum, conditioned reinforcement, behavior economics; *Stein*—addictive behaviors and models, drug and alcohol prevention/treatment; *J. Tschanz*—neuropsychology of Alzheimer's disease and other dimentias; *White*—educational research, hearing loss detection in infancy, and program evaluation.

Graduate Student Financial Assistance

Financial support for students enrolled in terminal MS programs is limited. MS students should meet with their academic advisor for information about possible assistantship opportunities.

PhD students are guaranteed an assistantship for at least their first year. However, for at least the last 15 years, 100 percent of PhD students have continued to enjoy assistantship support beyond their first year, if they desired it. The department has available a number of teaching assistantships. Though these are generally awarded to students matriculated in psychology PhD programs, they are occasionally given to exceptional MS students. Also, faculty in the department and college regularly offer research assistantships to graduate students, as does the Counseling Center and a variety of on- and off-campus facilities (e.g., Center for Persons with Disabilities, Bear River Mental Health Center, Head Start, and Early Head Start). Additionally, first-year psychology PhD students typically compete extremely well for several University Fellowships, which were established to attract top student scholars to USU. Furthermore, the department has some scholarship support specifically available to psychology graduate students (e.g., Walter Borg and Elwin Nielsen scholarships). Finally, in accordance with current School of Graduate Studies policy, PhD students may qualify for full tuition remission for up to 70 credits within their program.

Psychology Faculty

Professors

Frank R. Ascione, developmental

Carl D. Cheney, physiological

Tamara J. Ferguson, social and developmental psychology

Cecilia H. Foxley, counseling, human relations

Juan N. Franco, Vice President for Student Services, counseling and educational psychology

Richard N. Roberts, developmental

Charles L. Salzberg, applied behavior analysis

David M. Stein, clinical psychology

Karl R. White, research and evaluation

Research Professor

Byron R. Burnham, qualitative evaluation methods

Professors Emeriti

Michael R. Bertoch, counseling

Glendon W. Casto, developmental

Keith T. Checketts, school psychology and counseling, research methodology

John R. Cragun, industrial

Marvin G. Fifield, school and counseling

Arden N. Frandsen, educational

J. Grayson Osborne, behavior therapy, child

Richard B. Powers, experimental social

David R. Stone, learning, educational

Sebastian Striefel, clinical child

Associate Professors

Susan L. Crowley, counseling

Gretchen A. Gimpel, school

George Julnes, evaluation methodology, research methodology

Kevin Masters, clinical

Research Associate Professor

Mark S. Innocenti, school psychology

Associate Professors Emeritus

William R. Dobson, clinical

Elwin C. Nielsen, clinical and school

Assistant Professors

Scott C. Bates, social and community psychology

M. Scott DeBerard, health psychology

Renee V. Galliher, clinical psychology

Donna M. Gilbertson, school psychology

Steve Lehman, educational psychology

Maria C. Norton, research and evaluation methodology

Amy I. Odum, behavior analysis

Melanie M. Domenech Rodriguez, counseling, child clinical

Timothy Shahan, behavior analysis

Kerstin E. E. Schroder, health psychology

JoAnn T. Tschanz, neuropsychology, abnormal psychology, physiological psychology

Research Assistant Professor

Susan G. Friedman, research

Assistant Professor Emeritus

J. Whorton Allen, counseling

Adjunct and Clinical Faculty

Kent W. Anderson, professional-scientific

Ann M. Berghout Austin, infancy through childhood

Carolyn G. Barcus, counseling

David W. Bush, clinical/counseling

Robert S. Cook, rural and family interventions

Gwenaelle C. Couillard, training

Mary E. Doty, clinical

Monique Frazier, child clinical

Eric J. Gee, research and evaluation

Richard D. Gordin, Jr., sport and exercise psychology

Randall M. Jones, family research management

Joan A. Kleinke, counseling and personnel services
J. Russell Mason, sensory evaluation, ethology
Kent E. Nabers, gero-psychology
Mark A. Nafziger, counseling psychology
D. Kim Openshaw, marriage and family therapy
Lori A. Roggman, developmental
Thomas R. Schenkenberg, neuropsychology
Patricia L. Truhn, neuropsychology, crisis intervention
Brian Tschanz, social psychology
Beth Walden, research and evaluation methodology
Leland J. Winger, Jr., clinical
Jean Wollam, educational psychology
Blaine R. Worthen, research and evaluation

Course Descriptions

Psychology (PSY), pages 467-472

Secondary Education

Department Head: Barry M. Franklin
Location: Emma Eccles Jones Education 330
Phone: (435) 797-2222
FAX: (435) 797-1441
E-mail: seced@usu.edu
WWW: http://www.coe.usu.edu/seced/

Undergraduate Advisor: Harold E. Heap, Education 330B, (435) 797-2224, harold.heap@usu.edu

Degrees Offered: Second Bachelor of Science (BS), Second Bachelor of Arts (BA), Master of Science (MS), Master of Arts (MA), and Master of Education (MEd) in Secondary Education; BS and BA in Composite Teaching—Social Studies. The department participates in the Interdepartmental Doctor of Education (EdD) and Doctor of Philosophy (PhD) programs, focusing on the Curriculum and Instruction specialization.

Graduate Specializations: Educational Leadership, English as a Second Language (MEd only), English Education, Gifted and Talented, Mathematics Education, Middle Level Education, Reading Education, Social Studies Education, Science Education

Undergraduate Programs

Objectives

The Department of Secondary Education coordinates state-approved programs for secondary teacher licensure across campus. The department offers the Secondary Teacher Education Program (STEP), a sequence of courses and field experiences designed to prepare students for teaching careers in secondary schools. The STEP program is fully accredited by the Utah State Board of Education and by the National Council for Accreditation of Teacher Education. Students who successfully complete the program are recommended for secondary licensure in the State of Utah, enabling them to teach in grades 6-12.

Requirements

Departmental Entrance Requirements. In addition to meeting the admission requirements for the University, students in good standing must have a minimum entrance GPA of 2.75 and maintain that GPA in order to student teach. All students must be admitted to the teacher education program. See details below.

Admission to Teacher Education. Prior to enrolling in STEP courses, students must be admitted to the teacher education program. Criteria for admission include completion of a minimum of 60 semester credits, and (1) minimum ACT scores, (2) University Studies requirements, (3) a speech and hearing test, (4) successful completion of the Teacher Education Writing Exam, and (5) recommendations from advisors in major and minor fields. Application forms are available from advisors; from the Office of Teacher Education, Graduation, and Educator Licensing, Room 103, Emma Eccles Jones Education Building; and from the Department of Secondary Education, Room 330, Emma Eccles Jones Education Building.

Students must submit copies of University transcripts, including transfer coursework, verifying a minimum total GPA of 2.75. Criminal Background Check materials, required by the State of Utah, must also be submitted at this time. The fee for the Criminal Background Check is payable to the Utah State Office of Education. A money order must be provided as payment. Questions about the admission requirements may be directed to the Secondary Education advisor.

Bachelor's Degree in Social Studies Composite Teaching. Students who are accepted in good standing by the University and who have a minimum total GPA of 2.75 may be admitted to the Social Studies Composite Teaching Major. In order to graduate with the Social Studies Composite Teaching degree, students must (1) maintain a minimum 2.75 total GPA, (2) earn a grade of *C* or better in all courses in the major, (3) complete the Secondary Teacher Education Program (STEP), and (4) meet all requirements for the Secondary Teacher License (see below).

For the bachelor's degree, students must complete: (1) University Studies requirements, (2) courses required for the Social Studies Composite Teaching Major (see list below), (3) The Secondary Teacher Education Program (STEP), and (4) electives. Students must complete each course in the Social Studies Composite Teaching Major with a minimum grade of *C*. Upon completing all requirements for graduation, students are eligible for a secondary teaching license from the Utah State Office of Education (grades 6-12). Students with the Social Studies Composite Teaching Major graduate from the Department of Secondary Education. Courses in the Social Studies Composite Teaching Major are provided by various departments. Students should check regularly with these departments and the Secondary Education advisor for changes and substitutions.

Students must complete a total of 60 credits selected from various social science courses listed below. The number of credits and course choices are listed after the area in which they must be completed.

History (21 credits). HIST 1030, 1040, 1050, 2700, 2710, 3850, and 4860.

Geography (15 credits). GEOG 1030, 1130, 2030, 3850, and 4200 (Utah).

Economics (6 credits). ECON 1500 and 2010.

Political Science (9 credits). POLS 1100; POLS 4120 or 4130; electives (3 credits minimum), chosen from POLS 2200, 3130; and a third POLS course approved by the Secondary Education Advisor.

Psychology/Sociology/Anthropology (15 credits). PSY 1010, SOC 1010, ANTH 1010; choose 6 credits from SOC 2500, 3010, or other courses approved by the Secondary Education Advisor.

Secondary Teaching License (grades 6-12). To obtain a teaching license, undergraduate students must complete (1) 30 credits of University Studies requirements, including written communications, (2) an approved composite teaching major *or* approved teaching major and teaching minor (see below), and (3) the Secondary Teacher Education Program (STEP). The Secondary Education advisor will assist returning students who already have an undergraduate degree with program planning for

licensure. These students occupy "Second BS" or "Second BA" status while pursuing licensure. They also may apply for a second bachelor's degree in conjunction with teacher licensure. Consult the Admissions Office for details.

All students should note that secondary teacher licensure is not automatic upon completion of the program. In order to receive Utah licensure, students must apply for the Basic Teaching License. Applications are available in the Office of Teacher Education, Graduation, and Educator Licensing, Emma Eccles Jones Education Building, Room 103.

Special Education Dual Licensure. Students can be licensed in both special education and in a secondary subject area through a dual licensure program offered jointly by two departments. Early in their programs, students should consult with undergraduate advisors in Secondary Education and the Department of Special Education and Rehabilitation.

Optional Middle Level Endorsement (grades 6-9). The Department of Secondary Education has joined with the Department of Elementary Education to offer a Middle Level Endorsement for students seeking initial teacher licensure and for persons who already have an elementary or secondary teaching license. Students pursing this endorsement must take additional coursework that specifically focuses on middle level curriculum and instruction. To be recommended for the Middle Level Endorsement, students must student teach (SCED 5630) in the middle grades. Information about this program is available from the Secondary Education Advisor and the Department of Elementary Education.

ESL Teaching Minor or Endorsement. The USU Elementary Education Department and the Secondary Education Department jointly offer a K-12 English as a Second Language (ESL) endorsement. Undergraduate students seeking initial teacher licensure can obtain an ESL Teaching Minor (24 credits) and the ESL endorsement. Students pursuing the minor must complete the following courses: LING 4100, 4400, 4900; SCED 3300 or 4300; SCED 4710, 4770, 5630.

Composite Majors, Teaching Majors, and Teaching Minors. Secondary Teacher Licensure requires that students complete a composite teaching major *or* a combination of a single-subject teaching major and teaching minor. Students are strongly encouraged to meet as soon as possible with advisors in their declared teaching major and minor. The following composite teaching majors, single-subject teaching majors, and teaching minors are approved for Utah State University.

Composite Teaching Majors (46 credits minimum). Agricultural Education, Art Education, Biological Science, Business Information Technology and Education, Earth Science, Family and Consumer Sciences Education, Marketing Education, Music Education, Social Studies Education, and Technology and Industrial Education.

Teaching Majors (30 credits minimum). Chemistry, English, Geography, Health Education, History, Mathematics, Modern Languages, Physical Education (K-12), Physics, Political Science, Psychology, Sociology, and Theatre Arts.

Teaching Minors (16 credits minimum). Business Computer and Information Systems, Business Information Technology and Education, Chemistry, Economics, English, Geography, Health Education, History, Marketing Education, Mathematics, Modern Languages, Physical Education Coaching, Physics, Political Science, Psychology, Sociology, Speech Communication, and Theatre Arts.

Secondary Teacher Education Program (STEP)

Three-Level Program (35 credits). Secondary Education coordinates a state-approved program to complement the teaching majors and minors in 21 departments. The framework is organized into three sequential levels, each taken during a different semester. Students should plan to complete the STEP Program during their junior and senior years after most or all of the major and minor coursework has been completed. *All three levels of the STEP are offered during fall and spring semesters, but not during summers. Levels of the STEP are taken as a package, not piecemeal. Each level must be satisfactorily completed before students advance to the next level.*

As outlined below, Level 1 and Level 2 courses are offered by the Department of Secondary Education and other cooperating departments. Teaching Methods courses are offered by many departments across campus. Students should refer to the requirement sheets of their composite teaching major, or their teaching major and minor, to determine which methods courses they are required to complete on Levels 1 and 2 to prepare for student teaching at Level 3. Student teaching in a composite teaching major, or in at least one teaching major and one teaching minor, is required.

Level 1 (11 credits). After admission to teacher education, students should take SCED 3100 and 3210 during the same semester. In addition, Level 1 students must complete one or more teaching methods courses as required by the student's composite teaching major, or by the student's teaching major and minor, as well as an Instructional Technology course. (Students should contact their departmental advisor to determine which Instructional Technology course to take.) Finally, a departmentally sponsored course with a 3300 number should be taken for in-school clinical experiences.

Level 2 (12 credits). After successfully completing Level 1 courses, students should take SPED 4000 and SCED 4200, 4210 during the same semester. In addition, Level 2 students must complete all remaining methods courses in their major and minor teaching fields. Finally, a departmentally sponsored course with a 4300 number should be taken for in-school clinical experiences.

Level 3 (12 credits). After successfully completing Level 2 courses, students should take Student Teaching Seminar (departmentally sponsored course with a 5500 number) and Student Teaching (departmentally sponsored course with a 5630 number).

Students must enroll for either Clinical Experience I or Clinical Experience II concurrent with their methods courses. Methods instructors, in concert with the Office of Field Experiences, set up and monitor these field activities in middle and high school settings. The clinical experiences provide a classroom context for understanding STEP and methods courses. A clinical experience fee of $50 is assessed at each of the two levels. This fee provides a stipend to classroom teachers who work with clinical experience students in the public schools. Students should refer to the requirement sheet for their composite teaching major or their teaching minor to determine which methods courses they should take.

Background Check and Student Teaching. As a result of legislative mandate, all applicants for student teaching must undergo a criminal background check prior to student teaching placement. The Office of Field Experiences, Emma Eccles Jones Education Building, room 330, will assist students in complying with this mandate. The fee for the background check is payable only by money order to the Utah State Office of Education.

Applications for student teaching must be submitted to the Office of Field Experiences, Emma Eccles Jones Education Building, room 330, one year in advance. *Students must have completed 80 percent of their teaching major/minor (or composite major) requirements prior to student teaching*. The Portfolio Interview is part of the application process.

Students should be financially prepared to stay off campus, if necessary, during the 13-week block of student teaching. Because student teaching requires a major commitment of time and energy, it should be planned with care. Students are urged to forego outside employment, if possible, during the student teaching experience.

Graduate Programs

Admission Requirements

The Department of Secondary Education assists in the preparation of graduate students seeking the MEd, MA, and MS degrees, as well as the EdD and PhD degrees. Students desiring information concerning the various graduate programs should contact the department head. The application for admission to a graduate program is made through the School of Graduate Studies. See *Graduate Admission Procedures* (pages 90-91).

Students applying to a master's degree program may take either the Miller Analogy Test (MAT) or the Graduate Record Exam (GRE). Students applying to a doctoral degree program should take the GRE. Scores at the 40th percentile or above are required for admission. In addition, students must have at least one year of teaching experience (or comparable professional experience) and a valid secondary teaching license.

All students applying to the doctoral degree program (Curriculum and Instruction specialization) participate in oral interviews with the Curriculum and Instruction Management Committee. A sample of academic writing should be included as part of the doctoral-level admission folder.

Master's applications are considered three times a year: June 15 for fall semester registration, October 15 for spring semester registration, and March 15 for summer semester registration. Doctoral applications are considered more frequently. *Application folders will be not be considered until all required information is received by the School of Graduate Studies and sent to the department*.

Master's Degree Programs

Secondary Education master's degree programs provide coursework and professional experiences for those preparing to become master teachers, teacher-leaders, supervisors, or curriculum specialists. Each program provides coursework in education, with associated work in a specialized subject matter, which is the teacher's area of concentration. Typically, the area of concentration derives from the teacher's ongoing work with middle school or high school students.

Areas of specialization in Secondary Education include the following: Educational Leadership, English as a Second Language (MEd only), English Education, Gifted and Talented, Mathematics Education, Middle Level Education, Reading Education, Social Studies Education, and Science Education. Three University departments—Art, Business Information Systems, and Music—also participate in master's degree programs sponsored by Secondary Education. Admission to these fields of study requires approval of the cooperating department. In planning areas of specialization, students work with a faculty advisor and select graduate courses from the University-wide curriculum.

MEd Degree Plan B (36 credits). The MEd Plan B offers a Portfolio Project Option or Creative Project Option which culminates in the presentation of the project in a final exam setting. Students take a common core of courses from college and department curricula, then courses in areas of concentration in relation to their teaching specialities. The research course for the MEd focuses on issues of application as well as action research. Creative projects are diverse and range from action research to curriculum development. The professional portfolio project provides the context for a personal knowledge base. Although portfolios share certain structural features, each student's portfolio is unique.

MEd Degree Plan C (40 credits). The MEd Plan C is a coursework only program. Students take a common core of courses from college and department curricula, then courses in areas of concentration in relation to their teaching specialities; additional coursework is taken in the area of concentration. At the conclusion of the program, a culminating experience to meet the needs of the student is developed. Options for the experience can be an interview with the advisor, oral comprehensive examination under the supervision of the advisor, written comprehensive examination under the supervision of the advisor, or other culminating experience developed by the student and advisor and approved by the department head.

MS and MA Degrees Plan A (30 credits). The MS/MA option culminates in a formal defense of a thesis. This option is for teachers whose long-term goals require a traditional, research-oriented degree. The MS thesis involves either an experimental or qualitative research study. The MA thesis involves development of a scholarly literature review. The MA degree also requires foreign language competency.

Doctoral Degree Programs

For students who have already completed a master's degree, Secondary Education participates in the interdepartmental doctoral program coordinated by the dean of the College of Education and Human Services. Both PhD and EdD degrees are offered in the Curriculum and Instruction specialization. For an overview of the program, including program requirements and admission procedures, see pages 185-186 of this catalog. As with any degree program, students interested in doctoral study are encouraged to contact the department head of Secondary Education.

Financial Assistance

Departmental support or grant support is available to doctoral-level and master's level students pursuing full-time study on campus. Such financial support typically is through assistantships, which carry half-time teaching, research, or supervisory obligations. Typical assistantships carry forward for three years. Awards are made on a competitive basis. Students who wish to be considered for financial aid should apply to the department no later than February 1 for the following academic year. Acceptance to graduate study does not guarantee financial assistance.

Secondary Education Faculty

Professor

Barry M. Franklin, curriculum policy, theory, and history

Professors Emeriti

Ross R. Allen, mathematics education, comparative education

Eldon M. Drake, journalism, general student teaching

Kenneth C. Farrer, curriculum development

Richard S. Knight, social studies specialist

Izar A. Martinez, administration, research methods, measurement/evaluation

Walter L. Saunders, science specialist

James P. Shaver, social studies, former School of Graduate Studies Dean

William J. Strong, content area reading, Utah Writing Project Director

Associate Professors

Kay Camperell, content area reading/writing, learning theory, literacy education

Janice L. Hall, qualitative research, professional development, supervisor of student teaching

Grace C. Huerta, educational foundations, multi-cultural education

Adjunct Associate Professor

Michael K. Freeman, higher/adult education, educational leadership

Associate Professor Emeritus

Varnell A. Bench, extension, administration, supervision

Assistant Professors

George G. Hruby, literacy/reading

Sherry Marx, ESL/Bilingual

Thomas C. Pedroni, social studies, critical social theory, qualitative methods, critical pedagogy

L. Ruth Struyk, classroom assessment, classroom management, measurement, instructional supervision, program evaluation

Lecturer

Marla J. Johnson, science education

Undergraduate Advisor

Harold E. Heap, classroom management, adolescent development

Course Descriptions

Secondary Education (SCED), pages 474-477

Social Sciences

Degree Coordinator: Dean Gary Kiger,
College of Humanities, Arts and Social Sciences
Location: Main 338
Phone: (435) 797-1195

Degree offered: Master of Social Sciences (MSS)

Major Disciplines: History, Political Science, and Sociology

Minor Disciplines: Anthropology; Business Administration; Instructional Technology; Environment and Society; Family, Consumer, and Human Development; History; Political Science; Psychology; Social Work; and Sociology

Graduate Program

Administration

The program is administered by a committee of the department heads (Management Committee) from the three major disciplines or their designees. The committee is chaired by annual rotation by one of the members of the committee, and reports to the Degree Coordinator. The Management Committee reviews policy and develops recommendations which are submitted to the Degree Coordinator for approval.

Degree Description

The social sciences are disciplines that have as a common objective the understanding of human behavior and social relationships. The MSS offers multidisciplinary graduate training for candidates desiring in-depth applied understanding of human performance, human environments, and/or the structuring of social, political, and economic systems. Students in History and Sociology typically follow the Plan B option, which requires a minimum of 30 credits. A minimum of 15 credits are required in a major discipline, plus a minimum of 15 credits from one of the following two tracks: *Track A:* a minimum of 15 credits from two approved minor areas, with at least two courses in each minor area. *Track B:* a minimum of 15 credits from an approved minor and a cluster, with at least two courses in the minor and two courses in the cluster. Courses counted in a cluster must be outside the selected major and minor. Three of the 30 credits required for the Plan B option must be thesis credits, but no more than 3 credits of thesis can be counted toward a degree. Departments may impose more rigorous requirements. A maximum of 3 credits may be earned either from readings/conferences or from independent research.

The MSS degree is primarily intended to prepare degree recipients for employment or advancement in social science-related occupations. Students interested in pursuing doctoral work should consider a Plan A Master of Science program.

Admission Requirements

See general admission requirements, pages 90-91. In addition, the faculty of each discipline determines whether to recommend to the graduate dean the acceptance of applicants. For further information, contact the Graduate Coordinator in the department of the proposed major.

Degree Requirements

Student Supervision. For each student admitted, a supervisory committee is ordinarily appointed consisting of at least one faculty representative from the student's major discipline and (a) one from each of the minor disciplines, or (b) one from a minor discipline and one from a discipline associated with the cluster. Policies governing student supervision may vary from specialization to specialization.

Plan B Research Paper. Each Plan B student must submit a research paper for thesis credit in accordance with School of Graduate Studies and departmental requirements. Ordinarily, the Plan B paper is written in the major discipline, but in some cases, with the approval of the student's supervisory committee, it may be written in one of the minor disciplines. Information specific to each major discipline may be obtained by contacting the sponsoring department.

Further Information

Candidates interested in pursuing this degree program may obtain specific information by contacting the head of one of the participating departments, the School of Graduate Studies, or the dean of Humanities, Arts and Social Sciences.

Sociology, Social Work and Anthropology

Department Head: Richard S. Krannich
Location: Main 224
Phone: (435) 797-1230
FAX: (435) 797-1240
E-mail: lstocking@hass.usu.edu
WWW: http://www.usu.edu/sswa

Undergraduate Program Directors:
Sociology: Peggy Petrzelka, Main 216E, (435) 797-0981, peggyp@hass.usu.edu
Social Work: Terry L. Peak, Main 239D, (435) 797-4080, tpeak@hass.usu.edu
Anthropology: Bonnie Glass-Coffin, Main 245A, (435) 797-4064, glasscob@cc.usu.edu

Sociology Graduate Program Director:
Douglas B. Jackson-Smith, Main 216H, (435) 797-0582, douglasj@hass.usu.edu

Degrees offered: Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), Master of Arts (MA), and Doctor of Philosophy (PhD) in Sociology; participates in Master of Social Sciences (MSS); BS and BA in Social Work; BS and BA in Anthropology

Graduate Specializations: *PhD*—Demography, Environmental Sociology/Sociology of Natural Resources, Social Problems, and Sociology of Development

Undergraduate Programs

Objectives

The department offers educational programs for students to prepare for positions in business, social welfare, teaching, research, personnel, government service, law enforcement, and industry, as well as providing liberal and general education for all interested students. The program offers a wide range of courses for the study of social, cultural, and behavioral dynamics. The department also provides University Studies, Liberal Arts and Sciences, and other service courses for students from all majors.

Requirements

Departmental Admission Requirements. New freshmen admitted to USU in good standing qualify for admission to the sociology and anthropology majors, as well as to the pre-social work major. Transfer students from other USU majors or other institutions must have a minimum 2.5 overall GPA.

For admission to the sociology major, students must additionally have earned a grade of *C-* or better in SOC 1010. For admission to the social work major, transfer students must have earned a minimum 2.75 GPA in all social work classes. Applicants to the social work major must have completed the basic social work core curriculum, must have a minimum 2.5 overall GPA and a minimum 2.75 GPA in social work classes, must have completed SW 1050 with a grade of *C+* or better, and must have completed an application form (available from the department).

Sociology

Undergraduate Program Director: Peggy Petrzelka
Program Office: Main 224, (435) 797-1230

The study of the human individual and human groups is central to sociology. These subjects offer a broad foundation for understanding human behavior on an individual and group basis, and encourage the development of skills necessary for establishing favorable societal conditions for human development.

Students learn to systematically describe and explain group behavior, including the effects of one group on another and of groups upon individual behavior. Required sociology classes deal with how people in different societies organize and control their societies, critical issues in sociology as they have developed through history, and statistical methods for analyzing sociological data.

Upon completion of the prescribed program for a major in sociology, the student should be able to:

1. Demonstrate knowledge essential for understanding society from a sociological perspective;
2. Identify and critically evaluate the contributions of sociologists, social scientists, and scholars;
3. Identify and critically evaluate the forces and institutions that influence his or her life as a member of society;
4. Identify, comprehend, and critically evaluate the influences of race, class, gender, age, and disability on a member of society;
5. Pursue careers in sociological areas, business, government, and/or graduate study; and
6. Apply the methods and concepts of sociology to the analysis of social issues, problems, and conflicts in preparation for participation as agents of creative social change.

Students select courses from three different areas. **Social Problems** classes focus on retirement and other aspects of aging, the causes and prevention of juvenile delinquency, and the cultural characteristics of minority groups. **Groups and Institutions** courses look at collective behavior, the organization of communities, and the development of gender roles, as well as economic systems, educational systems, and social inequality. **Population** and **Environment and Development** courses deal with the effects of the environment and human behavior and the consequences of different patterns of population growth and settlement. A Law and Society Area Studies Certificate is available. A teaching major in sociology is available for students wishing to teach in secondary schools.

Surveys of graduates indicate that sociology majors pursue a wide range of occupations. About one-third are employed in the professional sector, while close to one-fourth are in service occupations. In addition, 26 percent are involved in sales or management/administration. In terms of specific job titles, social service is a popular option, as are retail sales and teaching. Other frequent job titles include: vocational rehabilitation counselor, research analyst, data coordinator, management analyst, district sales manager, parole officer, juvenile probation officer, social services director, civil service test examiner, personnel director, insurance salesman, and correctional service officer. A variety of government and business positions are also expanding for sociology majors with the new emphasis on a liberal arts education. The growing awareness of the value of sociological perspectives for problem-solving continues to provide an increasing range of opportunities for employment in a variety of work settings.

Departmental Graduation Requirements. Sociology majors must meet the following course requirements:

1. Complete the general requirements of the University. Majors are expected to take STAT 1040 to fulfill the quantitative literacy requirement for University Studies.
2. Complete a minimum of 33 credits of sociology coursework. At least fifty percent of the sociology coursework should be completed in the USU Sociology program. Sociology majors must maintain a minimum GPA of 2.5 in sociology courses and earn a grade of *C-* or better in courses to be counted toward the major.
3. A minor outside the program is encouraged but not required.
4. Complete the following required courses: SOC 1010, 3010, 3110, 3120, and 4010.
5. Choose a minimum of 18 credits from the following sociology elective courses. At least 3 credits must come from each of the three specialty areas listed below.

a. *Social Problems:* SOC 1020, 3410, 3420, 3430, 3750, 4420.

b. *Groups and Institutions:* SOC 2500, 3320, 3330, 3500, 4330.

c. *Population, Environment, and Development:* SOC 3200, 3600, 3610, 4620, 4710, 4730, 5650/6650.

Sociology and Social Work Dual Major. Sociology majors desiring additional preparation for employment in the social services may complete a dual major in sociology and social work. With the help of advisors, students who will seek positions in other special areas could include appropriately related courses.

Minor. Students minoring in sociology must complete a minimum of 12 credits in sociology courses. SOC 1010 and 1020, as well as six additional credits with a SOC prefix, are required.

Teaching License. Sociology is defined as an approved teaching major in Utah secondary schools by the State Board of Education. The sociology major must complete a minor in a subject that is required in Utah high schools. In addition to completing the courses required for the sociology major, the sociology teaching major must also complete the required teaching licensure courses in education. Students can also elect sociology as an approved teaching minor.

Law and Society Area Studies. The Department of Sociology, Social Work and Anthropology sponsors an interdisciplinary program emphasizing the study of the relationship between law and society. Students must complete 24 credits, chosen from a selected list of courses, in at least three disciplines. A minimum 3.0 GPA must be maintained in these courses.

The selected courses are: FCHD 3100; JCOM 4030; MHR 2990, 3810, 5640; PHIL 2500, 4600, 4610, 5600; POLS 3120, 3130, 3170, 3320, 3810, 4120, 4130, 4810, 5130; SOC 1020, 3410, 3420, 3430, 4420; SPED 5070; SW 5350. Only 12 credits may be selected from a single discipline. The Law and Society Area Studies program is pursued in conjunction with a major. Credits may be applied to the major, as well as to the area studies requirements. A student's transcript will reflect the Law and Society Area Studies emphasis upon completion of requirements for a degree.

More information may be obtained from the department or from the Science/HASS Advising Center, Student Center 302.

Gerontology Program. The Department of Sociology, Social Work and Anthropology is one of several departments sponsoring an interdisciplinary gerontology program, which prepares students for careers in the field of aging. Students may earn a certificate in gerontology by completing a selected list of course requirements, including supervised field practicum in a gerontological setting.

More information concerning the gerontology certification program may be obtained from the Department of Family, Consumer, and Human Development.

American Studies Major. The Department of Sociology, Social Work and Anthropology is one of several departments offering an area of concentration for the American Studies program. Students who wish to focus their work in American culture should refer to the American Studies program description (page 196) and check with the Sociology program for further information.

Social Work

Program Director: Terry L. Peak
Program Office: Main 239, (435) 797-1286; or Main 224, (435) 797-1230

Utah State University's Social Work Program offers a baccalaureate degree in social work. The program is accredited by the Council on Social Work Education (CSWE) and meets requirements established by the State of Utah for licensure of social service workers.

The Social Work Program provides a learning environment for those who seek to acquire knowledge and skill in order to bring about meaningful social change in individuals, groups, communities, and society in accordance with democratic principles of civil, social, political, and economic justice. The program provides grounding in the fundamental generalist skills, knowledge, and values of social work, such as critical thinking, clarification of personal values, awareness of diversity, professional use of self, and communication and interpersonal relationship skills.

Social Work at Utah State University recognizes the historic importance of social welfare in balancing the country's economic and social structure. The program is committed to the resolution of contemporary human social problems, such as poverty, racism, discrimination, exploitation, economic injustice, poor housing, malnutrition, and inadequate education.

Program Goals

There are two fundamental goals that guide the Social Work Program:

1. **To prepare students for employment as generalist social workers through education in a professional foundation curriculum and selected liberal arts education coursework.**
2. **To prepare students for advanced education.**

The program is based on a generalist conception of social work and a problem-solving, empowerment, and strengths model of practice. The social work sequence stresses problem solving at the interface of person and environment, which requires that students develop a repertoire of generalist practice skills. The program inculcates in students the knowledge, skills, understanding, and values necessary to perform multi-level assessments and interventions utilizing a theoretical knowledge base. The program is committed to building a student's education on a solid base that includes a liberal arts perspective vital to the development of a social worker.

The program endeavors to prepare students for advanced standing in graduate professional programs and to provide a solid academic base for continuing education. To accomplish this, the program facilitates the development of the profession's knowledge, values, and skills; provides a well-rounded liberal arts educational foundation; and teaches good study habits, written and oral communication skills, and the ability to think critically.

The program also endeavors to maintain a campus environment that will foster a sense of community and social responsibility. To accomplish this, the program provides opportunities for service learning, social development, and educational research forums through the state-affiliated National Association of Social Workers student organization and the Social Work Phi Alpha Honor Society.

Licensure

In the State of Utah, graduates with a bachelor's degree in Social Work are eligible to be licensed upon graduation as social service workers. Students may obtain further information on licensure from:

Department of Commerce
Division of Occupational and Professional Licensing
160 East 300 South
PO Box 146741
Salt Lake City UT 84114-6741
(801) 530-6628
http://www.dopl.utah.gov

Social Work Major

Liberal Arts Foundation. All students pursuing an undergraduate degree at Utah State University must meet requirements designed to assure a broad liberal arts foundation. Cross-cultural and cross-disciplinary perspectives are vital to a student's development as a social worker. The University Studies program, which is described in detail in this catalog (see pages 42-49), is required of all majors. Majors are expected to take STAT 1040 to fulfill the quantitative literacy requirement for University Studies. In addition to fulfilling University Studies requirements, majors will need to complete specific liberal arts courses, listed in the Social Work Program requirements, some of which fulfill both University Studies and Social Work Program requirements. Social Work majors must complete STAT 1040 and SOC 3120 to graduate.

Program Admission Requirements. The following regulations apply for admission to the Social Work Program: (1) New freshmen admitted to USU in good standing qualify for admission to the Social Work Major. (2) Transfer students from other institutions must obtain a minimum overall GPA of 2.5 and a minimum overall GPA of 2.75 in social work classes. (Refer to the *USU Social Work Program Transfer of Credit Policy*.) (3) Students transferring from other USU majors must complete the Social Work Major course of study and must obtain a minimum overall GPA of 2.5 and a minimum overall GPA of 2.75 in social work classes. (4) Students must apply for and meet criteria for advanced standing, in order to continue on in upper-division social work practice courses and field practicum courses. (5) Students are responsible for reviewing and knowing the requirements for the Social Work degree. (6) All courses required for the Social Work degree must be taken for a letter grade.

Social Work Major. Students may declare Social Work as their major at any time. All course offerings in social work are open to all Social Work majors, with the exception of the practice courses (SW 3050, 4150, and 4160) and the field practicum courses (SW 4870 and 5870), which require admission to advanced standing. Social work students are expected to take courses in sequence, in order to have the professional foundation knowledge required for each class. Maintenance of a high grade point average is important as students progress through the major and continue on to graduate school. Requirements for the Social Work major are as follows:

First year: SW 1050, FCHD 1500 (BSS), ENGL 1010 (CL), BIOL 1010 (BLS), SOC 1010 (BSS), PSY 1010 (BSS), STAT 1040 (QL), and ANTH 1010 (BSS).

Second year: ENGL 2010 (CL), SW 2400, 2500, and one elective enrichment course. Apply for advanced standing.

Third year: SW 3050, 4100, 4150, 4160, SOC 3120, and two elective enrichment courses. Apply for practicum.

Fourth year: SW 4870, 5350 (CI), and 5870.

Procedures for Advanced Standing in the Social Work Major. In order to be considered for advanced standing, students must turn in a completed application form by March 5 of the academic year. Applications for admission can be obtained in the Social Work Office, Main 239. At the end of spring semester, when the criteria for advanced standing have been met, eligible students will be ranked according to their grade point average, personal statement, performance on the advanced placement test, and faculty evaluation. The highest ranking students will receive advanced standing, which will allow them to enroll in upper-division practice courses. **Only those students who have completed first- and second-year requirements by the end of spring semester of the application year will be considered for advanced standing.** The primary reasons for this evaluation are: (1) to maintain a high-quality educational experience for students in upper-division practice courses, and (2) to maintain the status of full accreditation by the Council on Social Work Education. Students will receive notification of acceptance in June of the application year. Those students who do not receive advanced standing, and are therefore not allowed to enroll in upper-division practice courses, may retake courses to improve their GPA and reapply for advanced standing.

To be considered for advanced standing, students must meet the following minimum criteria:

1. Completion of the following courses with a *C* or better: FCHD 1500 (BSS); ENGL 1010 (CL), 2010 (CL); ANTH 1010 (BSS); BIOL 1010 (BLS); SOC 1010 (BSS); PSY 1010 (BSS); and SW 2400, 2500.
2. Completion of SW 1050 with a grade of *C*+ or better.
3. Junior status (61-90 credits) upon application.
4. Maintenance of a minimum overall GPA of 2.5 and a minimum GPA of 2.75 in social work classes.
5. No *Pass-D-Fail* grades in courses required for the major.

Students should also be aware that if there are any personal data, such as that included on the application for state licensure, which indicate a potential threat to the public safety and welfare, a student may be denied advanced standing in the program. Students turned down for advanced standing will be assisted in finding a more suitable major.

To maintain advanced standing and eligibility for graduation as a Social Work Major, a student: (1) must obtain a *B*- or better in SW 3050, 4150, and 4160; (2) must have completed SW 1050 with a *C*+ or better; (3) must maintain a minimum overall GPA of 2.5 or better and a minimum 2.75 GPA in the Social Work Major; (4) must receive a grade of *C* or better in all other courses required for the major; (5) must not repeat more than once, to improve a grade, any course required for the major; and (6) must not receive a *Pass-D-Fail* grade for any course required for the major.

Procedures for Admission to Field Practicum. Students must complete 480 clock hours of supervised field practicum and integrative seminar coursework. The field practicum courses are SW 4870 (Beginning Field Practicum) and SW 5870 (Advanced Field Practicum). Students may register for SW 4870 only after making application with the practicum director. Application must be made during the spring semester of the academic year prior to enrollment in the practicum, and is due by February 20. Applications are available in Main 239. No applications for the practicum will be accepted from students who will not complete all required coursework by the end of spring semester.

The following are eligibility criteria for admission to the field practicum:

1. Senior status (92-120 credits completed) by the end of the spring semester in which the student applies. Only those students who are candidates for the baccalaureate degree in social work may be admitted to the field practicum.
2. Completion of University Studies program (including Depth Education requirements) and all social work courses, with the exception of SW 5350.
3. A grade of *B*- or better in SW 3050, 4150, and 4160.
4. A grade of *C* or better in all courses required for the major and a grade of *C*+ or better in SW 1050.
5. No *Pass-D-Fail* grades received in courses required for the major.
6. Demonstration of appropriate professional, moral, and ethical character, and must abide by the National Association of Social Work (NASW) code of ethics.
7. Maintenance of an overall minimum GPA of 2.5 and a 2.75 minimum GPA in the Social Work Major.

Students should also be aware that if there are any personal data, such as that included on the application for state licensure, which indicate a potential threat to the public safety and welfare, a student may be denied continuation in the program. If a student is denied admission to the practicum, the faculty will review his or her file upon request.

Students entering the practicum cannot ordinarily begin their placement earlier than the start of fall semester. If they do so, this practice falls outside of the Social Work Program's responsibility, and any accrued hours will not count toward the practicum.

Students are strongly encouraged to join the NASW and be involved in the NASW Student Program Unit.

Transfer of Credit Policy. Students who transfer to the USU Social Work Program are required to complete an application for transfer credit. Students may substitute certain social work classes taken at other Council of Social Work Education (CSWE) accredited programs for USU courses. Course approval must be sought from the student's advisor. When petitioning for a substitution, the student is responsible to meet with an advisor and fill out a transfer of credit form, available in Main 239. Social work courses taken ten or more years ago *cannot* ordinarily serve as substitutes. Courses taken in a department or program *not accredited* by the CSWE *cannot* ordinarily serve as substitutes for the USU Social Work courses *unless* they have been covered in an articulation agreement.

The following regulations apply to transfer students: (1) A transfer credit application, with official transcripts from all institutions previously attended, must be submitted. (2) The transcripts must reflect a cumulative grade point average of at least 2.5 (on a 4.0 scale) and a 2.75 GPA in all social work courses. (3) The credentials of students seeking transfer to the Utah State University Social Work Program will be evaluated on an individual basis. (4) University Studies Depth Education requirements must be completed by **all** students, including transfer students who have earned an associate degree.

The following courses, or their equivalents, will be considered for transfer credit: SW 1050; STAT 1040 (QL); FCHD 1500 (BSS); ENGL 1010 (CL), 2010 (CL); ANTH 1010 (BSS); BIOL 1010 (BLS); SOC 1010 (BSS); PSY 1010 (BSS); and SW 2400, 2500. Students transferring from junior colleges will be required to apply for advanced standing and take upper-division social work courses at USU. Only those social work courses taken within the last ten years will be considered. Students transferring credits from CSWE accredited programs must apply for advanced standing and take SW 3050 (Practice I), SW 4150 (Practice II), SW 4160 (Practice III), SW 5350 (CI) (Social Welfare Policy), SW 4870 (Beginning Field Practicum), and SW 5870 (Advanced Field Practicum) with the USU Social Work Program.

During the month of March, Social Work faculty members will review applications for advanced standing, to qualify students to enroll in upper-division practice classes. Advanced standing is based on the following criteria: (1) completion of FCHD 1500 (BSS); ENGL 1010 (CL), 2010 (CL); ANTH 1010 (BSS); BIOL 1010 (BLS); SOC 1010 (BSS); PSY 1010 (BSS); and SW 2400, 2500 with a grade of *C* or better; (2) completion of SW 1050 with a grade of *C*+ or better; (3) junior status (61-90 credits) upon application; (4) maintenance of a minimum overall GPA of 2.5 and a minimum GPA of 2.75 in social work classes; (5) a passing score on the Advanced Placement Test (APT), which is a score of 70 percent or higher; and (6) no *Pass-D-Fail* grades received in courses required for the major. Students transferring to USU should obtain and complete a copy of the social work advanced standing application and send the application to the Social Work

Program by March 5, prior to the fall semester in which they intend to transfer.

Students transferring to USU should be advised that social work education is a professional program, designed to prepare competent and effective social work professionals. Coursework is based upon a specific body of knowledge, values, and professional skills. Therefore, if students have not completed the required criteria for advanced standing, completion of their educational program could take additional time. For more information about the Social Work Program, call (435) 797-1286, or visit the Social Work website at:
http://www.usu.edu/sswa/sw.htm.

Social Work Student Organizations

The Social Work Program recognizes the importance of students having opportunities to learn and socialize outside of the classroom. Students are encouraged to be become involved with the NASW student organization, as well as the USU Social Work Program Phi Alpha Honor Society. Information is available in Main 239.

Anthropology

Program Director: Bonnie Glass-Coffin
Program Office: Main 245, (435) 797-0219; or Main 224, (435) 797-1230

Anthropology is the integrated study of humans in all their aspects. It offers a broad framework for understanding humans as individuals and as members of widely varying societies through courses dealing with the biological evolution of humans, prehistoric culture change, and present diversity of cultures and human types. Two parallel goals of the discipline are to explore and develop an appreciation for human diversity and the shared legacy of our common humanity.

Anthropology includes the following subspecialties: cultural anthropology, biological anthropology, archaeology, and linguistics. Major requirements are designed to encourage broad exploration across anthropology, and students who major in anthropology examine a wide range of peoples and cultures, both past and present. They examine lifeways as different as the hunter-gatherers of Ice-Age Europe, tribal horticulturalists of lush interior Amazonia, and the diverse ethnic neighborhoods of modern U.S. cities. They explore both the biological and cultural basis of human behavior, and examine how it is manifested in individuals and groups. Anthropology courses use both scientific and humanistic approaches to the study of humankind, in all its complexity. Courses emphasize critical reasoning, oral and written communication skills, and the expansion of thinking beyond the familiar.

The contemporary social science student lives in a world of diminishing cultural and national barriers. In this setting, a major in anthropology can lead to a wide variety of careers. Anthropologists are on the staff of leading medical, business, law, public affairs, and other professional schools, and have played critical roles in international ventures, public health programs, community development activities, and minority and migrant social actions. Additionally, anthropology serves applied interests in international development, archaeology and cultural resource management, cross-cultural health care, and osteology/forensics. With first-hand experience in every region of the country and around the world, anthropologists bring a unique understanding of specific social and ethnic groups and of the biological, ecological, and cultural factors that influence human behavior.

Special features of the anthropology program include smaller courses, individualized attention, opportunities for laboratory, museum, and field work, and the opportunity of working in teaching assistant positions. All these features give anthropology majors choice and experiences unavailable to undergraduates in most programs. The Anthropology Museum and the Archaeology Field School provide additional hands-on learning opportunities. Anthropology participates in the Department of Geology emphasis in Geoarchaeology, the American Studies Program, and the Folklore Program in the Department of English.

Anthropology leads to a variety of "real-world" jobs. Anthropology graduates are: lawyers, nurses, health care administrators, travel consultants, teachers of all kinds, cultural resource professionals, agency and program administrators, and technical writers. They work for museums, government land management, environmental and foreign service agencies, Indian tribes, and are common in both the government and private sectors of the environmental-cultural heritage protection industry. They can be found in public and private foundations, bureaus, and agencies for the arts, humanities, sciences, and tourism.

Graduate study in anthropology opens the world of practicing anthropology. Not limited to college teaching, anthropologists with graduate degrees can be found in a variety of private sector and government agency positions.

For students seeking a dual major, an Anthropology major can complement a major in American Studies, Biology, Geology, Geography, History, Languages, and Political Science. It also pairs well with majors in Natural Resources, because cultural resource and Native American issues are important to many positions in private firms and government agencies concerned with land management and the environment.

Major Requirements. A minimum of 33 credits is required for the anthropology major. All students must take four required courses, including a three-semester sequence in the basic areas of anthropology and a beginning upper-division level course in the history of anthropology. The anthropology major also requires exposure across the breadth of the discipline. To achieve this, students select courses from topical and area clusters at the upper-division levels and a final capstone course. Additional graduation requirements include:

Methods component. Majors must complete one "Methods" course. The course chosen to meet this requirement may also count toward other anthropology major requirements.

A minimum of 16 credits of the anthropology course credits counting toward the major must be Utah State University courses. Credits from distance and residence center courses are subject to departmental approval for application toward the anthropology major.

Students majoring in anthropology must maintain a minimum 2.5 GPA in anthropology courses. A grade of *C* or better must be attained in courses counted for the major, including foreign language and statistics courses. In addition, majors must: (1) complete the general requirements of the University in consultation with the student's advisor; (2) complete the following required courses: ANTH 1010, 1020, 1030, 3990; (3) choose a minimum

of six credits from: ANTH 2100, 3110, 3150, 3160, 4110, 4120, 4130, 5100, 5110, 5120, 5160; (4) choose a minimum of six credits from: ANTH 3200, 3250, 4250, 5210; (5) choose a minimum of six credits from: ANTH 3170, 3300, 3310, 3350, 4350, 4360, 4370, 5300, 5310; and (6) choose a minimum of one course from: ANTH 4250, 4350, 5650, 5990.

Students planning to receive a BA degree must complete two years training or equivalent in a foreign language approved by the Languages, Philosophy, and Speech Communication Department or one year or equivalent in each of two foreign languages approved by the Languages, Philosophy, and Speech Communication Department.

Students planning to receive a BS degree must complete STAT 1040 (Introduction to Statistics), **and** one course having a Quantitative Intensive (QI) University Studies designation.

Anthropology majors are encouraged to complete both the foreign language and statistics requirements.

Minor Requirements. A minimum of 18 credits is required for the anthropology minor. A minimum of 12 anthropology credits counting toward the minor must be Utah State University courses. Credits from distance and residence center courses are subject to departmental approval for application toward the anthropology minor. Students must maintain a minimum 2.5 GPA in anthropology courses. A grade of *C* or better must be attained in courses counting toward the minor.

The following courses are required for the anthropology minor: ANTH 1010, 1020, 1030 (9 credits). In addition, students must complete 9 credits in anthropology, selected from ANTH 2100 and from 3000-, 4000-, and 5000-level anthropology courses, excluding ANTH 5210 (Physical Anthropology Lab), ANTH 5310 (Archaeology Lab), and ANTH 5900 (Independent Studies).

Sociology Graduate Program

Graduate Program Director: Douglas B. Jackson-Smith
Program Office: Main 224, (435) 797-1230

The Department of Sociology, Social Work and Anthropology offers graduate work leading to the MS, MA, and PhD degrees in Sociology. The department also administers an interdisciplinary Master of Social Sciences (MSS) degree with emphasis in International Rural and Community Development.

The Graduate Program in Sociology provides a unique integrative and reinforcing combination of demographic, organizational, political-economic, and social psychological orientations to major domestic and global issues. At the graduate level, the department is particularly strong in four areas: Demography, Natural Resource and Environmental Sociology, Social Problems, and Sociology of Development. Graduate students have the opportunity to merge basic foundation coursework in sociological theory and research methods with more specialized training in selected specialty areas and apprenticeship roles in both basic and applied research projects. Sustained personal interaction between faculty and students is a hallmark and strength of the program.

The Graduate Program in Sociology has developed a *Graduate Program Handbook* that provides more details about the application process, financial assistance decisions, and graduation requirements. An electronic copy of this handbook is available on the departmental website: **http://www.usu.edu/sswa/grad.htm**.

The typical graduate application has five main components:

1. A formal application form, available from the School of Graduate Studies;
2. Transcripts from the applicant's undergraduate and graduate studies;
3. Test scores from the Graduate Record Examination (GRE) for all applicants, and the Test of English as a Foreign Language (TOEFL) and the Test of Spoken English (TSE) examinations for international students whose native language is not English;
4. Letters of reference from faculty or scholars who can attest to the applicant's abilities to succeed in graduate school; and
5. A letter of intent providing background about the applicant's training, interests, and experiences, as well as an overview of the applicant's career goals and specific reasons why graduate training in sociology is important to the applicant.

All application materials should be sent directly to the School of Graduate Studies, 0900 Old Main Hill, Utah State University, Logan UT 84322-0900.

The department offers financial assistance to most graduate students enrolled in departmental programs. These funds are distributed through a competitive process, based on student qualifications, performance, and interests. Graduate assistants typically earn enough to cover basic costs of tuition and living expenses. In order to be considered for financial assistance for the following academic year, complete applications must be ***received by USU no later than February 1***. Decisions on graduate student funding are usually based on an overall evaluation of all five components of the application.

Students must have scores on the verbal and quantitative portions of the Graduate Record Examination (GRE) at or above the 40th percentile. TOEFL scores are required for international candidates, with a minimum score of 600 (paper test) or 250 (computer-based test) deemed acceptable. The Test of Spoken English (TSE) is also strongly recommended, with a minimum score of 50 deemed acceptable. International applicants who are admitted without having taken the TSE will be required to take a test of spoken English fluency administered by the Intensive English Language Institute (IELI) at Utah State University prior to beginning their first semester in the Sociology Graduate Program. Dependent upon the test results, the student may be required to complete a program of English language training during the first semester of residence in the graduate program. For consideration for admission to the MSS degree program, applicants may submit either GRE or Miller Analogies Test scores.

Applications are screened throughout the year by the Graduate Program Executive Committee. No applications will be considered until all required information arrives in the School of Graduate Studies or a formal petition to review a nearly-complete file is made and approved.

Students with or without an undergraduate degree in sociology may enter the master's degree program. However, before matriculating, basic competencies in sociology that have not been ac-

quired through prior courses or experience must be satisfied. Students entering the doctoral program must complete master's level prerequisites in sociological theory and research methods and statistics.

PhD in Sociology

In addition to coursework in sociological theory and methods, students are expected to concentrate in two of the following specialty areas. Specialty areas are distinct, but are also highly integrative. One line of integration involves the department's continuing emphasis on **Rural Sociology**, which links elements of all four specialty areas. The program is sufficiently flexible to permit students with a strong interest in an area other than the established specialty areas to elect that area as an emphasis area, rather than having a second specialization, with approval of the supervisory committee and the department head or his or her delegated representative. In this case, the student would select a series of courses in that area in consultation with his or her supervisory committee and the department head or his or her delegated representative.

Demography. The demography area of specialization is administered through the Population Research Laboratory. The orientation is twofold: (1) basic and policy-oriented research on sociological aspects of demographic structure and processes, including migration, marriage and fertility, morbidity, and mortality; and technical demographic topics such as population estimates and projections; and (2) the provision of demographic training to domestic and international students relevant to their respective settings. Research endeavors encompass a broad range of local, regional, national, and international projects in the areas of migration and population redistribution, family demography, life course and aging, health and disability, labor force, and population estimates and projections. Graduate coursework is provided in social demography, population theories and policy, and demographic methods, as well as through various special topic seminars.

Environmental Sociology/Sociology of Natural Resources. The faculty in this area maintain an active research involvement in a wide variety of areas, such as natural resource development, land use changes, public participation in environmental planning, hazardous facility siting, recreation, risk assessment, population/environment relationships, public land management issues, and natural resource policy. Faculty have been engaged in cooperative research ventures with engineering, natural resource sciences, and other physical and social sciences faculty. Graduate curricula offerings are focused on the sociology of natural resources, environmental sociology, environmental problems and inequality, and social risk analysis.

Social Problems. This area is a specialization focused on theoretical and research-related issues relevant to a range of topics. Students will find a good deal of flexibility in the program, allowing them to pursue special interests. The faculty members affiliated with this specialty area are actively involved in research on contemporary social problems and structures of inequality.

A number of themes are emphasized in each of the specific content courses for this area. For example: How are social problems defined? What identifiable interest groups are involved in defining social problems? How do responses to social problems vary across time, place, and group? Examples of specific content courses this area may include are: criminal justice, aging, gender, race and ethnic relations, mental health, sexuality, stratification, science and technology, medicine, and work.

Sociology of Development. This specialization focuses on both domestic and international issues. Two major goals of the program are to give students the conceptual and analytic foundations to understand the dynamics and impact of social change and development, and to convey specific skills required for effective performance in applied fields. The basic curriculum includes courses covering a broad range of topics related to processes in local, national, and international development, including community, rural sociology, international development, applied anthropology, political sociology, and economic development.

Core Courses. The core courses for the PhD degree in Sociology include SOC 7010, 7100, 7110, and 7150.

MS and MA in Sociology

The main objective of this degree program is to provide a firm foundation in sociological theory and methods. Students also have the opportunity to take electives in any of the departmental specialty areas or outside the department. A minimum of 30 credits (including a research thesis) is required for the degree.

Core Courses. The core courses for this degree include SOC 6010, 6020, 6100, and 6150. The ability to utilize a statistical package (or permission of instructor) is a prerequisite to SOC 6150. Such competence may be gained by taking STAT 4910 (SPSS Shortcourse, 1 credit) or STAT 4920 (SAS Shortcourse, 1 credit).

MSS Sociology Specialization

This specialization enables interdisciplinary training in three related disciplines. The program requires a minimum of 35 credits, including 17 credits in a major discipline (Sociology); and either (1) a minimum of 9 credits in each of two minors *or* (2) a minimum of 9 credits in a minor and a minimum of 9 credits in a cluster. Two credits for the Plan B paper are included in the minimum 17 credits in Sociology. A minimum overall GPA of 3.0 is required. This is an applied degree. Individual options and plans of study can be arranged in consultation with the student's supervisory committee. At present, the degree is available with an emphasis in International Rural and Community Development.

International Rural and Community Development. This emphasis is designed to prepare administrators, planners, and researchers for work in international settings. The emphasis is on social and community factors in development. The interdisciplinary curriculum in sociology of development, rural sociology, economic anthropology, political science, and the economics of development has been specifically designed to prepare practitioners and leaders for careers in applied social development. The coursework can be adapted to the individual career interest of each student. The program involves students both from abroad and from the United States.

Core Courses. Individualized programs of study are prepared with the cooperation of the student and supervisory committee.

Research

The graduate program's research agenda is focused within the framework of the department's specialty areas. Since the areas are integrative, research tends to involve collaborative participation by several faculty members. Several active research projects are supported by the Utah Agricultural Experiment Station. Research is conducted at various levels, including international, national, regional, and state. The department houses two active research units, the Institute for Social Science Research on Natural Resources, and the Population Research Laboratory. Faculty play key roles in several interdisciplinary research units, including the Institute for Rural and Community Development and the Women and Gender Research Institute. Graduate program faculty are frequently involved in the research activities of other research units on campus, including the Center for Persons with Disabilities, the Utah Water Research Laboratory, the Mountain West Center for Regional Studies, and the International Irrigation Center.

Financial Assistance

Both departmental support and formal research grant support are available to graduate students and are awarded on a competitive basis. Some highly qualified departmental graduate students are also nominated to compete for University fellowships. Students who wish to be considered for financial aid must submit applications by February 1 for the coming academic year. Financial aid forms are available from the Department of Sociology, Social Work and Anthropology. Late applications are considered only if additional funds are still available.

Teaching assistantships are available through the department. Research assistantships are available through faculty members who have ongoing projects with the Utah Agricultural Experiment Station or who have research grants from the University, private companies, and federal or state agencies.

Career Opportunities

Traditionally, persons with advanced degrees in sociology have been employed in college and university settings. Recent evidence has shown a greater variety of career paths. A survey conducted by the American Sociological Association showed that 21 percent of sociologists holding the doctoral degree were employed in the private sector; 31 percent were working in the nonprofit sector; 46 percent were working in federal, state, or local government agencies; and 12 percent were self-employed. USU sociology graduates have followed this pattern of diversity. They have secured appointments in a variety of academic, governmental, and private settings, both domestic and abroad. A sizeable number have achieved key leadership positions and high visibility in the profession.

Sociology, Social Work and Anthropology Faculty

Professors

Stan L. Albrecht, Provost and Executive Vice President of Utah State University, environmental sociology, rural sociology, health studies

Richley H. Crapo, religion, sex, and gender; sexuality and homosexuality

Steven E. Daniels, rural development, natural resource policy

Susan E. Dawson, occupational and environmental health

H. Reed Geertsen, community, sociological theory, medical

Gary Kiger, Dean of College of Humanities, Arts and Social Sciences; social psychology; gender, work, and family; research methods

Yun Kim, demography, development, quantitative methodology

Richard S. Krannich, environmental, community, and rural sociology; research methods

David F. Lancy, educational anthropology, ethnography

Gary E. Madsen, methods

Jon R. Moris, applied anthropology, rural development, contemporary Africa

Steven R. Simms, archaeology, anthropological theory, behavioral ecology

Michael B. Toney, demography, ecology

Adjunct Professors

Gil-Sung Park, economic sociology

Douglas N. Sharon, cultural anthropology

Professors Emeriti

Therel R. Black, theory, rural sociology

H. Bruce Bylund, social change, methods

Gordon N. Keller, comparative kinship, applied anthropology

Ronald L. Little, environmental sociology, rural, quantitative methodology

Wesley T. Maughan, community organization, sociology of education

Bradley W. Parlin, comparative sociology of work

Pamela J. Riley, social psychology, international development, criminology, gender

David L. Rogers, complex organizations, political sociology, communities

William F. Stinner, social demography, life course, community

Alison C. Thorne, marriage and family

Associate Professors

E. Helen Berry, demography, ecology, methods, urban

M. Diane Calloway-Graham, women's development, women's clinical and societal issues, social work theory

Bonnie Glass-Coffin, medical anthropology, shamanism, Latin America, applied anthropology, method and theory

Patricia M. Lambert, biological anthropology, bioarchaeology, paleopathology

Derek T. Mason, juvenile delinquency

Terry L. Peak, social policy, health care, gerontology

Adjunct Associate Professors

Dale J. Blahna, natural resource sociology, policy, and outdoor recreation

Joanna L. Endter-Wada, cultural anthropology and natural resource policy and sociology

Assistant Professors

Youngtae Cho, demography, health studies

Kelly H. Hardwick, criminology, deviance, theory, methods

Douglas B. Jackson-Smith, sociology of agriculture, natural resources and environment, research methods, economic sociology

Susan E. Mannon, social inequality, sociology of development, gender

Sandra T. Marquart-Pyatt, environmental sociology, political sociology, methods

Peggy Petrzelka, environmental sociology, rural sociology, social change and development

Bonnie L. Pitblado, archaeology

Neil F. Wieloch, deviance, criminology, theory

Adjunct Assistant Professors

Nazih T. Al-Rashid, sociology of work

Sue H. Guenter-Schlesinger, diversity

Jason Leiker, criminology and juvenile delinquency

Janet L. Osborne, sociology of gender

Theresa L. Selfa, sociology of development

Bryan R. Spykerman, research methods

Assistant Professor Emeritus

Alice C. Smith, sociology

Course Descriptions

Sociology (SOC), pages 477-479
Social Work (SW), pages 488-489
Anthropology (ANTH), pages 334-336

Special Education and Rehabilitation

Interim Department Head: Benjamin Lignugaris/Kraft
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Phone: (435) 797-2382
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E-mail: lig@cc.usu.edu
WWW: http://sped.usu.edu

Graduate Program Coordinators:
Special Education Master's Programs: David E. Forbush, Education 320, (435) 797-0697, davidf@cc.usu.edu

Doctoral Programs: Timothy A. Slocum, Education 314, (435) 797-3212, tslocum@cc.usu.edu

Doctoral Programs: Charles L. Salzberg, Education 326, (435) 797-3234, salzberg@cc.usu.edu

Rehabilitation Counseling Program: Julie F. Smart, Education 322, (435) 797-3269, jsmart@cc.usu.edu

Multi-university Consortium in Sensory Impairments
Coordinator: Judith M. Holt, Center for Persons with Disabilities 197, (435) 797-7159, judith@cpd2.usu.edu

Advising:
Advising and Student Teaching Coordinator:
Darcie L. Peterson, Education 107, (435) 797-3252, darcie.peterson@usu.edu

Distance Undergraduate Programs Coordinator:
Nancy K. Glomb, Education 326, (435) 797-3911, nkglomb@cc.usu.edu

Degrees offered: Bachelor of Science (BS), Bachelor of Arts (BA), Master of Science (MS), Master of Education (MEd), and Educational Specialist (EdS) in Special Education; Master of Rehabilitation Counseling (MRC); Doctor of Philosophy (PhD) in Disability Disciplines; the Special Education and Rehabilitation Department participates in the Interdepartmental Doctor of Education (EdD)

Undergraduate emphases: *BS, BA*—Mild/Moderate Disabilities, Severe Disabilities, Early Childhood Special Education

Graduate specializations: *MEd, MS, EdS*—Behavioral Disorders, Early Childhood Special Education, Mild/Moderate Disabilities, Severe Disabilities, Transition/Special Education

Licensure is available for teachers in early childhood special education, mild/moderate disabilities, and severe disabilities. At the postbachelor's level, licensure is available for teachers in vision and hearing impairments. Special Education dual licensure programs are available with the departments of Secondary Education: Elementary Education; and Family, Consumer, and Human Development.

Undergraduate Programs

Objectives

The undergraduate programs in the Department of Special Education and Rehabilitation offer educational and training opportunities for teachers and support personnel working with exceptional children and adults with disabilities. The programs prepare students to work with individuals with mild, moderate, and severe disabilities and with early childhood special education. Students who are majoring in other teaching fields (i.e., elementary education, secondary education) are encouraged to pursue a second endorsement by taking those courses which lead to a special education license. Teacher education programs in the department are accredited by the State of Utah and nationally by NCATE.

Areas of Emphasis. The Department of Special Education and Rehabilitation offers training programs for individuals who want to work with children and adults with disabilities. A student fulfilling the undergraduate course requirements will qualify for a BS or BA degree in special education and be eligible for a license to teach students with mild/moderate disabilities, students with severe disabilities, or young children with disabilities. The severe and mild/moderate endorsements allow graduates to teach pupils with disabilities from kindergarten through 12th grades. The early childhood special education license allows graduates to teach children with disabilities from birth to five years old. In addition, the department offers dual teaching majors with the departments of Secondary Education; Elementary Education; and Family, Consumer, and Human Development. Students completing the dual major requirements in secondary education will be eligible for teacher licensure in one of the special education endorsement areas and their secondary education content major. Students completing the dual major requirements in elementary education will be eligible for teacher licensure in one of the special education endorsement areas and elementary education. Students interested in teaching preschool children with disabilities may receive an early childhood special education license for ages 0-5, in addition to a K-12 special education endorsement in severe or mild/moderate disabilities.

Requirements

Admission Requirements. Students are admitted to the Department of Special Education and Rehabilitation as Pre-Special Education majors by meeting the Utah State University minimum requirements (see pages 15-18). To become a Special Education major, a student must make written application to the department after meeting the following prerequisites: (1) completion of at least 40 attempted semester credits with a cumulative GPA of 2.75 or higher; and (2) completion of admission requirements to the College of Education and Human Services Teacher Education Program (see page 104). Students should apply to the department during fall semester of their sophomore year. Admission to the department is competitive based on several factors. These include: (1) the student's current GPA; (2) the number of credit hours completed by the end of fall semester; (3) completion of premajor classes (such as STAT 1040 and FCHD 1500); and (4) the student's career goals and experiences.

GPA Requirement. A minimum GPA of 2.75 is required to apply for admission, to remain in good standing, and to graduate from the program. All required special education classes must be completed with a grade of *C* or better.

Bachelor's Degree in Special Education. Undergraduate study leads to the Bachelor of Science or Bachelor of Arts degree in Special Education with licensure to teach students with mild/moderate disabilities, severe disabilities, or early childhood special education. The degree requires a total of **120 credits**. The requirements are as follows:

1. University Studies Requirements. Competency Requirements (9-13 credits), Breadth Requirements (18 credits), and Depth Education Requirements (5 courses). For more information, see pages 42-49.

2. Professional Education. 15-18 credits.

3. Special Education Major. 42-60 credits. Coursework includes: human growth and development; applied behavior analysis; introduction to systematic instruction (task analysis, curriculum-based measurement, behavioral objectives, contingent reinforcement); designing curriculum; Individualized Educational Programs (IEP); educational assessment, analysis, and adaptation of instructional materials; intervention strategies for academic and social behaviors; and parent involvement. Additionally, each endorsement area includes practicum work with exceptional children or youth. Finally, all students must complete student teaching with students with disabilities.

4. Professional Depth. 15 credits. The emphasis area is designed to enhance the Special Education major's background. Areas recommended include communicative disorders, psychology, sociology, family and human development, recreation, and physical education.

5. Electives. 7-20 credits.

Additional Information

For more information concerning Bachelor of Science or Bachelor of Arts requirements and the sequence in which courses should be taken, see major requirement sheets available from the Department of Special Education and Rehabilitation (Education 313) or the Special Education Advising Office (Education 107).

Financial Support

Scholarships, assistantships, grants-in-aid, and work-study programs are available through the University. In addition, there are some endowed scholarships available through the department and, sometimes, there are stipends available from federal grants.

Graduate Programs

Admission Requirements

Admission decisions are made by the department's Graduate Program Committee. Admission requirements are based upon those of the School of Graduate Studies (see pages 90-91). In addition, the committee considers experience, academic record and curriculum, formal recommendations, and test scores. To be considered for admission to the master's degree programs, applicants must submit either GRE or Miller Analogies Test scores. Doctoral program admission requires GRE scores. Students applying for admission to special education graduate programs, who do not have an undergraduate special education background, may be required to complete selected undergraduate courses prior to admission as fully-matriculated graduate students.

Applicants for the Rehabilitation Counseling and doctoral programs are screened throughout the year by the Graduate Program Committee. Applicants for the Special Education Master's program are reviewed on May 1, August 1, and December 1. Only complete files will be reviewed. Applications received after these dates will be considered, but opportunities for financial assistance may be limited. No applications will be considered until all required information arrives at the School of Graduate Studies office.

Teaching Licenses

The department prepares students for licensure as teachers of students with mild/moderate disabilities, students with severe disabilities, and preschool-age students with disabilities. Licensure may also be obtained in visual and/or hearing impairments through a multi-university consortium program. Licensure may be obtained as part of the graduate degree program or without a graduate degree.

Degree Programs

Master of Science in Special Education (MS). The Master of Science degree program is designed for persons who desire to improve their teaching skills and who are contemplating an advanced degree beyond a master's degree. Generally speaking, MS theses differ from MEd creative projects in that they involve experimental research. That is, a study is designed to determine the relationship between an independent variable (i.e., an intervention or treatment) and a dependent variable (i.e., a target behavior). The intent of such research is to contribute knowledge to the field of special education. A minimum of 36 credits, including a thesis, is required for the MS degree.

Master of Education in Special Education (MEd). The Master of Education degree program is designed for persons who desire a graduate program that will help them improve their competencies as educators. This includes school personnel, as well as individuals who are involved in education-related activities across a variety of community, work, and clinical settings. The MEd degree focuses on refining school practices in terms of instruction and management practices, legal requirements, and professional collaboration. All candidates must complete a creative project. A minimum of 36 credits, including a creative project, is required for the MEd degree.

Master of Rehabilitation Counseling (MRC). The Master of Rehabilitation Counseling prepares persons with the basic competencies to provide rehabilitation counseling to a broad range of individuals with disabilities in a variety of settings, such as state rehabilitation agencies, independent living centers, rehabilitation hospitals, private rehabilitation facilities and agencies, employment assistance programs, and private industry. The degree is a 48-credit program consistent with the requirements of the Council on Rehabilitation Education (CORE). The Rehabilitation Counseling Program has a limited number of scholarships funded

through the U.S. Department of Education, Rehabilitation Services Administration. These scholarships require a postgraduate commitment to work for a not-for-profit agency serving the needs of individuals with disabilities for two years for every year of scholarship received.

Educational Specialist Program (EdS). The educational specialist degree is designed for advanced graduate students seeking instruction beyond a master's degree. Programs are individually planned to address specific student needs. Completion of the EdS program is based on completion of required coursework, submission of a research proposal to a supervisory committee, and satisfactory defense of the research project.

Doctor of Philosophy in Disability Disciplines (PhD). The PhD program prepares leadership personnel for positions in research and university programs.

Completion of the PhD program certifies competence in the three following areas: (1) mastery of the theoretical and applied content required for providing appropriate services for persons with disabilities (infants and toddlers, children, youth, and/or adults), (2) ability to conduct independent research with particular emphasis on topics related to persons with disabilities, and (3) ability to effectively teach audiences of varying sophistication and expertise and to supervise the delivery of special education, rehabilitation, or other services.

Doctorate of Education (EdD). The department participates in the College of Education and Human Services Interdepartmental Doctorate of Education (EdD) degree program. The general purpose of the special education emphasis area of the EdD program is to prepare leadership personnel for positions in administration, supervision, curriculum development, and teacher training. For information about areas of specialization, emphases of study, research sponsored, admission requirements, procedures to follow, and other information, see pages 185-186 of this catalog.

Financial Assistance

Acceptance of a student to a graduate program is independent of financial aid. Financial assistance available through the School of Graduate Studies includes University fellowships, scholarships, and fee waivers. Further, federal grants to the faculty members often provide stipends and assistantships for doctoral students.

Additional Information

Graduate handbooks outlining the graduate programs, policies, and procedures in the Department of Special Education and Rehabilitation may be obtained from the department office in room 313 of the Education Building.

For more information about graduate requirements and the sequence in which courses should be taken, see major requirement sheets, available from the department.

Graduation requirements described in this catalog are subject to change. Students should check with the department concerning possible changes.

Because the Special Education and Rehabilitation graduate programs occasionally undergo fine-tuning and updating, prospective students are advised to check the departmental website at:
http://sped.usu.edu.

Special Education and Rehabilitation Faculty

Professors

Alan M. Hofmeister, technology, school reform, reading and math instruction

Benjamin Lignugaris/Kraft, personnel preparation, secondary special education, social/vocational skill training, behavioral analysis, instructional design and program development

Sarah Rule, early intervention, developmental disabilities, technology and teacher education

Charles L. Salzberg, applied behavioral analysis, single-subject research design, research on teacher training, employment preparation for persons with disabilities, video assisted training programs, paraeducator training, and students with disabilities in higher education

Julie F. Smart, rehabilitation counseling, disability studies, Hispanics with disabilities, Spanish translation of rehabilitation instruments, multicultural rehabilitation

Richard P. West, behavior analysis in education, computer-based decision making, parent training, school organization and administration

Karl R. White, research and evaluation, early intervention

Adjunct Professor

K. Richard Young, behavior disorders, behavior analysis, social skills

Professors Emeritus

Garth M. Eldredge, rehabilitation counseling

Marvin G. Fifield, evaluation of persons with emotional disturbances

Associate Professors

Judith M. Holt, early childhood and visually impaired

Pamela J. Hudson, adolescents with mild disabilities, mathematics

Robert L. Morgan, behavior analysis/transition

Timothy A. Slocum, reading, mild/moderate disabilities, behavior analysis, research methods

Adjunct Associate Professor

Daniel P. Morgan, behavior disorders, social skills, legal issues in special education, personnel development in special education

Associate Professors Emeritus

Hyrum S. Henderson, teacher training

Devoe C. Rickert, vocational training

Assistant Professors

David E. Forbush, mild/moderate disabilities, reading, behavior analysis in schools, assessment, educational systems change, educational leadership

Thomas S. Higbee, early childhood, severe disabilities, autism

Timothy N. Tansey, rehabilitation, counseling, administration, employment training

Research Assistant Professor

Cynthia J. Rowland, distance education, speech and language development, naturalistic instructional methods, early literacy, assistive technology

Extension Assistant Profesor

Nancy K. Glomb, special education teacher education, distance education, legal issues, behavior disorders, collaboration

Adjunct Assistant Professors

David W. Bush, psychological, assessment, counseling

Julie Landeen, legal issues in special education, special education administration

Marilyn Likins, paraeducators, mild and moderate disabilities, alternative teacher preparation

Sharon Neyme, students at-risk

Ginger Rhode, legal issues in special education, behavior analysis

Kathleen Robins, multi-sensory disabilities

Randyl Schelble, mild and moderate disabilities

Clinical Instructors

Barbara J. Fiechtl, preschool and infant service delivery

Greg E. Gerard, chronic illness, assistive technology, instructional technology, distance education

Kimberly H. Snow, curriculum development

Adjunct Clinical Instructors

Kirk Allen, emotionally disturbed, special education administration

Gayle Baker, severe disabilities

Jerry Christensen, personnel development, special education leadership

Marlene Deer, preschool disabilities, severe disabilities

Glenn Dyke, behavior disorders, mild and moderate disabilities

AnnaLee Hansen, mild and moderate disabilities

Melanie Jones, mild and moderate disabilities

Susanne Kuresa, behavior disorders, classroom management

Martell Menlove, special education administration

Cindy Myers, moderate and severe disabilities, alternative teacher preparation

Lois Naegele, American Sign language, deaf culture, rehabilitation counseling

Bruce Schroeder, collaboration, special education administration, special education personnel development

Patricia B. Willis, learning disabilities, early literacy

Clinical Instructor Emeritus

Joan F. Forsgren-White

Course Descriptions

Special Education (SPED), pages 482-486
Rehabilitation Counseling (REH), page 473

Theatre Arts

Department Head: Colin B. Johnson
Location: Chase Fine Arts Center 232
Phone: (435) 797-3046
FAX: (435) 797-0086
E-mail: luannh@hass.usu.edu
WWW: http://www.usu.edu/theatre

Undergraduate Advisors:
Theatre Arts: Colin B. Johnson, Fine Arts Center 232, (435) 797-3046, colin.johnson@usu.edu
Theatre Design and Technology Emphasis: Bruce L. Duerden, Fine Arts Center 148, (435) 797-3026, bruced@hass.usu.edu
Theatre Education Emphasis: David E. Sidwell, University Reserve 125, (435) 797-3703, dsidwell@hass.usu.edu

Graduate Program Coordinator: Nancy E. Hills, Fine Arts Center 229A, (435) 797-3049, nhills@hass.usu.edu

Degrees offered: Bachelor of Arts (BA), Bachelor of Fine Arts (BFA), Master of Arts (MA), and Master of Fine Arts (MFA) in Theatre Arts

Undergraduate programs: *BA*—General Theatre Arts Studies (History and Dramatic Literature); *BFA*—Acting, Theatre Design and Technology (costume design, lighting design, scenic design, stage management, theatre technology), Theatre Education

Graduate specializations: *MFA*—Advanced Technical Practice, Design (scenery, costume, lighting)

Undergraduate Programs

Objectives

The primary mission of the Department of Theatre Arts is to offer a flexible program with the following objectives:

1. To prepare students for professional work in performance, various types of theatre design, and technical practice with producing theatre organizations;
2. To teach appreciation and service courses contributing to the University Studies Program;
3. To prepare students for careers as theatre instructors in secondary schools and to provide service courses in support of the language arts curriculum of the State of Utah for elementary education majors;
4. To prepare students for advanced study and training;
5. To sponsor public performances in which students can practice the art and craft of theatre and interpretive/narrative performance. These productions will enhance the cultural life of the University community and region.

Production Groups and Theatres. The Theatre Arts Department sponsors the following production groups and divisions: Utah State Theatre, Old Lyric Repertory Company (summer), Studio/Conservatory Stage Series, Narrative Theatre, and Utah State Children's Theatre. Facilities used for performances by these groups include a 690-seat thrust stage in the Chase Fine Arts Center, the 380-seat proscenium Lyric Theatre in downtown Logan, and the flexible 80-seat Studio Stage. Facilities also include a costume shop, scenery shop, sound studio, design studio, dance and movement laboratory, and storage areas.

Requirements

Departmental Admission Requirements. Admission requirements are the same as those described for the University on pages 15-18. Students in good standing may apply for admission or transfer to the program. Students transferring into the department must have a minimum 2.5 GPA (on a scale of 4.0) regardless of credit amount transferred. Admission to specialized BFA programs by audition, interview, or portfolio review subsequent to admission to the department is explained below. Students must maintain an average 2.5 minimum GPA in all theatre classes required for graduation. No grade of less than a *C-* is accepted in any theatre class, and no required classes, regardless of department, may be taken on a *pass-fail* basis.

Core Courses. All Theatre Arts majors are required to complete the following core courses: THEA 1210, 1400, 1500, 2410, 3230. Entering and transfer students must attend a noncredit theatre orientation seminar. In addition, all students must complete a minimum of 6 credits of production practicum work.

Bachelor of Arts Degree

General Theatre Arts Studies Program (60 credits). Requirements are as follows: core courses and production work (21 credits); performance courses (9 credits); design/technical courses (3 credits); dramatic literature/history courses (15 credits); university minor (12 credits). To obtain a Bachelor of Arts degree, a student must fulfill the language requirement (see page 50). All majors enter in this degree program. Students interested in graduate programs in stage directing will be urged to complete this degree.

Bachelor of Fine Arts Degree

Program Entrance Requirements. Students seeking the BFA degree who choose the Acting Program or the Theatre Design and Technology Program will be admitted by audition *or* an interview and portfolio review. Periodic audition and review will be undertaken to determine good standing in these programs.

This degree is highly recommended for those students desiring more intensive preprofessional training in their selected discipline. Students in these programs also complete a capstone recital or project during their senior year.

Acting Program (74 credits). Candidates are accepted into this performance program through an audition and interview conducted by a BFA committee. Progress is monitored through periodic recitals/auditions before the same body, and students must maintain good status in the program for a minimum of two years. Transfer students are subject to the same acceptance process and progress review. Inquiries about specific requirements and expectations should be directed to the Theatre Arts Office.

Students seeking the BFA degree must work closely with advisors. Most University Studies courses and the core curriculum should be completed before the end of the sophomore year, as training is conducted in a manner adapted from conservatory practice. Individual needs, interests, and goals of the student are taken into consideration for selection of elective courses. A student handbook describing the procedures and containing a course of study is also available; these are designed to assist students who are presenting recitals, directing one-act productions, and preparing other projects.

Theatre Design and Technology Program (69-71 credits). Candidates are accepted into the design and technology program by interview and review of a portfolio by a BFA committee. The policies and recommendations for the acting program also apply to this program. Students may further specialize in costume design, lighting design, scenic design, stage management/technician, or theatre technology.

Theatre Education Program (69 credits). Candidates are accepted into the theatre education program by interview and a review of a portfolio by the theatre education committee. Requirements are as follows: core courses (15 credits); performance/directing courses (3 credits); theatre education/language arts courses (6 credits); design/technical courses (4 credits); theatre history/literature courses (3 credits); performance and production practicum courses (3 credits). Students earning a secondary education license must complete 35 additional credits in the Secondary Teacher Education Program (STEP), as well as an academic minor approved by the College of Education and Human Services. All majors desiring a teaching license must apply for admission to teacher education; it is recommended that this be done no later than the beginning of the sophomore year.

Theatre Arts Teaching Minor (20 credits)

Candidates are accepted into the theatre education program by interview and a review of a portfolio by the theatre education committee. Requirements are as follows: core courses (15 credits); production or performance practicum courses (2 credits); theatre education/language arts courses, THEA 4330 or 4340 (3 credits). The requirements for this academic minor must be approved and monitored by the College of Education and Human Services.

Academic Minor in Theatre Arts

Generally, a student interested in a theatre arts minor will complete the 15-credit core course requirements and two 1-credit practicums (see above).

Production Responsibilities

Because the production programs of the department are some of the most important training tools of the discipline, all majors and teaching minors are required to participate in them. A permanent theatre participation record is maintained for each student, and successful completion of crew and performance assignments is a requirement for graduation.

As a capstone experience to their university careers, all majors in their senior year are required to complete a project or recital appropriate to their area of emphasis (except those in the General Theatre Studies BA program, who complete a minor).

Financial Support

Scholarships, grants-in-aid, and work-study opportunities are available through the University. In addition, the department offers talent awards and tuition scholarships to its own majors. These are generally for one semester of in-state tuition and may be applied for each semester by continuing students. Several auditions and interviews are scheduled during the year, both on-campus and at regional theatre conferences and festivals. The department offers special work grants through its production program for qualified, skilled students. There are a number of named scholarships awarded to students qualifying under specific conditions. Contact the Theatre Arts Department for more information.

Graduate Programs

Admission Requirements

All students making application to the MFA program who cannot audition or interview with a member of the theatre arts faculty must submit a resume and a portfolio with renderings, designs, photographs appropriate to the specialization, and any special letters of reference not included with the formal application to the School of Graduate Studies.

The Miller Analogies Test (MAT) may be substituted for the more standard GRE, although the department does not recommend the MAT for international students.

Students who have received their undergraduate training at other institutions or in a discipline other than theatre will be expected to meet a proficiency equivalent to that of USU Theatre Arts graduates. This may require the student to complete the following minimum 20-credit program, which will not count toward the graduate degree: THEA 1400, 1500, 2410, 3230; 3 credits of THEA 4750; and 6 credits of elective Theatre Arts courses in one program area. The student will be given credit for any equivalent courses taken within seven years prior to the date of admission.

Students accepted into the program must begin during the fall semester. The nature of the discipline and the program require that students maintain a continuous residence at the campus during the first two years of study.

Master of Arts

The candidate for the 30 (minimum) credit MA degree will normally complete a thesis, but may, with the approval of the supervisory committee, present a thesis alternative Plan B (36 credits minimum required).

Required courses (30 credits). Requirements are as follows: THEA 6010, 6180, 6240, 6270; two advanced dramatic literature courses selected from the Theatre Arts, English, or Languages,

Philosophy, and Speech Communication departments; three 5000- or 6000-level THEA courses, two of which must be in a single area; and up to 8 credits of THEA 6970 (Thesis). Under special circumstances, a Plan B option in this program is available, requiring 12 credits of special project work and no more than 3 credits of THEA 6970, for a total of 36 credits minimum.

In addition, the standard language competency of 15 credits in one language is required for the MA degree (see page 95).

Master of Fine Arts

The candidate for the 60 (minimum) credit MFA must complete the Plan B program, and will undertake from three to five creative projects in the appropriate specialization. Under this plan, the required project reports customarily take the form of production books, journals, or a design or technical portfolio.

The normal residency is six semesters, including one or two summers in an established repertory or stock company or equivalent intern experience. Participation in the department's summer Old Lyric Repertory Company in Logan, Utah, satisfies this requirement. The nature of the discipline discourages credit by extension, large amounts of transfer credit, or numerous off-campus projects.

Required Courses. The program is completed in three phases, and while there may be considerable overlap between them, students undergo formal reviews before advancing to the next phase. The number of semesters given is approximate.

Entry Phase. Requirements are as follows: *fall semester:* THEA 6010, 6240, 6520, 6800; *spring semester:* THEA 6270 and advanced courses in the area of specialization.

Upon or during completion of this phase, the student will: (1) submit a petition to advance to the next phase; (2) identify two to four projects for the next phase; and (3) nominate a supervisory MFA committee of at least three members for submission to the department head. A communication proficiency examination will be conducted at the conclusion of THEA 6180 when the student presents his or her project to the Graduate Study Committee.

All of the above coursework (with the exception of the BA proficiency requirement, as necessary) must be completed, with grades recorded, prior to entry into the next phase. A full-time student entering in the fall semester who does not complete the Entry Phase by the following summer will be subject to termination.

Project Phase. During this phase, the student must complete two courses in advanced dramatic literature, along with additional advanced courses in the area of specialization; must complete a cognate skill, consisting of the equivalent of 6 semester credits outside the department, to develop a skill or increase knowledge in a field related to the specialization, subject to approval by the advisor and Graduate Study Committee; must participate in the summer Old Lyric Repertory Company (4 credits, repeatable) or its equivalent in a recognized stock or repertory program, with a letter of satisfactory performance from the company director submitted to the department; and must complete two to four projects in the field of specialization (approximately 6-12 credits).

Culminating Phase. Requirements are as follows: THEA 6920 (4 credits), 6970; execution of a final, culminating project; a maximum of 3 thesis credits, taken to complete all reports; and completion of two to four additional 5000- or 6000-level elective courses.

Note: Whenever possible, graduate projects are proposed and executed as part of the Utah State Theatre artistic season. The option to cancel a student project or to allow work to proceed, but disqualify it as an MFA project based upon insufficient preparation or validity, rests with the Graduate Study Committee, the student's supervisory committee chairperson (advisor), and the executive producer of Utah State Theatre. This rule is designed to protect the integrity of the production priorities of the department.

Upon completion of this phase, the student will: (1) assemble the supervisory committee for a final review in a defense of the student's graduate work; and (2) file a complete copy of all Plan B reports with the department, in accordance with the procedures of the School of Graduate Studies.

Financial Assistance

Teaching and general assistantships are awarded by the department. Assistantships are generally in the area of production, depending on theatre needs and the skills of applying students, and are renewable for up to three years. Application should be made directly to the department by February 1. Graduate students are not guaranteed financial assistance during their initial year of residence. Several other grants and forms of support are available on a competitive basis.

Career Opportunities

The MA degree is a general, nonterminal degree designed to train students for further doctoral work in the discipline and to serve as a career upgrade for secondary school teachers. Students interested in teaching dramatic literature and theatre history and criticism at the postsecondary level should plan to use the MA as a step toward further PhD studies. A few two-year colleges employ MA graduates in teaching positions; however, almost no four-year colleges do so.

The MFA is designed for students pursuing careers in educational, professional, and regional theatres, or, in some cases, further doctoral-level work. It is regarded by most university and college administrations as a terminal degree for individuals with academic appointments as acting coaches, designers, and technicians. The department makes no guarantee that its training will qualify its graduates to pass examinations administered by the theatrical trade unions or otherwise meet requirements for guild membership. MFA graduates are qualified to seek employment with regional and professional theatres, regardless of the guild or trade union status of these organizations.

Additional Information

Specific details about each of the foregoing programs are outlined in documents available through the department. Requirements are subject to change. Internet e-mail requests should be sent to: **luannh@hass.usu.edu**.

Theatre Arts Faculty

Professor

Colin B. Johnson, theatre history and criticism, film

Professor Emeritus

Sidney G. Perkes, scene and costume design

Associate Professors

Mark L. Damen, playwriting, history

Kevin Doyle, acting, directing

Bruce L. Duerden, technical theatre, lighting

Dennis Hassan, scene design

Nancy E. Hills, costume design

Lynda Linford, acting

David E. Sidwell, history, storytelling, theatre education

Associate Professor Emeritus

Arthur Y. Smith, interpretation, theatre education

Assistant Professors

Shawn Fisher, design, technical generalist

Adrianne Moore, voice, acting, directing

Artemis Preeshl, movement, dance, acting

Course Descriptions

Theatre Arts (THEA), pages 489-492

Toxicology

Director: Roger A. Coulombe, Jr.
Location: Animal Science 213
Phone: (435) 797-1600
FAX: (435) 797-1601
E-mail: rogerc@cc.usu.edu
WWW: http://toxicology.usu.edu

Degrees offered: Master of Science (MS) and Doctor of Philosophy (PhD) in Toxicology

Graduate Programs

Established in 1962, USU's Interdepartmental Graduate Program in Toxicology is one of the first degree-granting graduate toxicology programs in the country. More than 140 students have received MS and PhD degrees through this research-intensive interdisciplinary program. Students affiliate with the program through one of several departments: Animal, Dairy and Veterinary Sciences (ADVS); Biology; Chemistry and Biochemistry; Civil and Environmental Engineering (CEE); or Plants, Soils, and Biometeorology (PSB). The USDA Poisonous Plants Laboratory also provides facilities and research projects for study.

Admission Requirements

Students with a degree in life sciences, physical science, medical science, or engineering and with adequate preparation in chemistry, biology, physics, and/or mathematics are encouraged to apply. Admission to the program requires compliance with the general admission requirements of the School of Graduate Studies, a faculty sponsor, and acceptance into the sponsoring professor's home department. Applicants should have a minimum GPA of 3.0 from completed degree programs. International students must receive a minimum TOEFL score of 250 (computer-based) or 600 (paper-based).

Major Research Areas

Molecular and Biochemical Toxicology. Modern molecular biological techniques are used to determine the mechanisms of toxicity and carcinogenesis by examining how various natural and synthetic compounds interact with the cellular genome. Resultant mutations in oncogenes and tumor suppressor genes are being investigated. The mechanisms of free-radical toxicity, specifically by iron and other transition elements, are also important research topics. Other ongoing studies examine the mechanisms of cancer chemoprevention, chemical metabolism, effects of toxicants on macromolecular syntheses, and metabolic intermediates. The toxicity of poisonous plants is another program emphasis.

Environmental Toxicology. Utah State University has a comprehensive research program in several aspects of environmental toxicology. Specifically, Utah State University faculty pioneered the use of white-rot fungi for the biodegradation of environmental contaminants. Models are developed and tested for dealing with the migration of chemicals in the environment, especially those with potential routes for human exposure. Basic biological, chemical, and physical methods are explored for hazardous waste management programs.

Course Requirements

Students in the **MS program** are required to complete the following core courses: ADVS 6350, 6400, 6600 (taught alternate fall semesters), 6810; CHEM 5700, 5710; STAT 5200.

Students in the **PhD program** are required to complete the following core courses: ADVS 6350, 6400, 6600 (taught alternate fall semesters), 6810; BIOL 5600 or 5620; CHEM 5700, 5710; STAT 5200.

Additional coursework may be required, at the discretion of the student's advisory committee.

Financial Assistance

Graduate students are eligible for competitive fellowships, teaching assistantships, and research assistantships. Out-of-state fees are waived, and in many cases, in-state fees are also waived. Hourly employment, which often permits waiver of out-of-state fees, is also available.

The Toxicology Graduate Program participates in the WICHE Western Regional Graduate Degree Program (WRGP). Residents of participating states may enroll in this program without paying nonresident tuition. To facilitate this process, applicants should inform the Toxicology Program of their WRGP status upon application.

Toxicology Program Faculty

Professors

Anne J. Anderson, plant toxicology (Biology)

Ann E. Aust, metal-induced carcinogenesis (Chemistry and Biochemistry)

Steven D. Aust, biochemical toxicology and bioremediation (Chemistry and Biochemistry)

Roger A. Coulombe, Jr., molecular toxicology, cancer chemoprevention, natural product toxicology (ADVS)

Howard M. Deer, pesticides and occupational health (ADVS)

William J. Doucette, fate of environmental chemicals, phytoremediation (CEE)

R. Ryan Dupont, biological waste treatment (CEE)

William J. Popendorf, occupational toxicology and industrial hygiene (Biology)

Ronald C. Sims, environmental engineering (CEE)

Research Professor

Darwin L. Sorensen, aquatic toxicology (CEE)

Associate Professors

Paul R. Grossl, soil chemistry and phytoremediation (PSB)

Jeffery O. Hall, veterinary toxicology (ADVS)

Collaborators at USDA Poisonous Plants Laboratory

Dale R. Gardner, natural product chemistry

Kip E. Panter, poisonous plants

James A. Pfister, behavioral toxicology

Bryan L. Stegelmeier, veterinary pathology