

# Agriculture

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The College of Agriculture includes the following departments:

**Agricultural Systems Technology and Education (ASTE)**  
**Animal, Dairy and Veterinary Sciences (ADVS)**  
**Economics (Econ)**

(jointly administered with the College of Business)

**Nutrition and Food Sciences (NFS)**  
**Plants, Soils, and Biometeorology (PSB)**

Degrees and curriculum options are listed in the *Instructional Units and Programs* section of this catalog. In addition to programs in the departments, the interdepartmental MS and PhD degrees in Toxicology involve more than one department.

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

Agriculture is the nation's largest industry. Of the 131 million people employed in the United States, about 21 million (16 percent) work in agriculture. This includes about half a million scientists who serve agriculture directly or indirectly. The agricultural industry is the biggest buyer, seller, and borrower in the United States, and it has the largest investment of any industry.

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

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

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

## Admission Requirements

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

## Facilities and Equipment

The E. G. Peterson Agricultural Science Building houses the administrative offices of the College of Agriculture; the Agricultural Experiment Station; University Extension; the Animal, Dairy and Veterinary Sciences Department; and the Plants, Soils, and Biometeorology Department. The Animal, Dairy and Veterinary Sciences Department personnel are housed in the Agricultural Science Building, the Animal Sciences Building, the Biotechnology Center, the Scaggs Laboratory, and the Veterinary Science Building. The Agricultural Systems Technology and Education Department is located in the Agricultural Systems Technology and Education Building. The Economics Department is housed in the George S. Eccles Business Building. The Department of Nutrition and Food Sciences is housed in the C. A. Ernstrom Nutrition and Food Sciences Building. Some classes and laboratories are located on Agricultural Experiment Station facilities near the campus, where research and teaching interact. Research units located in more distant areas of the state provide research opportunities for graduate students and faculty members.

## Curricula in Agriculture

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

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

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

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

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

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

**Business.** The businesses and industries that buy from, sell to, and provide service for people involved in production agriculture are expanding the need for employees educated in agriculture. These enterprises include feed, fertilizer, machinery, and chemical firms that supply the producer's needs, as well as marketing firms that assemble, process, ship, and merchandise agricultural products. Managers of large-scale farm enterprises also profit from the kind of education provided by the business curriculum. Students who want to capitalize on their agricultural background while pursuing a business or industrial career should consider the business option.

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

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

### ***Financial Support***

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

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

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

# Business

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**Academic Departments.** The College of Business includes the following academic departments. Information about degrees and curriculum options are listed in the departmental sections of this catalog.

**Accountancy, School of**  
**Business Administration**  
**Business Information Systems**  
**Economics**

(jointly administered with the College of Agriculture)

**Management and Human Resources**

**Interdisciplinary/College Programs.** The College of Business offers the following programs in addition to those offered by academic departments. Detailed descriptions of these programs are provided in this section of this catalog and in the separate *Master of Business Administration (MBA)* section.

**Business Minor**  
**Dual Major and Second Bachelor's Degree in Business**  
**International Business Minor**  
**Master of Business Administration (MBA)**

**Nondegree and Other Programs.** A wide variety of seminars and development programs are sponsored by academic departments and other units of the college. For example, *Business Relations* offers annual seminars in accounting, banking, customer service and marketing, human resources, international business, management information systems, and quality and productivity. The *Management Institute* meets the unique continuing education needs of a specialized segment of the population: supervisors, managers, and executives who provide leadership and direction for both private and public sector organizations. The *Small Busi-*

*ness Development Center* provides a variety of specialized diagnostic, consultative, manpower development, and industrial development services to individual businesses.

**Accreditation.** All bachelor's and master's degree programs in business are accredited by AACSB International—The Association to Advance Collegiate Schools of Business. This association is the professional accrediting agency in business. Accreditation by AACSB International facilitates transferability of credits to other institutions and acceptance of the credentials of graduates by the business community.

## Objectives

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

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

In implementing its **outreach objectives**, the college extends its resources and services to off-campus patrons by offering distance education programs and classes, participating in Continuing Education Centers, and by conducting on-site visits to individual firms and organizations, thereby enhancing the quality of life and economic well-being of citizens of the state.

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

## Undergraduate Programs

### Admission and Graduation Requirements

**Freshman Admission.** Students may be admitted directly into the College of Business 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 College of Business 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.

**Enrollment Restrictions.** Admission to the College of Business does not ensure access to the courses required for graduation. The following admission requirements must be met by all USU students:

1. There are no restrictions on 1000-level courses.
2. ACCT 2010, 2020, MHR 2990, and BIS 2450, 2550 require as prerequisites at least 15 credits of completed college-level work, an overall GPA (transfer credits included) of at least 2.50, and MATH 1050 or equivalent. In addition, BIS 2450 requires the CIL exam or equivalent.
3. 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.

4. MHR 4880 and 4890 require completion of at least 84 credits for admission.
5. A GPA of at least 2.50 is required in the College of Business Core and in all University courses taken.
6. College of Business courses may be repeated only once.
7. Many College of Business courses have prerequisites and other restrictions requiring adherence. Before registering for courses within the College of Business, students should refer to course listings in this catalog or consult with their advisor to ensure they have completed the necessary prerequisites.

**University Studies Requirements.** All freshmen-level students who enter USU Fall of 1998 and thereafter will be required to meet the University Studies requirements. Students who have received an Associate of Arts/Science degree from a college or university in the Utah System of Higher Education or from a school with which USU or the College of Business has an articulation agreement will be considered to have fulfilled the General Education portion of the University Studies requirements, *but must still complete the Depth Education portion*. It is recommended that all business students visit with an advisor in the Career and Education Opportunities Center, Business 310A, to clarify their specific requirements in this area. Additional information about these requirements is available on pages 42-49 of this catalog.

**USU Courses and Business Courses.** At least 30 of the last 60 semester credits must have been completed at USU, 10 of which must be included within the last 40 credits presented for the bachelor's degree. This includes credits earned through classes offered at the Logan campus, at designated centers, or by USU's distance education programs.

**Optional P/D+, D, F Grade Restriction.** This option (see the USU "Grading Policy," page 36) is not available for any required courses for majors and minors in the College of Business.

**College of Business Stop-out Policy.** Students having a break in attendance of College of Business programs in excess of one year will be subject to the college and departmental requirements in effect at the time of their return.

**Graduation.** Students must satisfy all University, college, and departmental major requirements to be eligible for graduation. Refer to appropriate sections of this catalog for details.

### **Minor in Business**

The college offers a minor for nonbusiness majors consisting of the five courses listed below. This minor is designed to develop a general background and perspective in business. Completion of this minor will acquaint students with each business discipline. Advisement for the minor in business is through the College of Business Career and Education Opportunities Center in Business 310A. An overall minimum GPA of 2.50 is required for the five courses. Students are responsible to complete prerequisite courses where applicable. Required courses for the minor in business include ACCT 2010; BA 3400 or 3460; BA 3500; MHR 3110; and one of the following courses: ECON 3400, MHR 2990, or BIS 3100.

### ***Minor in International Business***

Both College of Business majors and nonmajors are eligible to receive the International Business Minor. This minor is designed to develop a general background and perspective in business. All students who plan to pursue this minor receive academic advisement from the College of Business Career and Education Opportunities Center in Business 310A. This minor consists of four courses selected from a group of six courses (listed below) and completion of either a Language Competency Option or a Regional Studies Option. Four of the following seven courses are required as part of this minor: BA 4300 (International Finance), BIS 4550 (Principles of International Business Communications), BIS 5700 (Internet Management and Electronic Commerce), ECON 3400 (International Economics for Business), ECON 5150 (Comparative Economic Systems), MHR 3820 (International Management), and MHR 4890 (Business Strategy in a Global Context). Information about the Language Competency and Regional Studies Options is available in the Career and Education Opportunities Center, Business 310A.

### ***Minors in Other Business Subjects***

Minors are available in other business subjects, as indicated in departmental sections of this catalog.

### ***Dual Major and Second Bachelor's Degree***

The College of Business offers both a dual major and a second bachelor's degree—Bachelor of Science (BS) or Bachelor of Arts (BA)—in Business. This particular option requires a broad course distribution among the departments of the college. It is, therefore, administered by the college, rather than by a specific department. Requirement information is available in the College of Business Career and Education Opportunities Center, Business 310A.

For requirement information concerning other second bachelor's or dual major degrees having specialization within the college, see departmental sections of this catalog.

### ***College of Business Sponsored Student Organization***

**Phi Beta Lambda (PBL)** is a cocurricular student organization. The organization's goal is to provide opportunities to develop business career competencies and to promote civic and personal responsibility. Membership is open to all students interested in business.

### ***Other Professional Student Organizations***

The following student organizations are sponsored by College of Business departments and are available for membership, depending upon student objectives and qualifications.

**American Marketing Association (AMA):** Organization for marketing and marketing education majors.

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

**Beta Alpha Psi:** Honorary professional accounting fraternity.

**Beta Gamma Sigma:** Honorary business fraternity. (See page 71 for further information.)

**Association for Systems Management (ASM):** Organization for students planning careers in information processing and information systems management.

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

**Delta Epsilon Chi (DEX):** Co-curricular organization for marketing education and marketing majors.

**Economics Club:** Organization for students majoring in economics.

**Finance Club:** Organization for students majoring in finance.

**Institute of Management Accountants (IMA):** Organization designed for accounting majors.

**MBA Association:** Organization for MBA graduate students.

**Sigma Iota Epsilon (SIE):** National honorary and professional management fraternity.

**Society for Human Resource Management (SHRM):** Organization for majors in fields of personnel and human resource management.

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

A number of scholarships and assistantships are available to College of Business students at both the undergraduate and graduate levels. There are also opportunities for employment in research projects and other activities. Assistantships for graduate students are available for both teaching and research. Applications for undergraduate scholarships may be made directly to the Career and Education Opportunities Center, Business 310A.

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# Education and Human Services

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**Associate Dean for Research:** Carol J. Strong, Education 453A,

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The College of Education and Human Services has the following departments:

**Communicative Disorders and Deaf Education**  
**Elementary Education**  
**Family, Consumer, and Human Development**  
**Health, Physical Education and Recreation**  
**Instructional Technology**  
**Psychology**  
**Secondary Education**  
**Special Education and Rehabilitation**

The College of Education and Human Services provides preparation programs for prospective teachers, for counselors and other professional personnel in education, and for professionals in the human services area and in corporate settings. Students are urged to refer to the more detailed descriptions of programs, majors, and areas of specialization contained in this catalog.

**Accreditation.** Utah State University is a member of the American Association of Colleges for Teacher Education and is accredited by the National Council for the Accreditation of Teacher Education and the Utah State Board of Education. Students who are licensed to teach in the state of Utah may qualify for licensure in other states and the District of Columbia. Additional material accreditations include: American Association of Family and Consumer Sciences, American Psychological Association, American Speech-Language-Hearing Association, Council on the Education of the Deaf, and National Association of School Psychologists.

**University Studies Requirements.** All students graduating from the College of Education and Human Services must complete the USU University Studies requirements (see pages 42-49).

**Admission Requirements to Teacher Education.** Students wishing to enter the Teacher Education Program at Utah State University must formally apply for admission and be approved by the Office of the Associate Dean for Teacher Education, as well as by the department where the teaching major is being offered. All applicants are required to submit a record of their ACT scores, pass the Teacher Education Writing Exam, and take a speech and hearing test. Students are not permitted to enroll in the education professional core classes prior to being admitted to the Teacher Education Program.

Detailed information about admission to the Teacher Education Program should be obtained from a departmental advisor or

from the Office of the Associate Dean for Teacher Education, Graduation, and Educator Licensing.

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

The College of Education and Human Services currently offers preservice teacher preparation leading to licensure in 34 different areas. In addition, advanced programs leading to professional licensure are available for administrators, supervisors, school counselors, school psychologists, school library media specialists, speech pathologists and audiologists, educators of the deaf, and specialists in special education. Training is also available in English as a Second Language (ESL), reading, distance education, and gifted and talented education.

Specific requirements for each license may be obtained from the Office of the Associate Dean for Teacher Education, Graduation, and Educator Licensing or from the department in which the major work is offered. All students who desire licensure must complete a criminal background check.

For the early childhood, elementary, or secondary license, a closely supervised program of student teaching is conducted in selected schools throughout the state. Students should be financially prepared to live off campus during the semester selected as their professional semester of student teaching.

The Bachelor of Science degree with a major in elementary education, secondary education, or special education is designed for students preparing to teach in any of these fields. Students majoring in other departments of the University who wish to prepare for teaching are admitted to teacher education curricula as heretofore described. An endorsement in middle education is also available.

**Dual Licensing.** A student desiring to obtain early childhood and elementary education, elementary and secondary education, elementary and special education, elementary and deaf education, early childhood and deaf education, or secondary and special education licenses should consult with an advisor in the education departments early in his or her program. Ordinarily, dual licensure will require at least one additional semester of work.

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

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

The Center for Early Childhood Education provides educational experiences and resources for teachers and parents that reflect the most current understanding of the social, emotional, physical, and cognitive needs of children in pre-kindergarten, kindergarten, and the primary grades.

The Center for the School of the Future strives to determine what children should be taught and how they can learn it most effectively.

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

### ***Graduate Study***

Programs at the graduate level, leading to advanced professional degrees and/or licensure, are available in the administrative, supervisory, human services, clinical, library media, and counseling areas. The Master of Education (MEd), Master of Science (MS), and Master of Arts (MA) degrees are offered in most departments. An Educational Specialist (EdS) program is available in the following departments: Communicative Disorders and

Deaf Education, Instructional Technology, and Special Education and Rehabilitation. Interdepartmental Doctorate of Education (EdD) and Doctorate of Philosophy (PhD) degrees are available with specializations in Business Information Systems, Curriculum and Instruction, and Research and Evaluation. A professional Doctorate of Audiology (AuD) is available in the Department of Communicative Disorders and Deaf Education. PhD degrees are offered within the following departments: Family, Consumer, and Human Development; Instructional Technology; Psychology; and Special Education and Rehabilitation.

## ***Course Descriptions***

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# Engineering

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The College of Engineering includes the following academic departments:

**Biological and Irrigation Engineering  
Civil and Environmental Engineering  
Electrical and Computer Engineering  
Industrial Technology and Education  
Mechanical and Aerospace Engineering**

The College of Engineering includes the following research units:

**Anderson Center for Wireless Teaching and Research:**

Director to be appointed

**Center for Profitable Uses of Agricultural Biproducts:**

Conly L. Hansen, Director

**Center for Self-Organizing and Intelligent Systems:**

Kevin L. Moore, Director

**Center for Space Engineering:** Todd J. Mosher, Director

**Engineering Experiment Station:** Alma P. Moser, Director

**Huntsman Environmental Research Center:**

Maurice G. Thomas, Director

**Institute for Natural Systems Engineering:**

Thomas B. Hardy, Director

**International Irrigation Center:**

L. Humberto Yap-Salinas, Director

**National Center for Design of Molecular Function:**

Linda S. Powers, Director

**Utah Center for On-Site Wastewater Treatment:**

Judith L. Sims, Director

**Utah Transportation Center:** Anthony Chen, Acting Director

**Utah Transportation Technology Transfer Center:**

Doyt Y. Bolling, Director

**Utah Water Research Laboratory:**

Mac McKee, Director

Some of the recent areas of research in the Engineering Experiment Station include water management, toxic and hazardous waste management, solid waste recycling, risk assessment, transportation, structural systems, geotechnical analysis and buried structures, CAD/CAM, robotics and automation, thermal and cryogenic systems, image processing and compression, computer networking, parallel computing, neural networks, and virtual reality.

The College of Engineering has the major involvement in:

**Utah State University Research Foundation:**

David G. Norton, CEO

**Space Dynamics Laboratory:** Michael D. Pavich, Director

**Manufacturing Extension Partnership:**

Stephen S. Reed, Director

## Mission

The overall mission of the College of Engineering is to (1) prepare engineers and technologists to work in a complex technological world and create a better future by solving today's problems; (2) engage in research and development that will improve engineering design and practice; and (3) extend knowledge and research to industry and government.

## Goal

The goal of the academic programs of the College of Engineering is to provide engineering and technical education enabling engineering students to:

1. develop as ethical professionals who understand engineering and technology in its societal context;
2. learn modern engineering/science and technology principles and their application in conducting experiments and analyzing data;
3. gain experience in working on engineering problems and designing solutions to meet desired needs;
4. acquire skills in communicating effectively and working on teams; and
5. understand the importance of life-long professional development and learning.

The college strives to create a brighter future by working with students, employers, industry, and government research partners to achieve this objective.



## Programs

The undergraduate engineering BS degree programs offered by USU, which are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology (EAC/ABET), include: Biological Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, Environmental Engineering, and Mechanical Engineering.

At the graduate level, Master of Engineering (ME), Master of Science (MS), and Doctor of Philosophy (PhD) degrees are offered in these specific majors, along with the Civil Engineer (CE) and Electrical Engineer (EE) degrees.

The Industrial Technology and Education Department offers BS degrees in Technology and Industrial Education, Aviation Technology—Maintenance Management, and Aviation Technology—Professional Pilot, as well as an MS degree in Industrial Technology. Admission and academic requirements for the ITE Department are considerably different than those for the other engineering departments. For details, see the Industrial Technology and Education section of this catalog (pages 227-229).

For details about the various majors and specialties offered by departments and programs within the College of Engineering, see the respective departmental sections in this catalog.

## Assessment

The College of Engineering is committed to assessing the quality of its academic departments and programs, in order to assure that the desired educational outcomes will be achieved. Faculty members within the college strive to assure that their students obtain the skills and abilities needed for success in their chosen fields.

The college uses a variety of tools and methods to gather information and data to evaluate progress in meeting the college's program goals and objectives, and to take actions to continually improve the quality of students' educational experience.

## Undergraduate Programs

### Objectives

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

In the engineering programs, the curricula begin with studies in mathematics, basic science, introductory engineering, and introductory engineering design. These basic science and engineering skills are coupled with communication skills, as well as courses in humanities and social sciences. The professional engineering programs continue with engineering science, engineering design, and computer utilization. Engineering design activities start during the freshman and sophomore years, progressing in-depth during the junior and senior years as the student's proficiency increases. The design experience culminates with a capstone design sequence, which builds upon the fundamentals of engineering, communication skills, science, mathematics, humanities and social sciences, economics, ethics, safety, reliability, aesthetics, and social impact.

The expected outcomes of the professional engineering programs are: (1) to unite engineering sciences and computer skills with engineering design to enhance the practical problem-solving abilities, decision-making proficiency, and creativity of the engineering student; (2) to provide for an understanding and appreciation of professional responsibility and ethics; (3) to expand a sensitivity to the economic, legal, and social dimensions of engineering decisions; and (4) to provide the foundation and help instill a desire for life-long learning.

Studies in the humanities and social sciences serve not only to meet the objectives of a broad education, but also to meet the objectives of the engineering profession. In the interest of making engineers fully aware of their social responsibilities and better able to consider related factors in the decision-making process, the College of Engineering requires coursework in the humanities and social sciences as an integral part of the engineering program. To satisfy this requirement, courses selected must provide both breadth and depth and be planned to fulfill an objective appropriate to the engineering profession.

### Admission Requirements

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

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

Students can earn university credits in English, humanities, and social sciences by receiving appropriate scores on the College Level Examination Program (CLEP) tests. Advanced placement (AP) credit may be obtained in calculus, chemistry, English, history, and physics.

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

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

### Professional Engineering Program

**Introduction.** The purpose of the Professional Engineering Program (PEP) is to provide a quality education for engineering students by (1) requiring that students be fully prepared for upper-division engineering coursework by having satisfactorily completed all required preprofessional courses and (2) limiting enrollment in upper-division courses consistent with resources available within the departments and the college.

**Policy.** Enrollment in upper-division engineering courses (3000-level and above) is available *only* to students who have been accepted into the PEP or an appropriate graduate program or have a nonengineering major which requires a specific engineering class for which the student has passed the prerequisite courses.

**Application Requirements.** Current PEP applications listing the required PEP courses and admission standards are available from the various departments and the office of the Dean of Engineering. The minimum requirements a student must satisfy in order to be eligible to apply for admission to a professional program are:

1. The student must be in good academic standing in the University and the college.
2. The student must achieve a grade of *C-* or better in every required preprofessional course. Required preprofessional courses are defined by each major. They include math, science, and engineering courses, as well as ENGL 2010. The 2.3 minimum GPA requirement (see item 3 below) does not include ENGL 2010. The *P/D+*, *D*, *F* grading option may not be used except in freshman English Composition.
3. The student must achieve an overall grade point average of 2.3 or better for all required preprofessional coursework completed at USU.

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

**Transfer Credit.** Transfer credit accepted by the department and the college may be applied toward meeting the requirements for admission into the PEP; however, the grades received will not be used in the USU GPA calculation. For students with transfer credits, a final decision on admission into the PEP will not be made until after the applicant has completed at least 12 semester credits of acceptable engineering, math, and science coursework at USU. Some of this coursework may include upper-division classes taken by permission.

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

**Admission Procedures.** Satisfying minimum eligibility requirements does not ensure that a student will be admitted to a PEP program in a specific department. The number of students accepted in the Professional Engineering Program of a department will be based upon the number of students that can be accommodated in upper-division classes. Applicants will be ranked and selected in order of their academic standing in the required preprofessional courses. Admission into a PEP program is for a

period of three years. Students unable to complete graduation requirements during this time will be interviewed by the department head to determine whether special circumstances justify their continuance in the program.

### **Academic Requirements**

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

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

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

1. A GPA of 2.0 or higher must be maintained in all engineering/math/science courses required for, or used as technical electives in, the chosen major. Courses which were part of the preprofessional program requirements and University Studies courses are not included in this GPA calculation.
2. No more than 10 hours of *D* or *D+* credit may be applied toward meeting graduation requirements in engineering/math/science classes.
3. College of Engineering courses may be repeated only once. Audits count as a time taking a class unless prior written approval is obtained from the department head. A maximum of three required or elective courses completed as part of a professional program can be repeated in order to meet graduation requirements. (Courses completed as part of a preprofessional program are not included in this total of three repeats.)
4. The *P/D+*, *D*, *F* grading option may not be used in required or elective courses completed as part of a professional program. (The *P/D+*, *D*, *F* grading option is approved for University Studies Courses.)
5. The academic regulations listed above (1-4) apply to required coursework and any elective engineering/math/science course which could be used to satisfy graduation requirements for the chosen degree. That is, once a student completes a particular technical elective, it becomes a required course for that student.
6. Students in violation of departmental or college academic regulations, no longer eligible for graduation, or not making satisfactory progress toward a degree, will be placed on probation.
  - a. Students will be placed on probation if they (i) earn an *F* in an engineering/math/science course which could be used to satisfy graduation requirements for the chosen degree (see No. 5 above); (ii) have more than 10 hours of *D* credit (see No. 2 above); or (iii) have a GPA of less than 2.0 (see No. 1 above).
  - b. Students remain on probation until they improve their standing by repeating and passing all failed classes, repeating classes to reduce the number of *D* credits to 10 or less, and/or by raising their GPA above 2.0.

c. While on probation, a student must earn a semester GPA of 2.0 or higher in engineering/math/science 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 each semester with the college academic advisor to work out a schedule having the primary goal of correcting the existing academic problems.

### **General Engineering**

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

### **Additional Engineering Information**

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

Student chapters or societies include Society for Engineering in Agricultural, Food, and Biological Systems, American Institute of Aeronautics and Astronautics, American Society of Civil Engineers, Chi Epsilon, Institute of Electrical and Electronic Engineers, American Society of Mechanical Engineers, American Water Resources Association, Tau Beta Pi, International Technology Education Association, National Intercollegiate Flying Association, Professional Flight Society, American Welding Society, Society of Environmental Engineering Students, and Society of Women Engineers. Students are encouraged to affiliate with appropriate student societies.

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

**ROTC.** Many engineering students find satisfaction in serving their country in the Reserve Officer Training Program (ROTC) and as reserve officers after graduation. Junior and senior ROTC students receive compensation equivalent to a substantial scholarship. See the Department of Aerospace Studies section (pages 123-124) or the Department of Military Science section (pages 265-266) of this catalog.

**Scholarships, Fellowships, and Assistantships.** A number of scholarships and assistantships are available to College of Engineering students. Interested high school seniors are encouraged to submit the *Application for Undergraduate Admission and Scholarships* to the Admissions Office before February 1 of the year they wish to receive assistance. Continuing students, transfer students, and returning students should contact the Dean's Office, College of Engineering for a scholarship application. Completed applications are always due February 1. There are also opportunities for employment on research projects and other activities.

## **Concurrent BS/Master's Program**

### **Qualifications**

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.

### **Procedures**

Students must complete their junior year in engineering with a 3.3 GPA, both overall and during the last 60 semester credits. No later than the beginning of the first semester of the senior year, they must apply to the department offering their major and be accepted into the concurrent program. For application forms, students should contact their department office or the College of Engineering Advising Center (Engineering 314A).

To prepare a two-year completion plan of study, students must meet with their approved faculty advisor. (Department head gives approval for advisor.) Students must take the GRE exam and submit scores to the School of Graduate Studies. (See major department for minimum GRE qualifying scores.)

Students must fill out an application for admission to the School of Graduate Studies, with departmental acceptance into the concurrent program indicated in the upper-right corner of the first sheet. A Split Registration Form, which also indicates departmental acceptance into the concurrent program, must be filled out and submitted for each semester the student is enrolled in the concurrent program.

Formal acceptance into the School of Graduate Studies is required. The student must select a graduate committee, which must be approved by the School of Graduate Studies. The proposed master's program must be approved by the committee, as well as by the School of Graduate Studies.

During the second year of the concurrent program, the student must pay graduate tuition. When the student is within 21 credits of completing both degrees, he or she will be coded as a graduate student. Thereafter, the student will pay graduate fees and will be eligible for loans, but *not* grants.

An application for graduation with a BS degree must be completed. The student must maintain a 3.0 or higher GPA in courses approved for his or her concurrent program.

## **Graduate Programs**

For information about graduate programs, admissions, assistantships, and fellowships, see departmental sections of this catalog.

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

**Engineering Experiment Station.** The Engineering Experiment Station furthers engineering science, education, and practice through a variety of research programs to serve the needs of Utah and the nation. The experiment station especially encourages the development of interdisciplinary interdepartmental research. Major programs are conducted by the following:

- Anderson Center for Wireless Teaching and Research
- Center for High-Speed Information Processing (CHIP)
- Center for Profitable Uses of Agricultural Biproducts
- Center for Self-Organizing and Intelligent Systems
- Center for Space Engineering
- Huntsman Environmental Research Center
- Institute for Natural Systems Engineering
- International Irrigation Center
- National Center for Design of Molecular Function
- Utah Center for On-Site Wastewater Treatment
- Utah Transportation Center
- Utah Transportation Technology Transfer Center
- Utah Water Research Laboratory

**Utah Water Research Laboratory.** The Utah Water Research Laboratory offers facilities and student support for water research, including surface and ground water resources management and use. Strong programs have been developed through multiple projects in weather modification, water quality control, waste water treatment, hydraulics, flood and erosion control, hydrology, groundwater modeling, salinity control, water use in energy devel-

opment, water systems optimization, and the socioeconomic aspects of water resources planning. Studies are coordinated with academic programs in the departments of Civil and Environmental Engineering, Biological and Irrigation Engineering, and related departments in other colleges.

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

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

**Graduate Study.** The college offers graduate study programs leading to the ME, MS, CE, EE, and PhD degrees. For further information and details, see individual departmental sections of this catalog.

## *Course Descriptions*

General Engineering (ENGR), page 391

# *Humanities, Arts and Social Sciences*

**Dean:** Gary Kiger  
**Location:** Main 338  
**Phone:** (435) 797-1195  
**FAX:** (435) 797-1092  
**E-mail:** [hass.general@usu.edu](mailto:hass.general@usu.edu)  
**WWW:** <http://www.hass.usu.edu>

**Associate Dean; Director, Center for International Studies; Co-director, Asian Studies Major and Minor:** R. Edward Glatfelter, Main 333, (435) 797-1196, [edwardg@hass.usu.edu](mailto:edwardg@hass.usu.edu)

**Associate Dean:** Christine Hult, Main 338E, (435) 797-8619, [christine.hult@usu.edu](mailto:christine.hult@usu.edu)

**Associate Dean:** Charlotte Thralls, Main 338B, (435) 797-1231, [charie.thralls@usu.edu](mailto:charie.thralls@usu.edu)

**Director, Science/HASS Advising Center:** Mary E. Leavitt, Student Center 302, (435) 797-3883, [mleavitt@hass.usu.edu](mailto:mleavitt@hass.usu.edu)

**Liberal Arts and Sciences Program:** Contact Science/HASS Advising Center, Student Center 302, (435) 797-3883

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

**Aerospace Studies**  
**American Studies**  
**Art**  
**Asian Studies**  
**British and Commonwealth Studies**  
**Center for International Studies**  
**English**  
**History**  
**Intensive English Language Institute**  
**Interior Design**  
**International Studies**  
**Journalism and Communication**  
**Landscape Architecture**  
**and Environmental Planning**  
**Languages, Philosophy, and Speech Communication**  
**Liberal Arts and Sciences**  
**Military Science**  
**Mountain West Center for Regional Studies**  
**Music**  
**Nora Eccles Harrison Museum of Art**  
**Political Science**  
**Sociology, Social Work and Anthropology**  
**Theatre Arts**  
**Undeclared**  
**Women and Gender Studies**

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

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

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

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

Students accepted in good standing by the University are eligible for admission to the College of Humanities, Arts and Social Sciences. Because of limitations of faculty and/or space, a few departments within the college, such as Art, LAEP, and Sociology, Social Work and Anthropology, limit enrollment in their professional programs. See the departmental sections in this catalog and the department head for information regarding these limitations and/or requirements in addition to the University graduation requirements.

## ***Undeclared***

**Coordinator:** Mary E. Leavitt  
 Student Center 302, (435) 797-3883, [mleavitt@hass.usu.edu](mailto:mleavitt@hass.usu.edu)

The chief function of the Undeclared program is the advisement of students who have not yet decided upon a major or area of specialization. Students in the Undeclared program typically work on their University Studies requirements while exploring major options. This allows them to make progress toward overall degree requirements and provides them with extra time to make wise, informed decisions. Undeclared students are advised by counselors in the Science/HASS Advising Center until they choose a major.

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

No degree is offered through the Undeclared program. Most Undeclared students are freshmen or sophomores. Typically, by the junior year, most students have selected a major and are involved in taking major courses. Students do not usually remain in the Undeclared program beyond 60 credit hours or past the end of the sophomore year.

## Women and Gender Studies

**Co-directors:** Patricia Gantt, Ray B. West 205, (435) 797-2718, pgantt@english.usu.edu; Anne Shifrer, Ray B. West 301C, (435) 797-2731, annes@cc.usu.edu

Women and Gender Studies at Utah State University is a multidisciplinary program focusing on the role of gender in the everyday experiences of women and men. Students are provided with opportunities to examine the diverse experiences, perspectives, and contributions of women in the past, present, and future, both nationally and internationally. Specific courses examine the processes of gender role socialization, and the resulting cultural beliefs and stereotyped images of women. As a result, students gain appreciation for the role of gender and its practical implications in their basic life experiences, thus preparing them to understand current and future changes in the roles of women.

Each semester, Women and Gender Studies courses are taught by faculty members from a variety of disciplines, including Anthropology, Journalism and Communication, English, Fine Arts, Health and Physical Education, History, Natural Resources, Political Science, Psychology, Special Education, and Sociology. Throughout the year, several special topics courses are offered, and new courses are continually being developed. Two Women and Gender Studies scholarships are awarded to undergraduates.

Students may enroll in individual courses or apply coursework toward either a minor in Women and Gender Studies or an Area Studies certificate.

Further information may be obtained from one of the co-directors or from the Science/HASS Advising Center (Student Center 302).

## Mountain West Center for Regional Studies

**Director:** To be appointed, Main 303, (435) 797-3630

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

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

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

## Science/HASS Advising Center

**Director:** Mary E. Leavitt

**Assistant Director:** Irene B. McInerney

**Advisor:** Lisa R. Hamblin

**Advisor:** Jill S. Hoffmann

**Advisor:** Sally B. Peterson

**Advisor:** Lynne M. Slade

**Program Coordinator:** Susan Parkinson

Office in Student Center 302, (435) 797-3883

The Science/HASS Advising Center (SHAC) is a campus office designed to provide academic advising for students in the College of Science and the College of Humanities, Arts and Social Sciences. Academic advisors counsel these students in the University Studies requirements.

Academic advising is provided through the center to all Liberal Arts and Sciences majors. Undeclared students also are advised in the center, with special emphasis on major exploration and career counseling.

### Advising

College of HASS students receive advising concerning University and College of HASS policies and procedures, as well as in University Studies, the Liberal Arts and Sciences Program, graduation requirements and processes, and the USU Area Studies Certificate programs. In addition, students are advised concerning academic choices, low grade point averages, and other problems.

### Academic Services

SHAC represents the dean in providing academic services to undergraduate students in the College of HASS. This includes requests for academic record changes and other documentation requiring the dean's signature. Coordination of academic problems, support, or referrals to other University services are also provided. Transcript evaluations, including international and transfer records, are made and approved in SHAC.

### Graduation

All HASS graduation matters are processed through SHAC. Students should begin the graduation process *at least* one month prior to the graduation application deadline, and the application should be turned into SHAC *at least* two weeks prior to the deadline in order to avoid a late fee. A final review of University Studies (or other General Education programs) and other University graduation requirements will be made and the final approval signature added before the application is returned to the student for payment of the fee. If the student wishes to amend the application to substitute or drop courses that are listed on it, a Supplement Form must be submitted through SHAC.

The Area Studies Certificates are awarded at the time of graduation. Application for the certificate should be made through SHAC.

Liberal Arts and Sciences majors, Undeclared students, and all HASS students are welcome to explore the various services of the center.

## *Center for International Studies*

**Director:** R. Edward Glatfelter (HASS Dean's Office),  
Main 333, (435) 797-1196, edwardg@hass.usu.edu

The Center for International Studies promotes and coordinates international academic exchanges between the University and institutions of higher education abroad. Major objectives of the center are: (1) to develop bilateral university linkage programs, (2) to facilitate faculty and student exchange programs, and (3) to promote collaborative research programs, joint seminars, workshops, and conferences. The center also serves as the University academic center for international studies curriculum offerings and the Certificate for International Development program.

## *American Studies Major and Minor*

**Program Director:** Jan Roush, Ray B. West 312G,  
(435) 797-2729, jan.roush@usu.edu

Many important issues associated with the origin, evolution, and manifestation of American culture transcend the boundaries of traditional subject areas, so 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.

**Major.** To obtain a degree in American Studies, students must complete a total of 49 credits, including 10 credits of core requirements, introducing foundations of American literature, region, and culture; 6 credits chosen from the 3000 level, exposing students to the diversity of American culture; and 9 credits of upper-division work (4000 level), allowing 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.

## *Asian Studies Major and Minor*

**Program Co-directors:** R. Edward Glatfelter  
(HASS Dean's Office), Main 333, (435) 797-1196,  
edwardg@hass.usu.edu; Jing Huang, Main 330C,  
(435) 797-0099, jhuang@hass.usu.edu

**Major.** To graduate with a BA degree in Asian Studies, students must complete a minimum of 27 credits approved by one of the Asian Studies program co-directors. The program must include a minimum of 9 credits selected from the Core Courses. Also, a minimum of 18 elective credits are required, which must include 8 credits chosen from the Asian Studies Electives, and 9 credits from the General Electives, selected after consultation with the Asian Studies program advisor. In addition to the core and elective courses, 16 credits of an Asian language are required for graduation.

**Minor.** For an Asian Studies Minor, students must complete a minimum of 9 credits selected from the Core Courses. Also, a minimum of 6 credits must be selected from the Asian Studies Electives. The remaining 9 credits must be chosen from the General Electives, after consultation with the Asian Studies program advisor. In addition, at least 8 credits of an Asian language are recommended.

**Core Courses (required minimum of 9 credits):** ART 4780, HIST 3460, SOC 4710 (Asian Societies), ECON 5400, GEOG 4200 (when region covered is Asian), PHIL 3710, POLS 3230, 4260, 4470.

**Asian Studies Electives (minimum of 8 credits required for major):** HIST 3480, PHIL 4900 (when syllabus includes Asian philosophies), POLS 3250, 4220 (when syllabus includes Asian Conflicts), SOC 4730, ENGL 3320 (when syllabus includes Asian literature).

**General Electives.** For a listing of general electives, consult the Asian Studies Major Requirement Sheet.

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

## *British and Commonwealth Studies Minor*

**Program Coordinator:** To be appointed

The minor in British and Commonwealth Studies, sponsored jointly by the English and History departments, allows undergraduates to experience interdisciplinary study and broaden their international perspectives. Students engage in interdisciplinary study by doing extended work outside their home departments, while at the same time integrating their study around a single area.

They enhance their international experience by deepening their knowledge of the British Isles and by expanding their knowledge of British culture through its contact with other world cultures in the imperial, Commonwealth, and post-colonial eras. This minor requires a minimum of 18 credits. The program selected must be approved by the coordinator of the British and Commonwealth Studies Minor *at least one year prior to graduation*. Alternatives to this program are possible, but any alternative must be approved by the coordinator. **Courses used to fulfill requirements for the English or History majors** *may not* be used for the British and Commonwealth Studies minor.

All students must complete ENGL/HIST 2040 (British and Commonwealth Cultures), and must then complete four courses from the following: ENGL 2140, 2150, 3310, 4300, 4320; HIST 3510, 3720, 4210, 4250, 4390. Finally, they must take *either* ENGL 5920 (Directed Study) or HIST 4930 (Directed Readings), in which they complete an individual project on a topic concerning Britain and/or the Commonwealth.

## Classics Minor

**Coordination:** Mark L. Damen, Susan O. Shapiro,  
and Frances B. Titchener  
Department of History, Main 323, (435) 797-1290

An academic minor is available in the field of **Classical Studies** with three areas of emphasis: **Classical Civilization**, **Latin Language**, and **Greek Language**. From the ancient civilizations of the Mediterranean area are derived our government, literature, sciences, and laws. The classical world is the backdrop of the modern world. In association with various majors, the Classics Minor is designed to enhance intellectual abilities and practical skills.

Requirements for the three emphasis areas are as follows:

**Classical Civilization:** At least 21 credits from an approved list of courses.

**Latin Language:** 7 credits in upper-division Latin (3000-level or above), plus 6 credits from an approved list of courses.

**Greek Language:** 7 credits in upper-division Greek (3000-level or above), plus 6 credits from an approved list of courses.

Approved courses for the various minors are listed in the brochure titled *Classical Studies*. Brochures are available from the Department of History, Main 323.

## Nora Eccles Harrison Museum of Art

**Director:** Victoria Rowe, (435) 797-0164, victoria.rowe@usu.edu

**Education Coordinator:** Nadra Haffar-Peragallo,  
(435) 797-8207

**Staff Assistant:** Linda L. Pierson, (435) 797-1414,  
lpier@cc.usu.edu

**Collections Manager and Registrar:** Susanne L. Lambert,  
(435) 797-0166, susanne.lambert@usu.edu

The Nora Eccles Harrison Museum of Art is the major center for the exhibition of the visual arts in northern Utah. Emphasizing the breadth of artistic expression and the history of art in the western United States, the Museum's permanent collections include Twentieth Century American sculpture, ceramics, paintings, graphic arts, photographs, and American Indian arts. Selections from the collection are always on view and are rotated periodically to reflect the continuing growth and refinement of the collection. In addition to installations of its permanent holdings, the Museum organizes temporary and traveling exhibitions and serves as a venue for exhibitions of national and international stature. Artist talks, films, docent tours, and educational activities are additional dimensions of the Museum's programs which are designed to interpret, present, and foster the development of the visual arts.

As a component of Utah State University, the Museum provides educational opportunities for undergraduate and graduate students pursuing professional careers in the museum field. Through on-the-job training, independent study, and internships, students participate in collections care and management, exhibition development, installation design, and educational programming. Research and publication are also integral parts of the Museum's educational offerings, and students, along with faculty and other scholars, pursue projects which are relevant to the permanent collections and exhibitions.

Named for its benefactor, the Nora Eccles Harrison Museum of Art was made possible through an insightful and generous gift from the Nora Eccles Treadwell Foundation. Designed by internationally acclaimed architect, Edward Larabee Barnes, the 20,000-square-foot structure includes offices, a workshop, library, storage facilities, and five exhibition galleries.

For more information, write or call: Nora Eccles Harrison Museum of Art, Utah State University, 4020 Old Main Hill, Logan UT 84322-4020, (435) 797-0163, FAX (435) 797-3423.

## Course Descriptions

Humanities, Arts, and Social Sciences (HASS), page 408  
Women and Gender Studies (WGS), page 493



# Natural Resources

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**Director of Graduate Education:** Todd A. Crowl

**Director of Undergraduate Education:** Mark W. Brunson

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The College of Natural Resources has the following academic degree programs:

## College of Natural Resources

Master of Natural Resources (MNR)

## Aquatic, Watershed, and Earth Resources Department

Ecology (MS and PhD)

Fisheries and Aquatic Sciences (BS)

Fisheries Biology (MS and PhD)

Watershed and Earth Systems (BS)

Watershed Science (MS and PhD)

## Environment and Society Department

Bioregional Planning (MS)

Environmental Studies (BS)

Geography (BS, BA, MS, and MA)

Human Dimensions of Ecosystem Science  
and Management (MS and PhD)

Recreation Resource Management (BS, MS, and PhD)

## Forest, Range, and Wildlife Sciences Department

Conservation and Restoration Ecology (BS)

Ecology (MS and PhD)

Forestry (BS, MS, and PhD)

Rangeland Resources (BS)

Range Science (MS and PhD)

Wildlife Biology (MS and PhD)

Wildlife Science (BS)

A list of degree requirements, emphases, and specializations can be found in the catalog section for each department. For a description of the Master of Natural Resources (MNR) professional degree, see page 278.

**Interdisciplinary Programs.** Many of the degree programs listed above are interdisciplinary to some extent. However, the Conservation and Restoration Ecology, Environmental Studies, and Watershed and Earth Systems programs offer students the opportunity to develop broad interdisciplinary programs to meet their interests. Conservation and Restoration Ecology and Watershed and Earth Systems build on a strong science base; Environmental Studies has a greater emphasis on management and policy.

**Minors in Natural Resources.** The college offers minors in the following areas:

**Environmental Studies**

**Fisheries Science**

**Geographic Information Science**

**Geography/Geography Teaching**

**Recreation Resources**

**Watershed Science**

Requirements for the minors are found in the appropriate departmental sections of this catalog. Students should also consult a faculty advisor for the minor.

## Objectives

The College of Natural Resources provides programs of study and professional training in the use and management of natural resources and the environment. These programs deal with renewable land and water resources and the management of these resources and their ecosystems. Forests, rangelands, wildlife, fisheries, watersheds, and recreation resources comprise the natural resources and environmental areas in which the college has developed professional competence. The college's expertise in geography provides a link between the management of these resources and their value to our society and other cultures.

The College of Natural Resources programs and facilities provide exceptional opportunities for field experience. Forests and rangelands comprise more than 90 percent of the total Utah land area. The Wasatch-Cache National Forest and other areas of natural lands close to the USU campus provide unlimited study projects and opportunities for demonstration. Yellowstone and other national parks are within one day's driving distance.

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

**Summer Employment/Work Experience.** Students are strongly encouraged to seek summer employment with faculty research projects or natural resource agencies to gain practical work experience and help refine career goals. Students should check with the College of Natural Resources Academic Service Center in early January regarding summer employment opportunities.

## Undergraduate Programs

### Academic Policies

**Admission.** Freshmen accepted in good standing by the University are eligible for admission to the College of Natural Resources. Transfer students need a cumulative 2.5 GPA for admission to College of Natural Resources majors. Departments may impose additional requirements; refer to departmental sections for information.

Students will make more satisfactory progress in natural resources majors if they have had two years of high school algebra; have taken coursework in chemistry, physics, and biology; and have obtained basic computer skills. Four years of English are

also desirable. Prospective students should realize that natural resources fields are highly technical professions, requiring not just field ability, but also high aptitude for scholarship. Success is also correlated with an ability to work well with people.

**Natural Resources—Undecided.** Students who have not yet decided on a specific natural resources major may be admitted to the college as “undecided.” Many of the courses taken during the freshman year are common to all natural resources majors; however, students are encouraged to select a major as soon as possible. Students in the undecided category should meet with the college academic advisors for assistance in planning their educational program and selecting a major.

**Changes in Graduation Requirements.** Students who 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 at USU (or any revision of the University Studies requirements that has been in effect within seven years of their graduation) **and** (2) the major requirements in effect when they officially declared their major (or any revision of the major requirements that has been in effect within seven years of their graduation).

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.

**Academic Responsibility.** The departments publish current major requirement sheets each year. It is the student’s responsibility to know the current requirements and to consult with a faculty advisor in planning and completing his or her degree program.

**Graduation Requirements.** Students must satisfy all University, College of Natural Resources, and departmental major requirements for graduation. Students must complete a series of basic lower-division courses, providing the disciplinary foundation for the natural resource and environmental professions, before advancing to professional coursework; foundation course requirements vary among the departments of the college. Equivalents of the foundation courses can be taken at many two- and four-year colleges. Students intending to transfer to a College of Natural Resources major should consult with a faculty advisor before registering for foundation courses at another school. Some foundation and core courses can be used to satisfy University Studies requirements. College requirements also include a grade point average of 2.5 or higher for all courses taught by the College of Natural Resources. Refer to the appropriate sections of this catalog for further details on graduation requirements.

### *Professional Organizations*

Students are strongly encouraged to participate in professional organizations affiliated with their major. The College of Natural Resources has student chapters of the following professional societies:

**American Fisheries Society  
Society of American Foresters  
Society for Range Management  
The Wildlife Society**

### *Financial Aid*

**Scholarships.** A number of scholarships are available to students in the college. The S. J. and Jessie E. Quinney scholars program offers ten four-year, \$2,000 per year scholarships to entering and transfer undergraduate students in the College of Natural Resources. Interested high school seniors and transfer students are encouraged to write to the dean’s office regarding these scholarships.

There are also many \$250-\$2,500 per year scholarships for continuing students. For details, contact the dean’s office.

### *Research*

The College of Natural Resources maintains an extensive program of research through its academic departments and the affiliated Jack H. Berryman Institute, Center for Disturbance Ecology, USDA/APHIS Predator Behavior and Ecology Field Station, USDA Aquatic Ecosystem Monitoring Center, Utah Cooperative Fish and Wildlife Research Unit, and USU Ecology Center. Part-time employment opportunities are often available for undergraduates in college research programs.

## *Graduate Programs*

The college offers graduate study programs leading to the MA, MNR, MS, and PhD degrees. See the appropriate departmental sections for information on their graduate programs.

### *Financial Assistance*

**Assistantships.** Teaching or research assistantships are awarded through the departments. For further information, students should check with their department and major professor.

**Fellowships.** Fellowships and tuition waivers are awarded on a competitive basis. Incoming graduate students should apply through their major professor.

## *Course Descriptions*

Natural Resources (NR), page 451

National Environmental Policy Act (NEPA), page 447

# Science

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## Associate Dean for Undergraduate Affairs:

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**Associate Dean:** Richard J. Mueller, ESLC 245G,

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The College of Science has the following departments and programs:

**Biology**

**Chemistry and Biochemistry**

**Computer Science**

**Geology**

**Mathematics and Statistics**

**Physics**

**Cooperative Nursing Program**

Degrees, emphases, specializations, and program descriptions are listed with the departments and the Nursing Program. In addition, there is a Center for Atmospheric and Space Sciences (CASS) and two interdisciplinary programs which involve the college. The Department of Biology participates in the Interdepartmental Graduate Program in Toxicology. This program offers research opportunities leading to MS and PhD degrees within several specialties of toxicology. The college also participates in an interdisciplinary, interdepartmental program in ecology which operates under the Ecology Center. The Ecology Center brings distinguished scientists to campus, fosters faculty research, and enhances graduate education in all areas of ecology.

## Objectives

USU has always emphasized the sciences. Modern civilization is based on science, most facets of which are fundamental in a land-grant university.

Opportunities for rewarding careers are excellent in the fields of science. These opportunities exist in education, research, conservation, service, and industry.

The curricula of the science departments are designed to achieve five purposes:

First, they serve all students. No college graduate can be considered educated without an appreciation of scientific principles.

Second, the college trains teachers of science at all levels of education. Highly competent teachers are absolutely essential to the continued well-being and development of society.

Third, students are prepared to take positions in industry and business in a highly technological world.

Fourth, education is provided in the health fields both at the preprofessional and entry level. The college has excellent programs in pre dental and premedical education with an exceptional record of placing students in dental and medical schools. Undergraduate degrees in the various departments of the college can be tailored to include pre dental and premedical training. Other programs prepare graduates to enter the health profession directly upon graduation.

Fifth, the College of Science educates research scholars in many fields of science. This is accomplished by completing a sound undergraduate degree in the field, followed by graduate specialization.

Students planning to enter the sciences are urged to discuss their plans and goals early with advisors, who are available in each academic department. Basic coursework in mathematics, chemistry, physics, and computer science is essential to most areas of science.

## Admission Requirements

Students accepted in good standing by the University are eligible for admission to all departments in the College of Science. Students majoring in Computer Science must qualify for advanced standing status on the basis of their academic performance. Specific details are given in the Computer Science section of this catalog (see page 175).

## College of Science Core Requirements

**Mathematics Requirement.** All bachelor degree candidates in the College of Science must complete one year of calculus, consisting of MATH 1210 and 1220. In some degrees or options within degrees, the second semester of calculus may be replaced by STAT 3000. The substitution will be for specific degree programs, and not by student choice.

**Science Requirement.** Every bachelor degree candidate in the College of Science must complete a year-long sequence outside of his or her major department. The approved sequences are: (1) BIOL 1210, 1220; (2) CHEM 1210, 1220; (3) GEOL 1150, 3200; (4) PHYX 2110, 2120; and (5) PHYX 2210, 2220.

## Science Major (Undecided)

A beginning freshman student who wishes to major in science, but who has not selected a specific major, may register in the college as an Undecided Science Major. A course of study will be developed that will attempt to maximize transfer into the various departmental majors in the college. Students in the Undecided Science Major will be required to transfer to a departmental major after one year of study.

## Scholarships

Scholarships are available through the college and some of the departments. Students should contact the college or their major department for further information about these scholarships.

### ***Graduate Assistantships and Fellowships***

Excellent graduate assistantships and fellowships are available in all departments. Assistantships are available both for teaching and research. Applications should be made directly to the department concerned. For more information, see the *Graduate Financial Assistance* section of this catalog (pages 89-90).

### ***Graduate Programs***

Graduate programs leading to the MS degree are available in each department in the college. In addition, the Department of Mathematics and Statistics offers a MMath (Master of Mathematics) degree. The departments of Biology, Chemistry and Biochemistry, Computer Science, Mathematics and Statistics, and Physics offer programs leading to the PhD degree. See the departmental sections in this catalog for more information on these programs.

### ***Liberal Arts and Sciences Major***

The College of Science, in cooperation with the College of Humanities, Arts and Social Sciences, sponsors a Liberal Arts and Sciences (LAS) Major. LAS promotes integrated learning across

the life sciences, humanities, physical sciences, arts, and social sciences. All USU students are welcome in LAS. The LAS Major is described on page 249.

### ***Honors Program***

Several departments in the college participate in the University Honors Program by offering special honors courses and by sponsoring an option for graduation with departmental honors.

### ***Undergraduate Research***

The sciences provide an ideal setting for research. All departments within the College of Science provide opportunities for undergraduate students to participate in research activities. Interested students should discuss this option with their academic advisor or with an associate dean in the college office.

## ***Course Descriptions***

Science (SCI), page 477