

Department of

Agricultural Systems Technology and Education

College of Agriculture

Head: Professor Gary S. Straquadine, agricultural education/extension
Office in Agricultural Systems Technology and Education 101C, (435) 797-2230

Associate Head: Associate Professor Bruce E. Miller, agricultural systems and mechanization

FAX (435) 797-4002

E-mail garys@cc.usu.edu

WWW <http://www2.aste.usu.edu>

Professors *Robert L. Gilliland*, extension; *Weldon S. Sleight*, teacher preparation; **Adjunct Professor** *Kevin C. Kesler*, 4-H and youth development programs; **Professor Emeritus** *Gilbert A. Long*, agricultural education; **Assistant Professors** *F. Richard Beard*, research and extension, agricultural engineering; *John D. Harrison*, agricultural waste management/extension specialist; *Daniel J. Hubert*, teacher education; *Rhonda L. Miller*, sustainable agriculture/agricultural systems; **Lecturers** *Evan P. Parker*, agricultural technology and machinery management; *Daryl L. Reece*, agricultural engineering and equipment repair; *Afifa Sabir*, education and outreach, Biotechnology Center

Degrees offered: Bachelor of Science (BS) in Agricultural Education; BS, Bachelor of Arts (BA), Master of Science (MS) in Agricultural Systems Technology

Undergraduate emphases: *BS*—Agricultural Systems Technology: Agribusiness and Agricultural Mechanization; **Graduate specializations:** *MS*—Agricultural Extension Education, Agricultural Mechanization, International Agricultural Extension, and Secondary/Postsecondary Agricultural Education

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

Undergraduate Programs

Objectives

The programs offered in Agricultural Systems Technology and Education are for students who are preparing for positions as agricultural education teachers, as well as for positions in agricultural extension, agricultural mechanization, agribusiness, and agricultural production and management.

The facilities for these programs include laboratories with specially designed equipment for practical instruction in agricultural systems and mechanization, including computer application, agribusiness, agricultural buildings, engines, electricity, hydraulics, machinery, and repair welding.

Requirements

Departmental Admission Requirements. Admission requirements for the Department of Agricultural Systems Technology and Education are the same as those described for the University on pages 48-51. Students in good standing may apply for admission to the department.

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

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

An application for admission to teacher education should ordinarily be completed before the junior year (see College of Education requirements, page 86). Approval for admission to teacher education is a prerequisite to enrollment in education and psychology courses. A 2.75 GPA is required for admission to the teacher education program.

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

The Agricultural Education major involves four teaching areas, which correspond with the Utah agricultural education program model design. Students must complete the University Studies requirements (see pages 56-63). In addition, students must complete the following courses in preparation for teacher licensure: InsT 5200; ScEd 3100, 3210, 4200, 4210, 5300; SpEd 4000; and ASTE 2710, 3240, 3300, 3620, 4150, 4300, 5500, 5600.

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

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

The Bachelor of Science in Agricultural Systems Technology, **Agribusiness Emphasis**, includes the following courses: ASTE 1010, 2200, 2830, 3030, 3050, 3080, 3090, 3100, 4100, 4900, 5260; Acct 2010; Chem 1110; Econ 1500, 3030, 3050; Math 1060; Soil 3000; Stat 2300, and 24 credits of departmental electives. Students will complete a minor in Business or Agribusiness. Additional requirements in Animal Science; Plant and Soil Sciences; and Forest, Range, and Wildlife Sciences must also be met. In addition, students must complete the University Studies Requirements.

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

Bachelor of Science (Dual Major) in Agricultural Systems Technology and Agribusiness includes the following courses: ASTE 1010, 2200, 3030 (or 4100), 3050, 3090, 3200 (or 3080), 3600, 5260; Econ 1500, 1550, 3030, 3050, 4010, 4030, 5030, 5050, 5350; Acct 2010, 2020, Chem 1010; Math 1050, 1100; MHR 2990; Soil 4000; and Stat 2300. Students must also complete University Studies requirements.

The **Associate of Applied Science Degree in Agricultural Machinery Technology** includes a minimum of 6 credits of University Studies classes, 38 credits in Agricultural Mechanization, and 6-10 credits in business and related classes. Courses include: ASTE 1010, 1120, 1130, 1610, 1620, 1640, 2200, 2250, 2830, 2930, 3030, 3080, 3100, 3600, 3720, and 3730.

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

technology program includes a cooperative occupational experience placement at the end of the first year of instruction.

Requirements for the one-year program include: ASTE 1010, 1120, 1130, 1610, 1620, 1640, 3030, 3080. See major requirement sheet available from the department for more information.

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

Graduate Programs

Admission Requirements

See general admission requirements, pages 72-73. Applications will be considered throughout the year. However, students who wish to be considered for financial aid must apply by February 1 for the coming academic year. No application will be considered until all required information arrives at the office of the School of Graduate Studies.

Course Requirements

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

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

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

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

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

The **International Agricultural Extension** specialization was developed to prepare agriculturally educated people to perform administrative and supervisory roles in less-developed countries. The curriculum for this program includes coursework related to

managing people; planning, implementing, and evaluating programs to promote technology transfer; and managing fiscal affairs. Electives are selected from each of the following departments: Agricultural Systems Technology and Education; Animal, Dairy and Veterinary Sciences; Economics; Biology; Plants, Soils, and Biometeorology; and Instructional Technology.

Research

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

Financial Assistance

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

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

Requirement Changes

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

Agricultural Systems Technology and Education Courses (ASTE)

ASTE 1010. Introduction to Agricultural Systems Technology. Introduction to problem solving related to the areas of agricultural power and machinery, soil and water conservation, structures and animal environments, electrical circuits, and emerging technologies. (3 cr) (F)

ASTE 1120. Forage and Harvest Equipment. Fundamentals and principles in operations, adjustments, and maintenance of technologies utilized in agricultural forage and combine harvesting. (3 cr) (F)

ASTE 1130. Planting and Tillage Equipment. Fundamentals and principles in operation, maintenance, and repair of planting and tillage equipment. Exploration of different systems and their applications. (3 cr) (Sp)

ASTE 1610. Agricultural Machinery Engines. Fundamental principles and components utilized in the power production for agricultural machinery. Diesel engines, as power plants, will be overhauled using a systems approach. (6 cr) (F)

ASTE 1620. Agricultural Machinery Power Trains. Fundamental principles and components utilized in agricultural machinery transmittal of power through drive trains. A systems approach to overhauling these components will be developed. (6 cr) (Sp)

ASTE 1640. Agricultural Equipment and Parts Marketing and Communications. Introduction to principles and operation of computer software systems related

to marketing and management within the agricultural machinery business industry. Emphasis on business communication principles for effective transfer of information and problem resolution. (3 cr) (F)

ASTE 2200. Electricity in Agricultural Systems. Fundamentals of electricity (AC) as used on farms and ranches. Residential and commercial agricultural applications of the National Electric code. Electrical supply and service, distribution, proper grounding, and installation of components. (3 cr) (Sp)

ASTE 2250. Occupational Experience in Agriculture. Supervised occupational experiences for technical vocational preparation. (1-6 cr) (F,Sp)

ASTE 2710. Orientation to Agricultural Education. Students examine the framework of agricultural education, with a special emphasis on the nature of the programs, career opportunities, and the qualifications and preparation requirements of future agricultural educators. Students will spend 25-30 hours observing instruction in secondary classrooms. (2 cr) (F) ®

ASTE 2830. Agribusiness Sales and Marketing. Basic principles of agribusiness sales and marketing. After completing a series of self-assessments relating to sales, learning, and personality preferences, students learn to complete each major step of the sales process. (3 cr) (F)

ASTE 2900 (BSS). Humanity in the Food Web. Provides broad overview of food systems in conjunction with detailed analysis of particular issues, such as different theories and supporting data on the domestication of plants and animals, the use of human labor, the development and operation of complex technologies, and the analysis of socioeconomic data on human population growth and well-being. (3 cr) (F,Sp)

ASTE 2930. Individualized Projects in Agricultural Mechanics. Basic skill preparation for employment in agricultural industry. (1-3 cr) (F,Sp) ®

ASTE 3030. Metal Welding Processes and Technology in Agriculture. Selection of ferrous and nonferrous welding techniques in agricultural applications. Welding, cold- and hot-working metal in agricultural construction and maintenance. (3 cr) (F)

ASTE 3040 (QI). Fabrication Practices in Agricultural Buildings. Selection and use of agricultural building materials, including concrete and masonry, lumber, plywood, finishes, and fasteners. Application of hand and power tools and procedures in agricultural construction. (2 cr) (Sp)

ASTE 3050 (CI). Technical and Professional Communication Principles in Agriculture. Technical communication principles and practices used in the agricultural industry. Emphasizes technical writing of reports and correspondence using electronic information retrieval and presentation. Prerequisite: Engl 2010. (3 cr) (F,Sp)

ASTE 3080. Compact Power Units for Agricultural and Turfgrass Applications. Operation and application of agricultural and turfgrass equipment powered by internal combustion engines having less than 40 horsepower. (3 cr) (Sp)

ASTE 3090. Computer Applications in Agriculture. Overview of computer systems and software currently used in agriculture. Emphasizes development of term project using spreadsheets. Word processing, file management, CAD, and computer ethics. Prerequisite: BIS 1400 or satisfactory completion of University computer and information literacy exam. (3 cr) (F,Sp)

ASTE 3100. Leadership Applications in Agricultural Science, Management, and Development. Study of leadership styles and their applications in development of agricultural programs for youth and adults. Emphasizes leadership and communication principles for effective community resource management in rural environments. Experiences provided in leadership styles, program planning, and meeting organization. (2 cr) (Sp)

ASTE 3200. Irrigation Principles and Practices. Introduction to planning principles for irrigation systems and farm water resource development. Layout of system components and coverage of practices common to the Intermountain West. (3 cr) (Sp)

ASTE 3240 (CI). Teaching in Laboratory Settings. Basic principles of teaching students in laboratory settings. Overview of major concepts, considerations, and practices used for developing and evaluating agriscience curricula. Prerequisite: ASTE 2710. (3 cr) (Sp) ®

ASTE 3300. Clinical Experience I in Agricultural Education. In-school clinical observation experience. Students involved in observing management and assisting in teaching. Designed to provide familiarity with agricultural education classroom. (1 cr) (Sp)

ASTE 3500. Teaching Apprenticeship in Agricultural Education. Each student serves as an apprentice to professional agricultural educator. Students complete competencies leading to early preparation for student teaching. (2 cr) (F,Sp,Su)

ASTE 3600 (QI). Management of Agricultural Machinery Systems. Management principles for evaluation and selection of agricultural complements for performance, optimization, economics, environmental impact, and long-term sustainable agricultural practices. Prerequisite: Math 1050 or Stat 1040. (3 cr) (Sp)

ASTE 3620. Managing the FFA and SAE Programs. Introduction to basic concerns, understandings, and practices needed to effectively advise an FFA chapter. Students learn appropriate philosophies and skills for operation of a comprehensive supervised agricultural experience program. (2 cr) (Sp,Su)

ASTE 3710. Agricultural Machinery Hydraulic Systems and Diagnosis. Fundamental principles and components overhaul of hydraulic systems as applied in agricultural machinery. Exploration of techniques for diagnosing malfunctions and related failures with a systems approach. (3 cr) (F)

ASTE 3720. Agricultural DC Electrical Systems and Diagnosis. Fundamental principles and components overhaul of DC electrical systems as applied in agricultural machinery. Exploration of techniques for diagnosing malfunctions and related failures with a systems approach. (3 cr) (F)

ASTE 3730. Agricultural Machinery Auxiliary Systems and Diagnosis. Application of theory, testing, diagnosis, and repairs of auxiliary systems, including air conditioning, fuel injection, analog, electronic monitoring, and GPS as utilized in agricultural equipment. Prerequisite: ASTE 3720 or approval of instructor. (3 cr) (Sp)

ASTE 3900. Special Problems in Agricultural Systems Technology and Education. Students conduct short-term investigation and/or literature analysis with critical review of contemporary issues in Agricultural Systems Technology. Formal contract with approved faculty. Activities culminate with a written report. (1-6 cr) (F,Sp,Su)

ASTE 4100. Agricultural Structures and Environment. Overview of agricultural structures and environmental considerations related to livestock, livestock waste management, and commodity storage. Planning, layout, construction materials, concrete masonry, ventilation, insulation, and energy. (3 cr) (Sp)

ASTE 4150 (CI). Methods of Teaching Agriculture. Introduction to basic practices of classroom teaching and program planning. Through participation in discussions, activities, and assignments, students refine their abilities to develop programs, diagnose the learner, prepare the instruction, and guide student learning. Prerequisites: ASTE 2710, 3240. (3 cr) (F) ®

ASTE 4250. Occupational Experiences in Agriculture. Supervised occupational experience for technical and professional preparation in teacher education and/or agricultural business. (1-6 cr) (F,Sp,Su)

ASTE 4300. Clinical Experience II in Agricultural Education. Continued in-school observation of agricultural education teaching. Requires student participation in teaching, management, and program development in agricultural education. (1 cr) (F)

ASTE 4400. Advising Applied Technology Education Student Organizations. Principles and practices for advising applied technology student organizations in secondary education. Examination of leadership organizations supporting applied tech-

nology education. Emphasis on program planning, leadership development, and evaluation. (1 cr) (Sp,Su)

ASTE 4900. Senior Project Research and Creative Opportunity. Returning student teachers work to strengthen their weaknesses in areas such as scaled drawing, cost estimating, machine shop practices, construction, and small engines. (1-6 cr) (F,Sp,Su)

ASTE 5100 (d6100).¹ Electrical Controls and Motors for Agri-Industrial Applications. Operation and application of electrical motors, electrical and electronic controls, and circuit and overload protection utilized in agricultural and industrial installations. (3 cr) (Sp)

ASTE 5200. Assessment in Applied Technology Education. Principles and practices in assessing performance and development of applied technology students. Emphasizes testing and evaluation techniques used in applied technology education. (3 cr) (Sp,Su)

ASTE 5260 (CI) (d6260). Environmental Impacts of Agricultural Systems. Investigation of relationship between agricultural practices and environmental quality, including control of agricultural nonpoint-source pollution. (3 cr) (F)

ASTE 5500. Agricultural Education Secondary Curriculum Seminar. Cooperative examination of considerations and processes for teaching secondary students. Reflection on the practice of teaching. Preparation for entry into the teaching profession. (2 cr) (Sp) ®

ASTE 5600. Agricultural Education Student Teaching in Secondary Schools. Students teach agriscience and technology courses in secondary and middle school settings under the guidance of clinical and Utah State University supervisors. (8 cr) (Sp)

ASTE 6000. Methods of Equipment Testing, Diagnosis, and Repair. Investigation and demonstration of methods and procedures for testing, troubleshooting, and diagnosis of tractors, power units, and all types of agricultural equipment. (3 cr) (F)

ASTE 6070. Program and Curriculum Development in Applied Technology Education. Program planning for locally applied curriculum design to meet student interests and community needs for applied technology teachers. (3 cr) (F,Sp,Su)

ASTE 6100 (d5100). Electrical Controls and Motors for Agri-Industrial Applications. Operation and application of electrical motors, electrical and electronic controls, and circuit and overload protection utilized in agricultural and industrial installations. (3 cr) (Sp)

ASTE 6110. Applied Technology Education Program Planning and Evaluation. Program planning and evaluation. Study of strategies used in applied technology. Demonstration of manpower surveys and job analysis for curriculum development. (3 cr) (F)

ASTE 6130. Electrical and Hydraulic Component Testing, Diagnosis, and Repair. Involves supervision and demonstration of procedures for testing, diagnosis, and repair of all types of electrical and hydraulic components on modern agricultural equipment. (3 cr) (F)

ASTE 6140. Agricultural Development and Evaluation. Principles and strategies for developing, implementing, and evaluating agricultural technology and educational programs for U.S. and international organizations. (3 cr) (Sp)

ASTE 6170. Supervision and Administration of International Extension Programs. Investigation and analysis of theories and practices of supervision and administration as applied to international extension-education programs and rural development/agricultural extension operations. (3 cr) (F)

ASTE 6240. Strategies for Teaching Adults. Features contemporary strategies and guided practice for teaching adults in group and individualized learning settings. (3 cr) (F,Sp,Su)

ASTE 6250. Special Problems in Agricultural Systems Technology. A consideration of needs and special types of service in FFA, young farmers, and adult programs for applied technology teachers. (1-5 cr) (F,Sp,Su) ®

ASTE 6260 (d5260). Environmental Impacts of Agricultural Systems. Investigation of relationship between agricultural practices and environmental quality, including control of agricultural nonpoint-source pollution. (3 cr) (F)

ASTE 6300. Foundations of Adult Education and Program Evaluation. Addresses the context and providers of adult education. In addition, adult learning theories and participation models are examined. (3 cr) (F)

ASTE 6400. Food, Land and People Workshop. Designed for practicing K-12 teachers. Offers in-service development for infusing agriculture and the concepts of Food, Land and People into existing curriculum standards and objectives. Presentation of Agriculture in the Classroom instructional units, as well as hands-on methods and materials. (0.5-3 cr) (F,Sp,Su) ®

ASTE 6510. Principles and Practices of Extension Education. History, philosophy, and organizational structure of U.S. and international extension organizations, including programming models, teaching strategies, and accountability. (2 cr) (Sp)

ASTE 6600. Analysis of Machinery Management and Decision Making Processes. Involves the record keeping and analysis procedures for profitable decision making and machinery management related to modern production agriculture practices. (3 cr) (Sp)

ASTE 6700. Research Methods in Agricultural Systems. Introduction to research techniques used in agricultural systems. Includes research design, data gathering, and statistical analysis and interpretation. (3 cr) (Sp)

ASTE 6750. Agricultural Safety and Health: Issues and Decisions. Review of agricultural safety and health issues. Public and private concerns addressed through problem identification, data gathering, resolution, and evaluation. (3 cr) (Sp)

ASTE 6970. Research and Thesis. (1-9 cr) (F,Sp,Su) ®

ASTE 6990. Continuing Graduate Advisement. (1-3 cr) (F,Sp,Su) ®

¹Parenthetical numbers preceded by *d* indicate a *dual* listing.

® Repeatable for credit. Check with major department for limitations on number of credits that can be counted for graduation.