SIU Southern Illinois University
CARBONDALE

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Agricultural Systems and Education

The Agricultural Systems and Education major is administered through the School of Agricultural Sciences. The Agricultural Systems and Education program includes six specialized areas of study.

The primary objectives of this major are: to provide specialized academic preparation in agriculture appropriate for the specializations of the major, to provide a program for the student desiring a broad-based agriculture major, optionally combined with another discipline and to provide the quality academic and professional preparation necessary for success in the various career fields of the specializations. The following statements identify typical career opportunities for persons completing the respective specialization.

Agricultural Systems Technology Management Specialization: This specialization is intended for students interested in technical management of an agricultural related business involved in production, processing, or manufacturing. This specialization combines an understanding of the agricultural, biological, and physical sciences with managerial and technical skills. This understanding of science, systems management, and applications engineering can be used in a career in the production and processing of food, fiber, feed, and fuel. Students focus on the application of engineering principles, the study of agricultural technology, and integration of business management concepts in the food and agricultural industry.

Agricultural Education Specialization: This specialization is intended for those students who plan to be involved in agricultural programs as a teacher in secondary and post-secondary education, as well as in the fields of communication, extension, and industry. Students will complete course requirements for teacher licensure in secondary Agricultural Education, and can optionally complete training for teacher licensure in other majors, including biology, math, physical sciences, and social sciences.

Agricultural Production Management Specialization: This specialization provides the student with the background and preparation for careers in production based areas of agriculture, including sales and service positions in the supply and marketing chain, support industries, and agribusiness as well as production management positions and farming.

General Agriculture Specialization: This program is designed to provide the student with a broad-based background in agriculture and the flexibility so that the student, in conjunction with their advisor, can design a program of study that prepares them to meet their career goals. These customized programs often include emphasis in other disciplines.

Agricultural Communications Specialization: This specialization is designed to provide the student competencies in both agriculture (animal science, horticulture, crop/soil sciences, agricultural business/economics, and agricultural engineering/technology) and communications (print/broadcast journalism, marketing/advertising, publications, journalism law and ethics) for careers within the agricultural industry, agricultural extension service, or agricultural news agencies.

Food and Process Engineering Technology Specialization: This specialization is designed for students to be able to manage and supervise operations in the food processing industry as food processing technologists or managers. The students will gain a fundamental understanding of the science of food processing and preservation operations. The students will gain applied knowledge of food handling, food safety, food packaging, process automation, and operations management. Courses are designed to provide hands-on experience on modern food processing industrial practices through interactive classes including labs, projects, field trips, and internships in food industry.

Qualified candidates for the **Capstone Option** are accepted in the major. For a number of courses taught in the major, there will be additional charges for field trips, lab manuals, or supplies.

Technology Fee

The College of Agricultural Sciences assesses College of Agricultural Sciences undergraduate majors a technology fee of $4.58 per credit hour up to 12 credit hours. The fee is charged Fall and Spring semesters.

Bachelor of Science Degree in Agricultural Systems and Education

Agricultural Systems Technology Management Specialization

Degree Requirements	Credit Hours
University Core Curriculum Requirements	39
Foundation Skills: CMST 101, ENGL 101, ENGL 102, MATH 108 or MATH 125, UNIV 101	13
Disciplinary Studies: Fine Arts, Human Health, Humanities, CHEM 106, PLB 115, ABE 204 or ECON 113, Social Science	23
Integrative Studies (Multicultural/Diversity)	3
Requirements for Agricultural Systems Technology Management Specialization	40-41
AGSE 318, AGSE 361, AGSE 375	9
AGSE 371 or PHYS 101, PHYS 203A, PHYS 203B, PHYS 205A, or PHYS 205B	4
AGSE 497 or ABE 360	3
Choose from AGSE 372, AGSE 463, AGSE 472, AGSE 473, AGSE 476, AGSE 483, AGSE 488, AGSE 495, ME 102	18
ANS 121, ANS 122, or CSEM 200	3-4
ABE 204	3
Electives	40-41
Total	120

Agricultural Education Specialization

Degree Requirements	Credit Hours
University Core Curriculum Requirements	39
Foundation Skills: CMST 101, ENGL 101, ENGL 102, MATH 108, UNIV 101	13
Disciplinary Studies: Fine Arts, Human Health, EA 102 or HIST 101A or HIST 101B, Humanities, CHEM 106, PLB 115, EDUC 214, PSYC 102	23
Integrative Studies (Multicultural/Diversity): EDUC 211	3
Agricultural Education Specialization Requirements	19
AGSE 110, AGSE 170, AGSE 311A, AGSE 311B, AGSE 314, AGSE 318	
Other required courses:	44
AGRI 323	3
ANS 121, ANS 122	4
CSEM 200 or HORT 200	3
ABE 204	3
PLB 200	4
EDUC 301, EDUC 302, EDUC 303, EDUC 308, EDUC 313, EDUC 319, EDUC 401	24
CI 360	3
Electives	18
Total	120

Agricultural Production Management Specialization

Degree Requirements	Credit Hours
University Core Curriculum Requirements	39
Foundation Skills: CMST 101, ENGL 101, ENGL 102, MATH 108 or MATH 125, UNIV 101	13

Degree Requirements	Credit Hours	
Disciplinary Studies: Fine Arts, Human Health, Humanities, CHEM 140A, PLB 200, ABE 204 or ECON 113, Social Science	23	
Integrative Studies (Multicultural/Diversity)	3	
Requirements for Agricultural Production Management Specialization		10
AGSE 318, AGSE 375	6	
AGSE 371 or PHYS 101, PHYS 203A, PHYS 203B, PHYS 205A, PHYS 205B	4	
Other required courses		36
PLB 200	4	
CHEM 140A	4	
ANS 121, ANS 122	4	
CSEM 200	3	
Choose 2 courses from 3 of the following areas 1) ABE 350 or ABE 351, and 1 class from ABE 300-level or 400-level; 2) AGSE 372, AGSE 463, AGSE 472, AGSE 473, AGSE 476, AGSE 483, AGSE 488, AGSE 495, AGSE 497; 3) ANS 315 or ANS 331, and 1 class form ANS 409, ANS 430, ANS 465, ANS 485; 4) CSEM 240, CSEM 300	18	
Electives		35
Total		120

Agricultural Communications Specialization

Degree Requirements	Credit Hours	
University Core Curriculum Requirements		39
Foundation Skills: CMST 101, ENGL 101, ENGL 102, MATH 108, UNIV 101	13	
Disciplinary Studies: Fine Arts, Human Health, Humanities, CHEM 106, PLB 115, ABE 204 or ECON 113, PSYC 102	23	
Integrative Studies (Multicultural/Diversity)	3	
Agricultural Communications Specialization Requirements		16

Degree Requirements	Credit Hours	
AGSE 170, AGSE 180, AGSE 318, AGSE 359, AGSE 411		
Other required courses		9
ANS 121, ANS 122	4	
CSEM 200	3	
AGRI 323	2	
Electives		56
Choose from ABE, AGRI, ANS, CSEM, HORT, HTA, HND, FOR, MKTG, GEOG, JRNL, RTD, CMST	24	
Choose from CMST, JRNL, MKTG, RTD	25	
Electives	7	
Total		120

General Agriculture Specialization

Degree Requirements	Credit Hours	
University Core Curriculum Requirements		39
Foundation Skills: CMST 101, ENGL 101, ENGL 102, MATH 108, UNIV 101	13	
Disciplinary Studies: Fine Arts, Human Health, Humanities, CHEM 106, PLB 115 or ZOOL 115, ABE 204, Social Science	23	
Integrative Studies (Multicultural/Diversity)	3	
General Agriculture Specialization Requirements		16
AGSE 170, AGSE 314, AGSE 318, AGSE 371, AGSE 375		
Other required courses		18
AGRI 323	2	
ANS 121, ANS 122	4	
CSEM 200	3	

Degree Requirements	Credit Hours	
ANS elective	3	
ABE elective	3	
CSEM elective	3	
Electives		47
Choose a minor from any ABE, AGRI, AGSE, ANS, CSEM, HORT, HND, HTA, FOR	15	
Electives to achieve at least 42 (300- or 400-level)	32	
Total		120

Food and Process Engineering Technology Specialization

Degree Requirements	Credit Hours	
University Core Curriculum Requirements		39
Foundation Skills: CMST 101, ENGL 101, ENGL 102, MATH 108, UNIV 101	13	
Disciplinary Studies: Fine Arts, Human Health, Humanities, CHEM 140A, BIO 211, ABE 204 or ECON 113, Social Science	23	
Integrative Studies (Multicultural/Diversity)	3	
Food and Process Engineering Technology Specialization Requirements		33
AGSE 318, AGSE 361, AGSE 374, AGSE 375, AGSE 431, AGSE 473, AGSE 483, AGSE 488, AGSE 489, AGSE 495, AGSE 497		
Other required courses		32
BIOL 211, BIOL 213	5	
CHEM 140A, CHEM 140B	5	
MICR 201	4	
PHSY 203A, PHSY 203B	6	
ACCT 210	3	
IMAE 475	3	

Degree Requirements	Credit Hours
MATH 109	3
ABE 318	3
Electives	16
Total	120

Minor in Agricultural Systems

A minor in Agricultural Systems is offered. A minor consists of 15 semester hours of credit. Normally 12 hours must be taken at Southern Illinois University Carbondale. An advisor within the department must be consulted before selecting this field as a minor.

Minor in Agricultural Education

A minor in Agricultural Education is offered. A minor consists of 15 semester hours of credit. Normally 12 of the 15 hours must be taken at Southern Illinois University Carbondale. An advisor within the department must be consulted before selecting this field as a minor. Note, that the minor in Agricultural Education does not qualify the holder to an Illinois teaching license.

Food and Process Engineering Technology Minor

Requirements: A minor in Food and Process Engineering Technology is available to those students who are interested in the food and processing industry. A total of 15 hours of credit, from the list below, is required: AGSE 361; AGSE 375; AGSE 483; AGSE 488; or AGSE 495

Agricultural Systems and Education Courses

AGSE110 - Intro to Ag Education 110-3 Introduction to Agricultural Education. [IAI Course: AG 911] An entry level course introducing the philosophies of education and career and technical education, including: the history of and current issues in agricultural education; the nature of the educational process; the characteristics, duties and responsibilities of successful teachers; the components of an agricultural education program; the role of professional organizations in agricultural education; and state teacher certification requirements.

AGSE170 - Intro Physical Prin in Ag 170-4 Introduction to Physical Principles in Agriculture. [IAI Course: AG 906] An analytical introduction to physical and mechanical principles related to agricultural land measurement, power and machinery, electricity and electronics, structures, environment and handling of agricultural materials. Lab fee: $20.

AGSE180 - Intro to Ag Communications 180-3 Introduction to Agricultural Communications. Introduction to the uses of mass communications media and theories in agricultural communications, and to professional opportunities in applied communications in agricultural organizations.

AGSE250 - Pesticide Application 250-1 Pesticide Application. The student will learn the basic principles needed to successfully use pesticides in agricultural production systems. The use and function of application equipment to deliver pesticides in a safe and effective manner will be taught. Basic understanding of scouting, action threshold and decision making, active ingredient rotation, product formulation, and the generation, delivery and function of droplets will be covered. Course fee of $178 is

required. Students will be required to pass Illinois pesticide application basic standards exam and at least two other specialty certifications for successful completion of the class.

AGSE257 - Work Experience 257-1 to 10 Work Experience. Credit for on-campus work experience through a cooperative program developed between the department and the Financial Aid Office. Special approval needed from the chair. Mandatory Pass/Fail.

AGSE258 - Past Work Experience 258-1 to 10 Past Work Experience. Credit for career related employment based on the evaluation of the documentation of this experience by the Department of Agricultural Systems and Education. No grade for past work experience. Special approval needed from the department.

AGSE311A - Ag Education Programs 311A-3 Agricultural Education Programs. Designed to improve the techniques related to award programs and application processes of agricultural education specialists through discussion, application, organization, and assignment to problems in the field of agricultural education Career Development Event programs in the Illinois and National FFA programs. Emphasis will be placed on conceptual understanding, planning, instruction, and application of FFA and Agriculture Education Career Development Events. Prerequisite: AGSE 110 Introduction to Agricultural Education with a grade of C or consent of instructor.

AGSE311B - Ag Educ Classroom Methodology 311B-3 Agricultural Education Classroom Methodology. Nature and scope of the different teaching methodologies involved in classroom and laboratory instruction in the high school agricultural education classroom. Emphasis focuses on the development, implementation, application, and reflective practices for lesson development and improvement related to classroom and laboratory teaching methods. Prerequisite: AGSE 110 Introduction to Agricultural Education with a grade of C or consent of instructor.

AGSE314 - Ag Information Programs 314-3 Agricultural Information Programs. Preparation for an agricultural information internship; an in-depth study into the nature, scope, integral parts, and methods of a total agricultural information program.

AGSE318 - Computers in Agriculture 318-3 Computers in Agriculture. [IAI Course: AG 913] about the use and role of computers in agriculture. The major thrust includes an understanding and application of micro-computers in agriculture with special emphasis on how to save time, money, and increase efficiency in agriculture. This course includes advanced problem-solving and data management content.

AGSE359 - Internship Program 359-1 to 6 Intern Program. Supervised work experience in either an agricultural agency of the government or agribusiness. Restricted to junior standing or consent of instructor. Mandatory Pass/Fail.

AGSE361 - Intro to Control Programming 361-3 Introduction to Control Programming. Entry-level course in the logic and procedures of computer programming for control and monitoring of electronically controlled equipment and systems in agriculture. Topics include problem solving strategies, software design concepts, control logic, and algorithm development and troubleshooting. The laboratory setting provides hands-on experience in programming electronic devices with immediate visual feedback. Laboratory fee: $10.

AGSE364 - Ag Leadership 364-1 to 6 Agricultural Leadership Development. Credit is given for one year of service as a sectional or state FFA officer. Special approval is needed from the department and is dependent on successful completion and evaluation provided by the Illinois State FFA Office.

AGSE370 - Power Equipment 370-2 Consumer and Commercial Power Equipment. The primary focus of this course is to achieve an understanding of small engines. ATV's and power equipment (including chain saws, generators, mowers and turf equipment) and focus on their features, benefits, maintenance and repair.

AGSE371 - Physics in Agriculture 371-4 Physics in Agriculture. An introduction to physical principles as they apply to agriculture. These principle topical areas include mechanics, measurement, electricity, thermodynamics, hydraulics, material properties, and fluids. Prerequisite: MATH 108 or MATH 125, or concurrent enrollment.

AGSE372 - Ag Machinery Systems Mgmt 372-3 Agricultural Machinery Systems Management. A machinery management course focusing on the principles and measurement of engine power and the selection, operation, maintenance and analysis of power and machinery systems for optimum performance and efficiency. The problem solving process is emphasized. Prerequisite: AGSE 371. Fee: $20.

AGSE375 - Intro to Ag Systems 375-3 Introduction to Agricultural Systems. Operational functions and processes that are integrated to accomplish a designated, well-defined purpose in production and processing. Topics include planning and evaluating reliability, manpower, scheduling, economy, packaging, human and animal factors. Prerequisites: AGSE 318, 371. Lab fee: $10.

AGSE380 - Seminar: Ag Communications 380-1 to 2 (1,1) Agricultural Communications Seminar. Readings, discussions, and activities related to (a) current problems, issues, and practices in agricultural communication, (b) career opportunities, professional development, and ethical standards in agricultural communication. Restricted to junior standing.

AGSE381 - Professional Placement 381-1 Agricultural Systems Professional Placement. Professional ethics, protocols, and certifications within agricultural systems. Resume development, employment searches, and technical interviewing. Opportunities within ASABE (American Society of Agricultural and Biological Engineers). Restricted to junior standing or consent of instructor.

AGSE384 - Ag Construction Processes 384-3 Agricultural Construction Processes. Students will apply computer and hands-on techniques to different agricultural construction processes. The computer techniques will address construction challenges such as budget, deadlines, and limited resources. Safety, tool and equipment principles will be applied while completing specific agricultural construction projects. Lab fee: $25.

AGSE388 - International Studies 388-1 to 16 (1 to 8 per semester) International Studies. Course work undertaken as part of an approved University residential study program abroad. May be taken for a maximum of eight semester hours per semester and may be repeated for a maximum of 16 semester hours. Special approval needed from the major department or program.

AGSE390 - Special Studies in Ag Systems 390-1 to 4 Special Studies in Agricultural Systems. Assignments involving research and individual problems. Field trips. Special approval needed from the department.

AGSE391 - Honors in Ag Systems 391-1 to 4 Honors in Agricultural Systems. Completion of honors paper and comparable project within one of the specializations, under the supervision of one or more faculty members. Subject matter depends upon the needs and interests of the student. Special approval needed from the department.

AGSE402A - Problems Ag Education 402A-3 Problems in Agricultural Education. (Same as PSAS 402A) Designed to improve the techniques related to award programs and application processes of agricultural education specialists through discussion, application, organization, and assignment to problems in the field of agricultural education. Emphasis will be placed on conceptual understanding of FFA and Agriculture Education award programs, applications, Supervised Agricultural Experience Program, and National Chapter Award Program, affiliated professional partnerships, and external sources for developing the entire Agricultural Education program. Prerequisite: AGSE 110 Introduction to Agricultural Education with a grade of B or better.

AGSE402B - Problems Ag Technologies 402B-1 to 6 Problems in Agricultural Technologies. (Same as PSAS 402B) Designed to improve the techniques of agricultural mechanization workers through discussion, assignment, and special workshops on problems related to their field. Emphasis will be placed on new innovative and currently developed techniques for the field. Not for graduate credit. Special approval needed from the department.

AGSE411 - Ag Journal 411-3 SIUC Ag Journal. Coordinated approach to the planning, writing, layout and publishing of a journal on agriculture and education in the SIUC College of Agricultural Sciences. Special approval needed from the department.

AGSE412 - Methods:Ag Mechanization 412-3 Methods of Agriculture Mechanization. Theory and use of educational materials and devices adaptable to the needs and interests of educators involved in agricultural mechanization laboratories. There is a $15 laboratory fee for this course.

AGSE414 - Adult Ed Procds, Methods, Tech 414-3 Adult and Adolescent Education Procedures, Methods, and Techniques. Determining adult and adolescent education needs and interests of the school and community. Securing and organizing the information needed for adult and adolescent education programs and planning teaching activities. This course will be taken concurrently with EDUC 401A. Prerequisite: AGSE 110 with a grade of B or better.

AGSE415 - Beginning Teacher Seminar 415-3 Beginning Teacher Seminar. The application in the professional field setting, of principles and philosophies of the education system. Includes application of principles of curricula construction, programming student and community needs. Special approval needed from the department.

AGSE431 - International Ag Systems 431-3 International Agricultural Systems. Introduction to world agriculture, farming systems, world crops, agricultural trade, and food production and processing. Influence of population and climate. Ethical issues surrounding rain forest, global agriculture, finance, world trade, crops and livestock, and the environment. Appropriate technologies and their social and economic impact on developing countries. Not for graduate credit. Restricted to junior standing or instructor consent.

AGSE433 - Intro to Ag Biotechnology 433-3 to 7 Introduction to Agricultural Biotechnology. (Same as ANS 433, CSEM 433, HORT 433, PLB 433) This course will cover the basic principles of plant and animal biotechnology using current examples; gene mapping in breeding, transgenic approaches to improve crop plants and transgenic approaches to improve animals will be considered. Technology transfer from laboratory to marketplace will be considered. An understanding of gene mapping, cloning, transfer, and expression will be derived.

AGSE438 - Molecular Genetics Lab 438-3 Plant and Animal Molecular Genetics Laboratory. (Same as PLB 438, CSEM 438, ZOOL 438) Arabidopsis and Drosophila model organisms, lab-based training in laboratory safety, reagent preparation, phenotype analysis, genetics, DNA and RNA analysis, PCR, cDNA construction, cloning and sequencing of genes. Includes plant and bacterial transformation, and a population level analysis of genetic variation using RAPD markers in grasses and Alu insertion in humans. Two 2-hr labs and one 1-hr lecture per week. Prerequisite: BIOL 305 or equivalent or consent of instructor. Lab fee: $30.

AGSE463 - Ag Electrical Systems 463-3 Agricultural Electrical Systems. (Same as PSAS 463) Electrical knowledge and basics skills are developed and implemented with practical exercises and projects. Electrical circuits will be planned and constructed, with emphasis on convenience, codes and safety. Laboratory fee: $40.

AGSE472 - Precision Agriculture 472-3 Precision Agriculture. A study of the core components of Precision Agriculture including the Global Positioning System (GPS), multispectral and hyperspectral remote sensing technology, Geographic Information Systems (GIS), soil sampling, yield monitoring, and analysis & decision making systems applied for site specific management of production agriculture resources. Lab fee: $5.

AGSE473 - Agricultural Automation 473-3 Agricultural Automation. This course introduces students to topics such as power distribution, programmable controllers, sensors and components, ladder control circuits and diagrams, and motor controls. The lab will address automation issues for different industrial processes such as pasteurization. Prerequisite: AGSE 371. Lab fee: $20.

AGSE476 - Ag Safety & Health 476-3 Agricultural Safety and Health. Analysis of safety and health issues important to managers and supervisors in agricultural operations. Topics include agricultural accident data, causes and effects of accidents, hazard identification, strategies for accident prevention, response to accidents, and health risks and safeguards. Developments and documentation of accident and illness prevention activities in the workplace.

AGSE483 - Ag Processing Systems 483-3 Agricultural Processing Systems. This course provides students with an understanding of the design principles, equipment, procedures and processes utilized in handling, processing and storing agricultural products. Prerequisite: AGSE 371.

AGSE488 - Food Engineering Technology 488-3 Food Engineering Technology. This course introduces the basic principles of facilities planning for larger operations and complexes of the food processing industry, and gain management/technology insight in food engineering technology.

AGSE495 - Food & Pharmaceutical Pckgng 495-3 Food and Pharmaceutical Packaging. Applied packaging and food engineering principles used in packaging, storing, preserving, and transporting food and drug products. Topics include packaging functions, graphic design, printing, sterilization, and food safety. Utilization of paper, glass, plastics, laminates, and metals. Applications of machinery and equipment. Not for graduate credit. Prerequisite: AGSE 371.

AGSE497 - Ag Operations Management 497-3 Agricultural Operations Management. A capstone course in product support, interpretation of financial reports, preparing and monitoring budgets, time and process management, critical thinking, advanced problem solving. Prerequisites: AGSE 318, 371, 375. Restricted to senior standing.

AGSE499 - Ag Info for Teachers 499-3 Agriculture Information for K-12th Grade Teachers. A general inquiry into the agriculture literacy appropriate for K-12th grade students. A framework for evaluating content appropriate for K-12th grade students in the pursuit of agriculture literacy will be developed. Special approval needed from the department.

Agricultural Systems and Education Faculty

Albers, Myron C., Instructor, M.S., Southern Illinois University, 1998.
Choudhary, Ruplal, Associate Professor, Ph.D., Oklahoma State University, 2004.
Jones, K. L., Professor and Chair, Ph.D., Texas A&M University, 1999.
Legacy, James, Professor, Emeritus, Ph.D., Cornell University, 1976.
Pense, Seburn L., Professor, Ph.D., Oklahoma State University, 2002.
Shoup, W. David, Professor, Emeritus, Ph.D., Purdue University, 1980.
Sill, Steven M., Assistant Professor, Ph.D., University of Illinois, Champaign, 2015.
Stitt, Thomas R., Professor, Emeritus, Ph.D., Ohio State University, 1967.
Watson, Dennis G., Associate Professor, Ph.D., Michigan State University, 1987.
Wolff, Robert L., Professor, Emeritus, Ph.D., Louisiana State University, 1971.

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Catalog Year Statement:
Students starting their collegiate training during the period of time covered by this catalog (see bottom of this page) are subject to the curricular requirements as specified herein. The requirements herein will extend for a seven calendar-year period from the date of entry for baccalaureate programs and three years for associate programs. Should the University change the course requirements contained herein subsequently, students are assured that necessary adjustments will be made so that no additional time is required of them.