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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 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.

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.

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.

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.

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.

Bachelor of Science (B.S.) in Agricultural Systems and Education

B.S. Agricultural Systems and Education - Agricultural Communications Specialization Degree Requirements

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
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, HTEM, HND, FOR, MKTG, GEOG, JRNL, RTD, CMST	24
Choose from CMST, JRNL, MKTG, RTD	25
Electives	7
Total	120

B.S. Agricultural Systems and Education - Agricultural Education Specialization Degree Requirements

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 140A, PLB 115, EDUC 214, PSYC 102	23
Integrative Studies (Multicultural/Diversity): EDUC 211	3
Agricultural Education Specialization Requirements	24
AGSE 110, AGSE 170, AGSE 311A, AGSE 311B, AGSE 314, AGRI 323, AGSE 416, AGSE 414	
Other required courses:	49
CSEM 240, FOR 125, HORT 423	8
ANS 121, ANS 122	4
CSEM 200, HORT 220	7
ABE 204	3
EDUC 301, EDUC 302, EDUC 303, EDUC 308, EDUC 313, EDUC 319, EDUC 401	24
CI 360	3
Electives	8
Total	120

B.S. Agricultural Systems and Education - Agricultural Production Management Specialization Degree Requirements

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	30
PLB 200	4
CHEM 140A	1
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	41
Total	120

B.S. Agricultural Systems and Education - Agricultural Systems Technology Management Specialization Degree Requirements

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

Degree Requirements	Credit Hours
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

B.S. Agricultural Systems and Education - Food and Process Engineering Technology Specialization Degree Requirements

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, BIOL 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	29
BIOL 211, BIOL 213	5

Degree Requirements	Credit Hours
CHEM 140A, CHEM 140B	5
MICR 201	4
PHYS 203A, PHYS 203B	6
IMAE 475	3
MATH 109	3
ABE 318	3
Electives	19
Total	120

B.S. Agricultural Systems and Education - General Agriculture Specialization Degree Requirements

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 ZOO 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
ANS elective	3
ABE elective	3

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

Agricultural Education Minor

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 program 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.

Agricultural Systems Minor

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 program must be consulted before selecting this field as a minor.

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

Capstone Option for Transfer Students

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, Life, and Physical Sciences assesses undergraduate majors a technology fee of \$4.58 per credit hour up to 12 credit hours. The fee is charged Fall and Spring semester.

Agricultural Systems and Education Courses

AGSE110 - 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. Credit Hours: 3

AGSE170 - 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. Credit Hours: 4

AGSE180 - 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. Credit Hours: 3

AGSE250 - 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. Credit Hours: 1

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

AGSE258 - Past Work Experience Credit for career related employment based on the evaluation of the documentation of this experience by the program. No grade for past work experience. Special approval needed from the program. Credit Hours: 1-10

AGSE311A - 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. Credit Hours: 3

AGSE311B - 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. Credit Hours: 3

AGSE314 - 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. Credit Hours: 3

AGSE318 - 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. Credit Hours: 3

AGSE359 - 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. Credit Hours: 1-6

AGSE361 - 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. Credit Hours: 3

AGSE364 - Agricultural Leadership Development Credit is given for one year of service as a sectional or state FFA officer. Special approval is needed from the program and is dependent on successful completion and evaluation provided by the Illinois State FFA Office. Credit Hours: 1-3

AGSE370 - 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. Credit Hours: 2

AGSE371 - 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. Credit Hours: 4

AGSE372 - 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. Credit Hours: 3

AGSE373 - Precision Agricultural Equipment A thorough review and operation of precision agricultural equipment as it relates to planters, harvesting and tillage operations, as it is found on current production machines found at University Farms. Credit Hours: 2

AGSE375 - 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. Credit Hours: 3

AGSE380 - 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. Credit Hours: 1-2

AGSE381 - 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. Credit Hours: 1

AGSE384 - 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. Credit Hours: 3

AGSE388 - 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 program. Credit Hours: 1-8

AGSE390 - Special Studies in Agricultural Systems Assignments involving research and individual problems. Field trips. Special approval needed from the program. Credit Hours: 1-4

AGSE391 - 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 program. Credit Hours: 1-4

AGSE402A - 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. Credit Hours: 3

AGSE402B - 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 program. Credit Hours: 1-6

AGSE408 - International Agriculture Production Travel abroad will allow students to study climatological, ecological, physiological, sociological, and economical factors influencing world agricultural production practices. This course intends to provide students the opportunity to observe world crop production practices. This course intends to provide students the opportunity to observe world crop production systems on a first-hand basis. Crop specific production, harvesting, processing, and marketing methods will be discussed. Special approval needed from the program. Credit Hours: 3

AGSE411 - 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, Life, and Physical Sciences. Special approval needed from the college. Credit Hours: 3

AGSE412 - 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. Credit Hours: 3

AGSE414 - Professional and Applied Methods in Agricultural Education Designed to prepare prospective agriculture instructors for employment after graduation while using agriculture education methodology and instruction techniques related to curriculum preparation, managing supervised agriculture experiences, and advising FFA programs. Emphasis will be placed on summary of experiences, conceptual understanding of FFA award programs, applications, Supervised Agricultural Experience Program, National Chapter Award, and develop teaching philosophy and goals. Prerequisite: AGSE 110 with a grade of C or better. Credit Hours: 2

AGSE415 - 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 program. Credit Hours: 3

AGSE416 - Online Instruction and Award Programs in Agricultural Education Designed to improve prospective agriculture instructors' use of technology and online instruction techniques related to curriculum preparation, managing supervised agriculture experiences, and the National Chapter Award Program application process. Emphasis will be placed on conceptual understanding of FFA award programs, applications, Supervised Agricultural Experience Program, National Chapter Award, and online resources to aid instruction. Prerequisite: AGSE 110 with a grade of C or better. Credit Hours: 3

AGSE431 - 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. Credit Hours: 3

AGSE433 - 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. Credit Hours: 3-7

AGSE438 - 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. Credit Hours: 3

AGSE463 - 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. Credit Hours: 3

AGSE472 - 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. Credit Hours: 3

AGSE473 - 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. Credit Hours: 3

AGSE476 - 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. Credit Hours: 3

AGSE483 - 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. Credit Hours: 3

AGSE488 - 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. Credit Hours: 3

AGSE495 - 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. Credit Hours: 3

AGSE497 - 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. Credit Hours: 3

AGSE499 - 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 program. Credit Hours: 3

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.

Pense, Seburn L., Professor, Ph.D., Oklahoma State University, 2002.

Sill, Steven M., Assistant Professor, Ph.D., University of Illinois, Champaign, 2015.

Watson, Dennis G., Associate Professor, Ph.D., Michigan State University, 1987.

Emeriti Faculty

Legacy, James, Professor, Emeritus, Ph.D., Cornell University, 1976.

Shoup, W. David, Professor, Emeritus, Ph.D., Purdue University, 1980.

Stitt, Thomas R., Professor, Emeritus, Ph.D., Ohio State University, 1967.

Wolff, Robert L., Professor, Emeritus, Ph.D., Louisiana State University, 1971.

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