FERGUSON COLLEGE OF AGRICULTURE

College Administration

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The Ferguson College of Agriculture is the academic unit of the Division of Agricultural Sciences and Natural Resources and offers outstanding undergraduate and graduate programs that are recognized at the state, regional, national and international levels. In collaboration with the OSU Extension and OSU Ag Research, the Ferguson College of Agriculture faculty provides great breadth and exceptional quality in teaching, advising, research, extension, and service.

The Ferguson College of Agriculture values hands-on instruction and a well-rounded student experience. The college's award-winning faculty members are dedicated to developing students and passionate about adding value to the total educational experience. The college's academic programs not only teach the technical skills needed in their chosen field, but also prepares students to analyze information, communicate effectively, think critically, solve problems, and assume leadership roles in their respective fields of study. Students also receive a solid general education in communications, humanities, and social sciences.

Students in our college have a broad set of non-agricultural and traditional agricultural backgrounds and experiences. They come from urban cities and rural communities. Our students may be first-generation, legacy, in-state, out-of-state or international students. This diversity of perspective and background adds strength to the college experience for all students.

Career opportunities in agricultural sciences and natural resources are also diverse. The college's majors include traditional agricultural and natural resource disciplines such as animal and food sciences, agricultural business, soil science, range science, horticulture, entomology, and agricultural education, in addition to distinctive areas such as plant and animal biotechnology, food safety, natural resource management, agricultural communications, and agricultural systems technology. Programs in the Ferguson College of Agriculture also include many fields not commonly associated with agriculture such as landscape architecture, turf management, biochemistry and molecular biology, environmental science, leadership, pre-law, and pre-medical sciences. Active international programs, including study abroad opportunities, are available to students in every Ferguson College of Agriculture major and add a unique dimension to the college experience.

Accreditation

Agricultural sciences and natural resources include broad and diverse professions and do not have a single accrediting society as do some other professions. Programs in agricultural education, biochemistry, and molecular biology, biosystems engineering, forest ecology and management, and landscape architecture are accredited by their professional organizations.

Academic Programs

Undergraduate Programs

The Bachelor of Science in Agricultural Sciences and Natural Resources degree is offered in the following major fields of study: agribusiness, agricultural communications, agricultural economics, agricultural education, agricultural leadership, agricultural systems technology, animal science, biochemistry and molecular biology, entomology, environmental sciences, food science, horticulture, natural resource ecology and management, and plant and soil sciences. The Bachelor of Landscape Architecture is also offered in the Ferguson College of Agriculture. The biosystems engineering degree program is jointly administered by the Ferguson College of Agriculture and the College of Engineering, Architecture and Technology (Bachelor of Science in Biosystems Engineering). Every major must meet the College/Departmental requirements for the Ferguson College of Agriculture. In addition to undergraduate majors, most of the college's departments offer one or more minors. The requirements for the minors are available from the department offering the specified minor. The college also offers undergraduate certificate programs in equine enterprise management, food safety, and ethical leadership.

Graduate Programs

Graduate study is available in all Ferguson College of Agriculture academic departments and in the multidisciplinary international agriculture and food science programs. In addition to the Master of Agriculture and Master of Science degrees that may be obtained through several departments, the Doctor of Philosophy degree (PhD) may be earned in the following areas: agricultural economics, agricultural education, biosystems engineering, animal science, biochemistry and molecular biology, crop science, entomology, food science, plant pathology, soil science, natural resource ecology and management and in horticulture through multidisciplinary programs in crop science, and plant science.

High School Preparation and Admission Requirements

The high school preparation and admission requirements for the College are the same as the general University requirements. Additional online information can be found at https://go.okstate.edu/admissions/.

Transfer Students

Students who transfer from an accredited college or two-year college must meet the general University admission requirements. All transferred courses are recorded on the OSU transcript; however, a minimum of 60 credit hours must be earned at a senior college (baccalaureate degree-granting institution) to meet the Oklahoma State Regents for Higher Education requirements. Credits will be accepted by transfer from a community college to meet lower-division (i.e., 1000- and 2000-level courses) requirements only. Specific departmental requirements needed

for graduation are determined by the department in which the student plans to earn his or her degree.

Scholarships

Students enrolled in and entering the Ferguson College of Agriculture are annually awarded over 1.8 million dollars in scholarships by the College and its departments. When awarding scholarships, the Ferguson College of Agriculture looks at several areas of a student's background, including (but not limited to) scholastic standing in high school or college, organization and community involvement, financial need, and sincere interest in the various agriculture and natural resource disciplines.

Additional information may be obtained from the office of the associate dean, Ferguson College of Agriculture, Oklahoma State University, 136 Agricultural Hall, Stillwater, OK 74078 (https://agriculture.okstate.edu/students/undergraduate-students/scholarships.html).

Student Success Center

The Ferguson College of Agriculture Student Success Center (SSC) helps students with educational, career and personal goals. The SSC provides important services, programs and student support including Student Success Leaders, Living and Learning Communities, Study and Snacks, Freshmen in Transition, Career Services, Prospective Student Services, and Multicultural Programs, and assistance with tutoring and other campus services.

Special Academic Programs

Honors Program

The Honors Program through the Ferguson College of Agriculture is designed to provide students with opportunities to pursue new challenges and academic excellence. Honors courses, seminars and special honors contracts provide for discussions and independent study by students who have the desire and ability to explore academic subjects beyond the normal classwork material. The OSU Honors College oversees the following Honors Award Recognitions:

1. General Honors.
2. College or Department Honors.
3. The Honor's College Degree.

Award descriptions and Honors College eligibility requirements can be found in the Honors College section of the catalog. Online information is available at http://honors.okstate.edu (http://honors.okstate.edu/).

Pre-Professional Programs

Pre-law, pre-medical, and pre-veterinary are not majors, but rather statements of intention that indicate a career goal you are working toward while obtaining your bachelor's degree. The Ferguson College of Agriculture offers several pathways to help achieve your goal of pursuing an advanced degree.

Pre-Law

The Ferguson College of Agriculture Animal Science and Agribusiness majors have specific degree options for students interested in pre-law that promote the development of problem-solving abilities and exceptional writing skills.

Pre-Medical

The Ferguson College of Agriculture offers degree tracks within several majors that can lead you to a career in the medical#field. Majors with a pre-medical option include Animal Science, Biochemistry and Molecular Biology, Biosystems Engineering, and Entomology.

Pre-Veterinary Medicine Curriculum

Specific pre-veterinary science options in agribusiness, animal science, biochemistry and molecular biology, entomology, and natural resource ecology and management as offered in the Ferguson College of Agriculture, include courses required for admission to the College of Veterinary Medicine.

Graduation Requirements

General University requirements for graduation are stated elsewhere in the Catalog. In addition, specific requirements must be met for the Bachelor of Science in Agricultural Sciences and Natural Resources and Bachelor of Landscape Architecture degrees. For the BSAG degree, the required total semester credit hours vary by department, major and option. A minimum of 40 semester credit hours and 100 grade-points must be earned in courses numbered 3000 or above. The Bachelor of Landscape Architecture is a four-year program requiring 126 credit hours.

College and Departmental Organizations, Competitive Teams and Honor Societies

There are more than 60 student organizations and competitive teams within the Ferguson College of Agriculture providing students with leadership, social, and career opportunities. Online information about student involvement is available at (https://agriculture.okstate.edu/students/student-involvement/index.html (https://agriculture.okstate.edu/students/student-involvement/)).

Academic Areas

- Agricultural Communications (p. 2423)
- Agricultural Economics (p. 2434)
- Agricultural Education (p. 2469)
- Agricultural Leadership (p. 2476)
- Animal and Food Sciences (p. 2486)
- Biochemistry and Molecular Biology (p. 2512)
- Biosystems and Agricultural Engineering (p. 2527)
- Entomology and Plant Pathology (p. 2547)
- Environmental Sciences (p. 2560)
- Horticulture and Landscape Architecture (p. 2575)
- International Agriculture (p. 2603)
- Natural Resource Ecology and Management (p. 2606)
- Plant and Soil Sciences (p. 2635)

Undergraduate Programs

The Bachelor of Science in Agricultural Sciences and Natural Resources degree is offered in the following major fields of study: agribusiness, agricultural communications, agricultural economics, agricultural education, agricultural leadership, agricultural systems technology, animal science, biochemistry and molecular biology, entomology, environmental science, food science, horticulture, natural resource ecology and management, and plant and soil sciences. The Bachelor of Landscape Architecture is also offered in the Ferguson College of Agriculture. Every major must meet the College/Departmental requirements for the Ferguson College of Agriculture. Most departments offer one or more minors. The requirements for the minors are available from the department offering the specified minor. The college also offers

undergraduate certificate programs in equine enterprise management, food safety, and ethical leadership.

- Agribusiness, BSAG (p. 2444)
- Agribusiness: Accounting Double Major, BSAG (p. 2446)
- Agribusiness: Agricultural Communications Double Major, BSAG (p. 2448)
- Agribusiness: Community and Regional Analysis, BSAG (p. 2450)
- Agribusiness: Crop and Soil Sciences, BSAG (p. 2452)
- Agribusiness: Farm and Ranch Management, BSAG (p. 2454)
- Agribusiness: International, BSAG (p. 2456)
- Agribusiness: Natural Resources, BSAG (p. 2458)
- Agribusiness: Pre-Law, BSAG (p. 2460)
- Agribusiness: Pre-Veterinary Business Management, BSAG (p. 2462)
- Agricultural Communications, BSAG (p. 2428)
- Agricultural Communications: Agribusiness Double Major, BSAG (p. 2430)
- Agricultural Communications: Animal Science Double Major, BSAG (p. 2432)
- Agricultural Economics, BSAG (p. 2465)
- Agricultural Education: Multidisciplinary, BSAG (p. 2474)
- Agricultural Leadership, BSAG (p. 2480)
- Agricultural Leadership: Extension Education, BSAG (p. 2482)
- Agricultural Leadership: International Studies, BSAG (p. 2484)
- Agricultural Systems Technology, BSAG (p. 2535)
- Animal Science: Business/Pre-Law, BSAG (p. 2499)
- Animal Science: General Option, BSAG (p. 2501)
- Animal Science: Pre-Veterinary/Pre-Medical, BSAG (p. 2503)
- Animal Science: Production and Operations, BSAG (p. 2505)
- Biochemistry and Molecular Biology, BSAG (p. 2521)
- Biochemistry and Molecular Biology: Biotechnology, BSAG (p. 2523)
- Biochemistry and Molecular Biology: Pre-Medical or Pre-Veterinary Science, BSAG (p. 2525)
- Entomology: Bio-Forensics, BSAG (p. 2553)
- Entomology: Insect Biology and Ecology, BSAG (p. 2555)
- Entomology: Pre-Veterinary and Pre-Medical, BSAG (p. 2557)
- Environmental Science: Environmental Policy, BSAG (p. 2569)
- Environmental Science: Natural Resources, BSAG (p. 2571)
- Environmental Science: Water Resources, BSAG (p. 2573)
- Food Science, BSAG (p. 2510)
- Horticulture: Horticultural Business, BSAG (p. 2587)
- Horticulture: Horticultural Food Safety, BSAG (p. 2589)
- Horticulture: Horticultural Science, BSAG (p. 2591)
- Horticulture: Landscape Management, BSAG (p. 2593)
- Horticulture: Public Horticulture, BSAG (p. 2595)
- Horticulture: Turf Management, BSAG (p. 2597)
- Horticulture: Urban Horticulture, BSAG (p. 2599)
- Landscape Architecture, BLA (p. 2601)
- Natural Resource Ecology & Management: Fisheries & Aquatic Ecology, BSAG (p. 2621)
- Natural Resource Ecology & Management: Forest Ecology & Management, BSAG (p. 2623)
- Natural Resource Ecology & Management: Rangeland Ecology & Management, BSAG (p. 2625)
- Natural Resource Ecology & Management: Wildlife Biology & Preveterinary Science, BSAG (p. 2627)
- Natural Resource Ecology & Management: Wildlife Ecology & Management, BSAG (p. 2630)
- Plant and Soil Sciences: Agronomic Business, BSAG (p. 2647)
- Plant and Soil Sciences: Crop Production and Management, BSAG (p. 2649)
- Plant and Soil Sciences: Plant Biotechnology and Improvement, BSAG (p. 2651)
- Plant and Soil Sciences: Soil and Water Resources, BSAG (p. 2653)

The Biosystems Engineering degree program is jointly administered by the Ferguson College of Agriculture and the College of Engineering, Architecture and Technology.

- Biosystems Engineering: Bioprocessing & Food Processing, BSBE (p. 2537)
- Biosystems Engineering: Biosystems Engineering, BSBE (p. 2539)
- Biosystems Engineering: Environmental and Natural Resources, BSBE (p. 2541)
- Biosystems Engineering: Machine Systems & Agricultural Engineering, BSBE (p. 2543)
- Biosystems Engineering: Pre-Medical, BSBE (p. 2545)

Certificates

Undergraduate Certificates

- Equine Enterprise Management, UCRT (p. 2507)
- Food Safety, UCRT (p. 2508)

Minors

- Agricultural Economics and Agribusiness (AEAB), Minor (p. 2464)
- Agricultural Leadership (AGLE), Minor (p. 2479)
- Agricultural Real Estate Appraisal (AREA), Minor (p. 2467)
- Agronomy (AGRN), Minor (p. 2646)
- Animal Science (ANSI), Minor (p. 2498)
- Biochemistry (BIOC), Minor (p. 2520)
- Entomology (ENTO), Minor (p. 2552)
- Environmental Economics, Politics and Policy (EEPP), Minor (p. 2468)
- Environmental Science (ENVR), Minor (p. 2568)
- Fisheries and Aquatic Ecology (FAEC), Minor (p. 2619)
- Food Science (FDSC), Minor (p. 2509)
- Forestry (FOR), Minor (p. 2620)
- Horticulture (HORT), Minor (p. 2586)
- Natural Resource Ecology and Management (NREM), Minor (p. 2632)
- Pest Management (PEST), Minor (p. 2559)
- Rangeland Ecology and Management (REM), Minor (p. 2633)
- Soil Science (SOIL), Minor (p. 2655)
- Wildlife Ecology (WLEC), Minor (p. 2634)

Graduate Programs

Graduate study is available in all Ferguson College of Agriculture academic departments and in the multidisciplinary international agriculture program. In addition to the Master of Agriculture and Master of Science degrees that may be obtained through several departments, the Doctor of Philosophy degree (PhD) may be earned in the following areas: agricultural economics, agricultural education, biosystems engineering, animal science, biochemistry and molecular biology, crop science, entomology, food science, plant pathology, soil science, natural resource ecology and management and in horticulture through interdisciplinary programs in crop science, and plant science.

- Agribusiness, MAG (p. 2443)
- Agricultural Communication, MS (p. 2426)
- Agricultural Economics, MS/PhD (p. 2443)
- Agricultural Education, MS/PhD (p. 2472)
- Agricultural Leadership, MAG (p. 2478)
- Animal Science, MS/PhD (p. 2496)
- Biochemistry and Molecular Biology, MS/PhD (p. 2518)
- Crop Science, PhD (p. 2644)
- Entomology, MS/PhD (p. 2550)
- Fisheries and Aquatic Ecology, MS/PhD (p. 2617)
- Food Science, MS/PhD (p. 2496)
- Forest Resources, MS/PhD (p. 2617)
- Horticulture, MS (p. 2575)
- International Agriculture, MAG/MS (p.)
- Plant and Soil Sciences, MS (p. 2644)
- Plant Pathology, MS/PhD (p. 2550)
- Rangeland Ecology and Management, MS/PhD (p. 2617)
- Soil Science, PhD (p. 2644)
- Wildlife Ecology and Management, MS/PhD (p. 2617)

Agricultural Communications

Modern agriculture, with its diversity and specialization, requires accurate communication between industry leaders and the public. Education in agricultural communications prepares students to provide the necessary communications link mixing the most current media platforms with traditional principles.

By majoring in agricultural communications, students gain communications education with industry specific classes in advertising and public relations, Web design, magazine writing and production, radio and television broadcasting, photography, reporting and newswriting, or research report writing. Opportunities also are available for the student to develop a double-major program with other departments in the Ferguson College of Agriculture.

For the graduate with a bachelor's degree in agricultural communications, career opportunities are abundant in the agricultural production industry and in service organizations as well as with publishing firms, broadcast stations, trade publications or related media.

Courses

AGCM 2113 Introduction to Agricultural Communications
Prerequisites: ENGL 1213 or 1413. Major in AGCM or consent of instructor.
Description: Fundamentals of agricultural news writing and other communication methods. Careers in and the role of the media in agriculture and related fields. Previously offered as AGCM 2103 and AGCM 4453.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGCM 3100 Special Topics in Agricultural Communications
Prerequisites: Consent of instructor.
Description: Investigation of specialized and/or advanced topics and issues related to agricultural communications. Previously offered as AGCM 3101. Offered for variable credit, 1-3 credit hours, maximum of 6 credit hours.
Credit hours: 1-3
Contact hours: Contact: 1-3 Other: 1-3
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Ag Ed, Comm & Leadership

AGCM 3103 Written Communications in Agricultural Sciences and Natural Resources
Prerequisites: ENGL 1213; College of Agricultural Sciences and Natural Resources student.
Description: Understanding and application of writing principles and communications theory as related to public issues in agriculture, food and natural resources.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGCM 3113 Writing and Editing for Agricultural Publications
Prerequisites: AGCM 2113 with a grade of "C" or better; major in agricultural communications.
Description: Interviewing, reporting, writing, and editing for agricultural publications.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Ag Ed, Comm & Leadership

AGCM 3123 Audio and Video Storytelling in Agricultural Communications
Prerequisites: Grade of "C" or better in AGCM 2113; Grade of "C" or better in AGCM 3233 or AGCM 4233, or concurrent enrollment in AGCM 3233.
Description: Exploration and application of audio and video media storytelling techniques for agricultural communicators as used in promoting, marketing and communicating about agriculture, food, natural resources and the environment.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Ag Ed, Comm & Leadership

AGCM 3203 Oral Communications in Agricultural Sciences & Natural Resources (S)
Prerequisites: Student in the College of Agricultural Sciences and Natural Resources.
Description: Application of oral communications skills used in the dissemination of information related to agricultural sciences and natural resources, and related topics. Acquisition of interpersonal communications skills and small group, impromptu and professional presentation skills.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Ag Ed, Comm & Leadership
General Education and other Course Attributes: Social & Behavioral Sciences

AGCM 3213 Layout and Design for Agricultural Publications
Prerequisites: AGCM 2113 with a "C" or better; major in agricultural communications.
Description: Fundamentals of layout and design as applied to agricultural publications. Practical application of design principles, typography, design software and printing practices.
Credit hours: 3
Contact hours: Lecture: 1 Lab: 4 Contact: 5
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Ag Ed, Comm & Leadership

AGCM 3223 Digital and Online Media in Agricultural Communications
Prerequisites: AGCM 2113 and AGCM 3213 with a "C" or better; major in agricultural communications.
Description: Fundamentals of using digital and online media and mass communication for agriculture and natural resources, including web, social media and email marketing. Practical application of theory and skills related to design, management and evaluation of digital and online media.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Ag Ed, Comm & Leadership

AGCM 3233 Basic Photography and Photo Editing for Agriculture
Prerequisites: AGCM 2113 with a "C" or better; major in agricultural communications.
Description: Beginning course focusing on photographic equipment, related software and photo composition in an agricultural setting.
Credit hours: 3
Contact hours: Lecture: 1 Lab: 2 Contact: 5 Other: 2
Levels: Undergraduate
Schedule types: Independent Study, Lab, Lecture, Lecture Lab Indep Study
Department/School: Ag Ed, Comm & Leadership

AGCM 3503 Issues Management and Crisis Communications in Agriculture and Natural Resources
Prerequisites: Junior or senior standing; Major in CASNR.
Description: Theoretical perspectives and practical applications of issues management, crisis management, and crisis communications principles. Development of knowledge, skills, and abilities necessary for identifying and managing issues faced by organizations; leading organizations through crises; and communicating before, during and after crisis.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGCM 4113 Features Writing and Editing for Agricultural Publications
Prerequisites: AGCM 3113 with a grade of "C" or better; major in agricultural communications or consent of instructor.
Description: Brainstorming, researching, interviewing, developing, writing and editing feature stories for agricultural publications. May not be used for degree credit with AGCM 5113.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGCM 4203 Professional Development in Agricultural Communications
Prerequisites: AGCM 2113 with a "C" or better; major in agricultural communications.
Description: Professional preparation and personal development for careers in agricultural communications, including business communications writing, resume and portfolio development, presentation delivery, financial planning and management, networking, and job interview skills.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGCM 4233 Agricultural Photography Tour
Description: Agricultural photography travel course focused on advanced composition techniques including but not limited to night photography, portraits, painting, etc. Students will be exposed to many cultural and agricultural sites from a photographic perspective. No credit for students with credit in AGCM 5233.
Credit hours: 3
Contact hours: Lecture: 1 Lab: 4 Contact: 5
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Ag Ed, Comm & Leadership

AGCM 4300 Internships in Agricultural Communications
Prerequisites: Consent of internship coordinator and adviser.
Description: Supervised work experience with approved employers in agricultural communications. Presentation required following the internship experience. Previously offered as AGCM 4500. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Ag Ed, Comm & Leadership

AGCM 4403 Planning Campaigns for Agriculture and Natural Resources
Prerequisites: AGCM 3113, AGCM 3213 and AGCM 3223 with a "C" or better; major in agricultural communications.
Description: Communications campaign development for agriculture and natural resources activities and issues, including development of materials, budgets and contracts.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Ag Ed, Comm & Leadership

AGCM 4413 Agricultural Communications Capstone
Prerequisites: AGCM 3213 and AGCM 3233 or AGCM 4233, and AGCM 4113 with a "C" or better; senior or graduate standing in agricultural communications.
Description: The development of an agricultural magazine through advanced feature writing and editing, page layout, graphic design, photography, and sponsor communications as well as an understanding of the printing process. May not be used for degree credit with AGCM 4413.
Credit hours: 3
Contact hours: Lecture: 1 Lab: 4 Contact: 5
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Ag Ed, Comm & Leadership

AGCM 4990 Problems in Agricultural Communications
Prerequisites: Consent of instructor.
Description: Small group and individual study and research in problems relating to communications within the agricultural sector and from the agricultural sector to other constituencies. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Ag Ed, Comm & Leadership

AGCM 5000 Research and Thesis
Prerequisites: Graduate standing.
Description: Independent research and thesis under the direction and supervision of a major professor. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Graduate
Schedule types: Independent Study
Department/School: Ag Ed, Comm & Leadership

AGCM 5100 Special Topics in Agricultural Communications
Prerequisites: Consent of instructor.
Description: Investigation of specialized and/or advanced topics and issues related to agricultural communications. Offered for variable credit, 1-3 credit hours, maximum of 6 credit hours.
Credit hours: 1-3
Contact hours: Contact: 1-3 Other: 1-3
Levels: Graduate
Schedule types: Independent Study
Department/School: Ag Ed, Comm & Leadership

AGCM 5103 History and Philosophical Foundations of Agricultural Communications
Prerequisites: Graduate standing.
Description: Discussion of the history, philosophical foundations and current issues regarding agricultural communications and the land-grant system.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGCM 5113 Features Writing and Editing for Agricultural Publications
Prerequisites: AGCM 3113 with a grade of "C" or better; major in agricultural communications or consent of instructor.
Description: Brainstorming, researching, interviewing, developing, writing and editing feature stories for agricultural publications. May not be used for degree credit with AGCM 4113.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGCM 5123 Advanced Audio and Video Storytelling in Agricultural Communications
Description: Application of audio and video storytelling concepts to communicating about issues in agriculture, food, natural resources, and the environment.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Ag Ed, Comm & Leadership

AGCM 5132 Writing for Scholarly Publications in Agricultural Sciences and Natural Resources
Description: Development of scientific writing skills for agricultural sciences and natural resources disciplines, including research proposals, theses, dissertations, conference papers, and journal articles.
Credit hours: 2
Contact hours: Lecture: 2 Contact: 2
Levels: Graduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGCM 5133 Agricultural Photography and Photo Editing
Description: Photographic history, theory and research along with practical knowledge in equipment, software, composition, and the photographic light triangle. May not be used for degree credit with AGCM 3233.
Credit hours: 3
Contact hours: Lecture: 1 Lab: 2 Contact: 5 Other: 2
Levels: Graduate
Schedule types: Independent Study, Lab, Lecture, Lecture Lab Indep Study
Department/School: Ag Ed, Comm & Leadership

AGCM 5203 Theory and Practice in Agricultural Communications
Prerequisites: Graduate standing.
Description: The study of major communication theories and theorists in the context of agricultural communications.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGCM 5213 Advanced Concepts in Agricultural Publishing
Prerequisites: Graduate standing.
Description: Analysis, redesign and creation of agricultural publications. Evaluation of audience, production, advertising and editorial content.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGCM 5223 Digital and Online Media in Agricultural Communications
Prerequisites: Consent of instructor.
Description: Fundamentals of using digital and online media and mass communication for agriculture and natural resources, including web, social media and email marketing. Practical application of theory and skills related to design, management and evaluation of digital and online media. May not be used for degree credit with AGCM 3223.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Ag Ed, Comm & Leadership

AGCM 5233 Agricultural Photography Tour
Description: Agricultural photography travel course focused on advanced composition techniques including but not limited to night photography, portraits, painting, etc. Students will be exposed to many cultural and agricultural sites from a photographic perspective. No credit for students with credit in AGCM 4233.
Credit hours: 3
Contact hours: Lecture: 1 Lab: 4 Contact: 5
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Ag Ed, Comm & Leadership

AGCM 5303 Communicating Ethical Issues in Agriculture
Prerequisites: Graduate standing.
Description: An introduction to communicating ethical theories in the context of agriculture. Ethical theory and current research are used to critique contemporary issues in agriculture.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGCM 5403 Public Relations Campaigns in Agricultural Sciences and Natural Resources
Prerequisites: AGCM 5213.
Description: Public relations campaign development for agriculture and natural resources organizations and issues, including public relations theory, strategic planning and campaign material development. No credit for students with credit in AGCM 4403.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Ag Ed, Comm & Leadership

AGCM 5413 Agricultural Communications Capstone
Credit hours: 3
Contact hours: Lecture: 1 Lab: 4 Contact: 5
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Ag Ed, Comm & Leadership

AGCM 5503 Risk and Crisis Communication in Agricultural Sciences and Natural Resources
Description: Development of risk and crisis communication skills and knowledge with special emphasis in agricultural sciences and natural resources.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGCM 5990 Advanced Studies in Agricultural Communications
Prerequisites: Consent of supervising professor.
Description: Individual and small group study or research in agricultural communications topics and issues. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Graduate
Schedule types: Independent Study
Department/School: Ag Ed, Comm & Leadership

Undergraduate Programs

- Agricultural Communications, BSAG (p. 2428)
- Agricultural Communications: Agribusiness Double Major, BSAG (p. 2430)
- Agricultural Communications: Animal Science Double Major, BSAG (p. 2432)

Graduate Programs

The Master of Science degree in Agricultural Communications is designed to build mastery of knowledge in key areas such as communication theory, history, philosophy, technology, advanced communication skills and research and data analysis. The Master of Science degree in agricultural communications reflects the distinctive body of knowledge, research base, professional delivery, and program focus of the discipline. In addition, the program introduces and requires students to apply research tools and methods.

The Master of Science program serves two primary purposes:

1. Encouraging mastery of discipline-specific knowledge with an introduction to research and data analysis, and
2. Offering discipline-specific knowledge with professional application to the work setting.

The Master of Science program offers students two options for completion of the degree: thesis option and formal report option. The thesis option requires 30 approved credit hours of coursework, which includes a six-credit hour formal thesis following the graduate college format. The formal report option requires 32 approved semester credit hours of coursework, including a two-credit hour formal report.

Students applying for the Master of Science program without a background in the appropriate option will be expected to complete coursework to bring their preparation to an acceptable level.

The Doctor of Philosophy program in Agricultural Education, Communications and Leadership is designed to prepare graduates for careers in professional education, supervision, administration, curriculum development and other areas of professional leadership in agriculture, agricultural extension, career and technology, and agricultural communications. Within the minimum 60-credit hour requirement, 15 credit hours must be completed in the core area. In addition, 15 credit hours must be completed in an area of specialization such as agricultural Extension, technical agriculture, educational administration, or other similar areas. The additional hours include 15 hours of research design and statistics and 15 hours for the dissertation.

Admission Requirements

Students seeking admission to the master's degree program must have earned a bachelor's degree in agricultural communications or a closely related field. A student with background deficiencies must compensate for such deficiencies before completing the Master of Science degree. Evidence of academic ability (2.80 GPA or above) in undergraduate coursework is required. Three letters of reference and a statement of purpose are also required. Graduate Record Exam (GRE) scores are required for students seeking admission to the Master of Science degree program.

Admission to the doctoral degree program is based upon evidence the applicant meets the general requirements of the Graduate College, has demonstrated superior achievement, and can successfully complete

a doctoral program as evidenced by three letters of recommendation, GRE scores, a minimum of 2.80 undergraduate grade-point average and 3.00 graduate grade-point average, and a philosophy statement and goals. Alternative criteria may be considered by the graduate committee for those who submit ample supportive evidence of other exemplary qualifications.

Faculty

J. Shane Robinson, PhD—Professor and Head
Professors: D. Dwayne Cartmell, PhD; M. Craig Edwards, PhD; Shelly R. Legg, PhD; Jon W. Ramsey, PhD; Robert Terry, Jr., PhD
Associate Professor: Angel Riggs, PhD; Quisto Settle, PhD
Assistant Professors: Courtney Brown, PhD; Lauren Cline, PhD; Bradley Coleman, PhD; Chris Eck, PhD; Audrey King, PhD
Lecturers: Kenna Sandburg, MS; Nathan Smith, MS; Kaylee Travis, MS

Agricultural Communications, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p. 977)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
Select one of the following:		3
MATH 1483	Mathematical Functions and Their Uses (A)	
MATH 1493	Applications of Modern Mathematics (A)	
MATH 1513	College Algebra (A)	
MATH 1813	Preparation for Calculus (A)	
STAT 2013	Elementary Statistics (A)	
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Any course designated (N)		7
Must include one Laboratory Science (L) course		
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1]	3
or ECON 2103	Introduction to Microeconomics (S)	
Select one of the following:		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [1]	
SPCH 2713	Introduction to Speech Communication (S) [1]	
Additional General Education		
Courses designated (A), (H), (N), or (S)		6
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
Agricultural Sciences and Natural Resources		
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
ANSI 1023 & ANSI 1021	Introduction to the Animal Sciences and Introduction to the Animal Sciences Lab	4
or ANSI 1124	Introduction to the Animal Sciences	
PLNT 1213	Introduction to Plant and Soil Systems (N)	3
Select one course from each of the following lists:		
Group 1: [2]		2
FDSC 1133	Fundamentals of Food Science	
FDSC 2102	Regional Diversity in Food Production, Selection and Consumption (D)	
ANSI 2233	The Meat We Eat	
ANSI 2253	Meat Animal and Carcass Evaluation	
NSCI 2013	Principles of Human Nutrition (N)	
NSCI 3543	Food and the Human Environment (IS)	
Group 2: [2]		3
AGEC 4503	Environmental Economics and Resource Development	
ENPP 2143	Global Agricultural Biosecurity and Forensics	
ENTO 2003	Insects and Society (N)	
ENTO 2223	Insects in Global Public Health (N)	
ENTO 2993	Introduction to Entomology (LN)	
ENVR 1113	Elements of Environmental Science (N)	
NREM 1014	Introduction to Natural History (LN)	
SOIL 1113	Land, Life and the Environment (N)	
SOIL 2124	Fundamentals of Soil Science (N)	
Group 3: [2]		3
AGED 4713	International Programs in Agricultural Education and Extension (I)	
AGEC 2303	Food Marketing to a Diverse Population (D)	
AGEC 3403	Agricultural Small Business Management	
AGEC 3423	Farm and Agribusiness Management	
AGEC 3463	Agricultural Cooperatives	
AGLE 2303	Agricultural Leaders in Society (S)	
AGLE 2403	Agricultural Leadership in a Multicultural Society (DS)	
AGLE 3403	Facilitating Social Change in Agriculture	
AGLE 3803	Global Leadership in Agriculture (I)	
Written & Oral Communications		
AGCM 2113	Introduction to Agricultural Communications	3
AGCM 3113	Writing and Editing for Agricultural Publications	3
Hours Subtotal		**22**
Major Requirements		
Core Courses		
AGCM 3123	Audio and Video Storytelling in Agricultural Communications	3
AGCM 3213	Layout and Design for Agricultural Publications	3
AGCM 3223	Digital and Online Media in Agricultural Communications	3

AGCM 3233	Basic Photography and Photo Editing for Agriculture	3
or AGCM 4233	Agricultural Photography Tour	
AGCM 3503	Issues Management and Crisis Communications in Agriculture and Natural Resources	3
AGCM 4113	Features Writing and Editing for Agricultural Publications	3
AGCM 4203	Professional Development in Agricultural Communications	3
AGCM 4300	Internships in Agricultural Communications	2
AGCM 4403	Planning Campaigns for Agriculture and Natural Resources	3
AGCM 4413	Agricultural Communications Capstone	3
AGEC 3323	Agricultural Product Marketing and Sales	3
or MKTG 3213	Marketing (S)	
AGEC 3703	Issues in Agricultural Policy	3
or NREM 4043	Natural Resource Administration and Policy	
or POLS 3493	Public Policy	
or POLS 4363	Environmental Law And Policy	
or POLS 4593	Natural Resources and Environmental Policy	
AGEC 3713	Agricultural Law	3
or AGEC 3723	Environmental Law for Agriculture and Natural Resources	
or LSB 3213	Legal and Regulatory Environment of Business	
Select one of the following courses:		3
FIN 2123	Personal Finance	
ACCT 2003	Survey of Accounting	
ACCT 2103	Financial Accounting	
Related Courses		
To be selected from courses in the following areas:		17
AECL, AG, AGCM, AGEC, AGED, AGLE, ANSI, ART, AST, BIOC, DHM, ECON, EEE, ENTO, ENGL, ENVR, FDSC, GEOG, GEOL, HIST, HORT, HTM, MC, MGMT, MKTG, MMJ, NREM, PLNT, POLS, PSYC, SC, SOC, SOIL, SPAN, SPCH, STAT, or TH		
Hours Subtotal		**58**
Electives		
0 or hours to complete required total for degree		
Total Hours		**120**

[1]

College & Departmental requirements that may be used to meet General Education requirements.

[2]

If used as (N) or (S) courses in General Education, hours in this block reduced by 3.

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.
- The student must earn a minimum grade of “C” in all AGCM courses.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Agricultural Communications: Agribusiness Double Major, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 128

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p. 977)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
Select one of the following:		3
MATH 2103	Business Calculus (A) [1]	
MATH 2123	Calculus for Technology Programs I (A) [1]	
MATH 2144	Calculus I (A) [1]	
STAT 2023	Elementary Statistics for Business and Economics (A) (or equivalent STAT course designated A) [1]	3
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
Select one of the following:		4
CHEM 1014	Chemistry In Civilization (LN) [1]	
CHEM 1215	Chemical Principles I (LN) [1]	
CHEM 1314	Chemistry I (LN) [1]	
Any course designated (N)		3
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1]	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		6
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
Agricultural Sciences and Natural Resources		
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
ANSI 1124 & PLNT 1213	Introduction to the Animal Sciences and Introduction to Plant and Soil Systems (N)	7
Written & Oral Communications		
AGCM 2113	Introduction to Agricultural Communications	3
AGCM 3113	Writing and Editing for Agricultural Publications	3
Select one of the following: [2]		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S)	
SPCH 2713	Introduction to Speech Communication (S)	
SPCH 3733	Elements of Persuasion (S)	
Hours Subtotal		**17**
Major Requirements		
Agricultural Communications Core Courses		
AGCM 3123	Audio and Video Storytelling in Agricultural Communications	3
AGCM 3213	Layout and Design for Agricultural Publications	3
AGCM 3223	Digital and Online Media in Agricultural Communications	3
AGCM 3233	Basic Photography and Photo Editing for Agriculture	3
or AGCM 4233	Agricultural Photography Tour	
AGCM 3503	Issues Management and Crisis Communications in Agriculture and Natural Resources	3
AGCM 4113	Features Writing and Editing for Agricultural Publications	3
AGCM 4203	Professional Development in Agricultural Communications	3
AGCM 4300	Internships in Agricultural Communications	2
AGCM 4403	Planning Campaigns for Agriculture and Natural Resources	3
AGCM 4413	Agricultural Communications Capstone	3
Select one of the following: [2]		3
FDSC 1133	Fundamentals of Food Science	
FDSC 2102	Regional Diversity in Food Production, Selection and Consumption (D)	
FDSC 2233	The Meat We Eat	
or ANSI 2233	The Meat We Eat	
FDSC 2253	Meat Animal and Carcass Evaluation	
or ANSI 2253	Meat Animal and Carcass Evaluation	
NSCI 2013 & NSCI 2011	Principles of Human Nutrition (N) and Applied Principles of Human Nutrition	
NSCI 3543	Food and the Human Environment (IS)	
Agribusiness Core Courses		
Select from one of the following pairs of courses:		6
ACCT 2103	Financial Accounting	
ACCT 2203	Managerial Accounting	
or		

ACCT 2003	Survey of Accounting	
ACCT 3004	Foundational Accounting and Data Skills	
AGEC 3213	Quantitative Methods in Agricultural Economics	3
AGEC 3323	Agricultural Product Marketing and Sales	3
AGEC 3333	Agricultural Marketing and Price Analysis	3
AGEC 3423	Farm and Agribusiness Management	3
AGEC 3603	Agricultural Finance	3
AGEC 3713	Agricultural Law	3
AGEC 4343	International Agricultural Markets and Trade (I) [3]	3
AGEC 4503	Environmental Economics and Resource Development [3]	3
AGEC 4703	American Agricultural Policy [3]	3
ECON 2203	Introduction to Macroeconomics	3
ECON 3113	Intermediate Microeconomics	3
or ECON 3023	Managerial Economics	
Hours Subtotal		**71**
Electives		
0 or hours to complete required total for degree		
Total Hours		**128**

1

College & Departmental requirements that may be used to meet General Education requirements

2

If used as (N) or (S) course above, hours in this block reduced by 3 hours

3

AGEC 4503 Environmental Economics and Resource Development satisfies environmental science requirement and AGEC 4703 American Agricultural Policy satisfies policy requirement for the Agricultural Communications major. AGEC 4343 International Agricultural Markets and Trade (I) satisfies international dimension requirements. If another course is taken for these requirements, a different 4000-level AGEC course except AGEC 4990 Problems of Agricultural Economics may be taken. At least nine hours of 4000-level AGEC besides 4990 required for AGBU major

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.
- The student must earn a minimum grade of “C” in all AGCM courses.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Agricultural Communications: Animal Science Double Major, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 130

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p. 977)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
MATH 1483	Mathematical Functions and Their Uses (A) [1]	3
or MATH 1513	College Algebra (A)	
STAT 2013	Elementary Statistics (A) [1]	3
or MATH 1613	Trigonometry (A)	
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
Select four hours from the following:		4
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN) [1]	
BIOL 1114	Introductory Biology (LN) [1]	
Any course designated (N)		3
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1]	3
or ECON 2103	Introduction to Microeconomics (S)	
Additional General Education		
Courses designated (A), (H), (N), or (S)		6
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
Agricultural Sciences and Natural Resources		
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
ANSI 1023 & ANSI 1021	Introduction to the Animal Sciences and Introduction to the Animal Sciences Lab	4
or ANSI 1124	Introduction to the Animal Sciences	
Select one of the following: [2]		3
ENTO 3003	Livestock Entomology	
ENVR 1113	Elements of Environmental Science (N)	
NREM 1014	Introduction to Natural History (LN)	
PLNT 1213	Introduction to Plant and Soil Systems (N)	
SOIL 1113	Land, Life and the Environment (N)	
Select two of the following: [2]		5
ANSI 2112	Live Animal Evaluation	
ANSI 2233	The Meat We Eat	
ANSI 2253	Meat Animal and Carcass Evaluation	
FDSC 1133	Fundamentals of Food Science	
FDSC 2102	Regional Diversity in Food Production, Selection and Consumption (D)	
CHEM 1314	Chemistry I (LN) [2]	4
or CHEM 1215	Chemical Principles I (LN)	
Written & Oral Communications		
AGCM 2113	Introduction to Agricultural Communications	3
AGCM 3113	Writing and Editing for Agricultural Publications	3
Select one of the following: [3]		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [3]	
SPCH 2713	Introduction to Speech Communication (S) [3]	
Hours Subtotal		**26**
Major Requirements		
Agricultural Communications Core Courses		
AGCM 3123	Audio and Video Storytelling in Agricultural Communications	3
AGCM 3213	Layout and Design for Agricultural Publications	3
AGCM 3223	Digital and Online Media in Agricultural Communications	3
AGCM 3233	Basic Photography and Photo Editing for Agriculture	3
or AGCM 4233	Agricultural Photography Tour	
AGCM 4113	Features Writing and Editing for Agricultural Publications	3
AGCM 4203	Professional Development in Agricultural Communications	3
AGCM 4300	Internships in Agricultural Communications	2
AGCM 4403	Planning Campaigns for Agriculture and Natural Resources	3
AGCM 4413	Agricultural Communications Capstone	3
AGEC 3323	Agricultural Product Marketing and Sales	3
or MKTG 3213	Marketing (S)	
AGEC 3703	Issues in Agricultural Policy	3

or NREM 4043	Natural Resource Administration and Policy	
or POLS 3493	Public Policy	
or POLS 4363	Environmental Law And Policy	
or POLS 4593	Natural Resources and Environmental Policy	
AGEC 3713	Agricultural Law	3
or AGEC 3723	Environmental Law for Agriculture and Natural Resources	
or LSB 3213	Legal and Regulatory Environment of Business	
Select one of the following courses:		3
FIN 2123	Personal Finance	
ACCT 2003	Survey of Accounting	
ACCT 2103	Financial Accounting	
Animal Science Core Courses		
ANSI 2111	Animal and Food Science Professional Development	1
ANSI 3423	Animal Genetics	3
ANSI 3433	Animal Breeding	3
ANSI 3443 or ANSI 3444	Animal Reproduction	3
ANSI 3543	Principles of Animal Nutrition	3
ANSI 3653	Applied Animal Nutrition	3
ANSI 4863	Capstone for Animal Agriculture	3
Select two of the following:		6
ANSI 4023	Poultry Science	
ANSI 4423	Horse Science	
ANSI 4543	Dairy Cattle Science	
ANSI 4553	Sheep Science	
ANSI 4613	Beef Cow-Calf Management	
ANSI 4633	Stocker and Feedlot Cattle Management	
ANSI 4713	Beef Seedstock Management and Sales	
Related Courses		*1*
To be selected from courses in agriculture, communications, or discipline-related areas to meet total		0
Hours Subtotal		**64**
Electives		*0*
0 or hours to complete required total for degree		
Total Hours		**130**

1

College & Departmental requirements that may be used to meet General Education requirements

2

If used as (N) course above, hours in this block reduced by 4

3

If used as (S) course above, hours in this block reduced by 3

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.
- The student must earn a minimum grade of “C” in all AGCM courses

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Agricultural Economics

The Department of Agricultural Economics at Oklahoma State University offers programs of study leading to the BS, MS, MAg and PhD degrees in Agricultural Economics and the BS and MAg degree in Agribusiness. Agricultural economics and agribusiness curricula study the economic relationships among individuals, firms and service agencies in agriculture and between the agricultural sector and other sectors of the economy. The department's courses emphasize the economic issues and concepts associated with producing, processing, marketing, and consuming agricultural goods and services and those used in the industry.

Undergraduate programs in Agricultural Economics and Agribusiness combine instruction in technical agricultural sciences with education in the application of economic and business management principles and tools. The agricultural economist or agribusiness person draws upon the physical and social sciences to outline, understand and solve economic problems created by agriculture's dynamic operating environment. Curricula in the Department of Agricultural Economics emphasize the decision-making and problem-solving skills used in the management of agricultural production and marketing firms.

Study in agricultural economics or agribusiness prepares students to excel in many challenging careers. Many graduates work to improve food production and processing throughout the world. Other graduates work with government policies that affect the food and fiber sector. Others assist rural communities to adjust and thrive in the rapidly changing world. Graduates also help protect and maintain natural resources and the environment for the greatest benefit of society. Many graduates choose career paths that lead them far from the farm; and others choose to return to family businesses.

Agricultural Economics

The Agricultural Economics BS degree trains students to analyze problems and make decisions using a solid framework of economic, business, mathematical and statistical principles. Students may tailor study to a wide variety of career interests. The Agricultural Economics degree plan emphasizes in quantitative studies including calculus and statistical methods. The degree prepares students for graduate study in agricultural economics or related fields or for a variety of employment opportunities at competitive salaries in private industry and government agencies that require more quantitative skills.

Agribusiness

The Agribusiness BS degree trains students to analyze problems and make decisions using a solid framework of economic and business principles. In addition, the agribusiness degree targets the skills needed for careers in agribusiness firms, including all areas of food and fiber production, processing and marketing. Students may choose from nine degree options: Farm and Ranch Management, Crop and Soil Science, International, Pre-Law, Pre-Veterinary Business Management, Natural Resources, and Community and Regional Analysis, or a double major with Agricultural Communications or Accounting. Agribusiness students also may develop a minor area of study or other double major by selecting various course electives. Employment opportunities for agribusiness graduates are widely diverse, including jobs with farms, agricultural advisors, processing firms, wholesalers and retailers of food and fiber products, farm input supply firms, banks and other financial services firms, utilities and educational institutions.

Minor in Agricultural Economics and Agribusiness

The minor helps students understand the basics of economics and business within the context of Agricultural Sciences and Natural Resources. Requirements of the minor include an introduction to Agricultural Economics or Microeconomics and Financial Accounting or Survey of Accounting plus 15 hours controlled electives of upper division Agricultural Economics courses.

Minor in Environmental Economics, Politics and Policy

This minor offered in cooperation with Political Science helps students understand economics, politics and policy issues related to environmental issues. Requirements of the minor include an introduction to Agricultural Economics or Microeconomics, a 3000-level environmental economics course, Environmental Economics and Resource Development and 12 hours controlled electives from related upper-division courses.

Minor in Agricultural Real Estate Appraisal

This minor helps students understand the basis of agricultural real estate appraisal. Requirements of the minor include financial and managerial accounting or survey of accounting and foundational accounting skills, statistics, quantitative methods in agricultural economics, farm and agribusiness management, agricultural finance and farm appraisal.

Courses

AGEC 1101 Agricultural Economics and Agribusiness Experience
Description: Developing connections between the student's major curriculum, career goals specific to agricultural economics or agribusiness, and networking with other students, faculty and alumni.
Credit hours: 1
Contact hours: Lecture: 1 Contact: 1
Levels: Undergraduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 1113 Introduction to Agricultural Economics (S)
Description: Economic theory of production, marketing, and consumption of agricultural products and natural resources. The role and structure of agricultural sciences and natural resources within the American economy. Policies to achieve efficiency and welfare goals in agriculture. No general education credit for students also taking ECON 1113 or ECON 2103. Previously offered as AGEC 1114.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Agricultural Economics
General Education and other Course Attributes: Social & Behavioral Sciences

AGEC 2303 Food Marketing to a Diverse Population (D)
Description: Food and beverage demand and preferences of socially and ethnically constructed groups in American Society. Real life issues of marketing to a diverse population, including Native, Asian, African and Hispanic Americans, and low-income populations.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Agricultural Economics
General Education and other Course Attributes: Diversity

AGEC 2313 Case Studies in Agricultural Trade and Development
Prerequisites: A course in economics or marketing.
Description: Real world issues in international trade and development of agricultural and food products. Development of an understanding of issues facing policymakers, producers, consumers, and other groups in examining the costs and benefits of various trade and development programs.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 2990 Problems in Agricultural Economics and Agribusiness
Description: Directed study on topics related to agricultural economics or agribusiness. Offered for variable credit, 1-3 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Agricultural Economics

AGEC 3010 Internship in Agricultural Economics
Prerequisites: Approval of internship committee and advisor.
Description: Supervised work experience with approved public and private employers in agricultural economics, including banks, farm credit services, agriculture chemical firms, Soil Conservation Service, congressional offices and other opportunities. Credit will not substitute for required courses. Graded on a pass-fail basis. Offered for variable credit, 1-3 credit hours, maximum of 3 credit hours.
Credit hours: 1-3
Contact hours: Contact: 1-3 Other: 1-3
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Agricultural Economics

AGEC 3023 Farm to Fork
Description: Survey of agriculture and natural resources and their relationships to society. Role of advanced scientific technologies in alternative systems of food production and distribution.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 3101 Professional Career Development
Prerequisites: Major in Agricultural Economics or Agribusiness or consent of instructor.
Description: Overview of the various areas of specialization within agricultural economics and agribusiness and their associated career opportunities and obligations. Development and improvement of written communication, oral communication and leadership skills. Previously offered as AGEC 4902.
Credit hours: 1
Contact hours: Lecture: 1 Contact: 1
Levels: Undergraduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 3183 Agribusiness Accounting and Taxation
Prerequisites: 60 semester credit hours, including ENGL 1113 and MATH 1513 or equivalent.
Description: Development of the ability to read, analyze, and use accounting information to improve decision-making and tax planning. Same course as ACCT 3183.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 3213 Quantitative Methods in Agricultural Economics
Prerequisites: (AGEC 1113 or ECON 2003 or ECON 2103) and (MATH 1483 or MATH 1513 or MATH 2103 or MATH 2144, each with a grade of "C" or better; or Math placement score required for MATH 2103 (see placement.okstate.edu)).
Description: Indices, graphics, budgeting, interest calculations, compounding and discounting, basic statistic measures, regression, optimization and computer applications.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Agricultural Economics

AGEC 3323 Agricultural Product Marketing and Sales
Prerequisites: 40 semester credit hours, including (AGEC 1113 or ECON 2003 or ECON 2103) and ENGL 1113.
Description: Fundamentals of agricultural marketing management and planning applied to specific agricultural product (input and output) marketing problems. Institutional differences between agricultural and non-agricultural marketing environments. The role of the individual sales representative in a marketing and sales organization. Written and oral presentations of marketing and sales information required of all students. Previously offered as AGEC 4313.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 3333 Agricultural Marketing and Price Analysis
Prerequisites: AGEC 3213.
Description: Supply, demand, and price determination within the institutional environment of agricultural commodity markets. Roles provided by government intervention, marketing agreements, and cooperatives in agricultural markets. Includes graphical, mathematical, and statistical analysis of commodity markets. Fundamentals of futures markets applied to agriculture. Previously offered as AGEC 3303.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 3403 Agricultural Small Business Management
Prerequisites: (AGEC 1113 or ECON 2003 or ECON 2103) and (ACCT 2003 or ACCT 2103 or ACCT 3183 or AGEC 3183).
Description: The essentials of operating an agricultural small business. An introduction to the planning, organizing, marketing, managing, financing, controlling and operating an agricultural small business. Not recommended for agricultural economics or agribusiness majors. No credit for students with prior credit in 4423.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 3423 Farm and Agribusiness Management
Prerequisites: (AGEC 1113 or ECON 2003 or ECON 2103) and (ACCT 2003 or ACCT 2103 or ACCT 3183 or AGEC 3183).
Description: Fundamentals of managerial functions as applied to agricultural firms. Organization and management of human, financial, and physical assets for the profitable operation of an agricultural business. An introduction to business planning, enterprise budgeting, financial statements and record keeping. Previously offered as AGEC 3413.
Credit hours: 3
Contact hours: Lecture: 2 Contact: 3 Other: 1
Levels: Undergraduate
Schedule types: Discussion, Combined lecture & discussion, Lecture
Department/School: Agricultural Economics

AGEC 3463 Agricultural Cooperatives
Prerequisites: AGEC 1113 or ECON 2003 or ECON 2103.
Description: An evaluation of the fundamental principles, objectives, structure, finance, and management associated with the cooperative organization. An analysis of the cooperative business organization within the modern economy: history, legislation and evolution. An examination of careers related to cooperatives. Previously offered as AGEC 3313.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 3503 Natural Resource Economics
Prerequisites: AGEC 1113 or ECON 2003 or ECON 2103.
Description: Framework for analyzing natural resource management decisions. Applications of microeconomic theory to the management of soil, water, and other resources, with special emphasis on the institutions having an impact on management opportunities. Supply of and demand for natural resources, resource allocation over time, rights of ownership, public issues of taxation, police power and eminent domain.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 3603 Agricultural Finance
Prerequisites: ("C" or better in AGEC 3213 and AGEC 3423) and (ACCT 2203 or ACCT 2003).
Description: Analyze farm and agribusiness financial statements. Understand the relationship between firm growth and financial leverage. Time value of money concepts and their application to capital budgeting. Discuss how agricultural lenders acquire and use funds.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 3703 Issues in Agricultural Policy
Prerequisites: AGEC 1113 or ECON 2003 or ECON 2103.
Description: Emerging issues related to agricultural policy in the United States.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 3713 Agricultural Law
Prerequisites: 40 semester credit hours, including AGEC 1113 or ECON 2003 or ECON 2103.
Description: Survey of law with emphasis on agricultural problems, applications, and strategies for managing legal risk in the agribusiness setting. Contract law, tort law, property law, real estate transactions, business organization, estate planning, debtor/creditor law, environmental law and water/resources law. Previously offered as AGEC 4413.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 3723 Environmental Law for Agriculture and Natural Resources
Description: Analysis of U.S. environmental laws and regulations with application to agricultural production and natural resource management.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 3803 International Agricultural Economics Tour (I)
Prerequisites: Consent of instructor.
Description: A two-three week international travel component. An integrated approach to the cultural, agricultural, historical, technological, political, economic, and religious backgrounds of the region. Comparison of the agricultural business environment of the region to that of the U.S. Previously offered as AGEC 4803.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Agricultural Economics
General Education and other Course Attributes: International Dimension

AGEC 3810 Domestic Agricultural Economics Tour
Prerequisites: Consent of instructor.
Description: An integrated approach to the cultural, agricultural, historical, technological, political and economic backgrounds of an agricultural region of the United States. Offered for variable credit, 1-3 credit hours, maximum of 3 credit hours.
Credit hours: 1-3
Contact hours: Lecture: 1-3 Contact: 1-3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 3990 Special Problems in Agricultural Economics
Description: Directed study of selected agricultural economics topics. Offered for variable credit, 1-3 credit hours, maximum of 3 credit hours.
Credit hours: 1-3
Contact hours: Contact: 1-3 Other: 1-3
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Agricultural Economics

AGEC 4101 Agricultural Economics Seminar
Prerequisites: Senior standing and agricultural economics or agribusiness major status.
Description: Contemporary problems in agricultural economics. Previously offered as AGEC 4911.
Credit hours: 1
Contact hours: Lecture: 1 Contact: 1
Levels: Undergraduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 4213 Advanced Quantitative Methods in Agricultural Economics
Prerequisites: ("C" or better in AGEC 3213) and (MATH 2103 or MATH 2123 or MATH 2144).
Description: Quantitative analysis of agricultural production and markets including risk and uncertainty. Introduction to simulation. Development of statistical and software skills. Written presentation of an analysis of data. Previously offered as AGEC 3203. May not be used for Degree Credit with AGEC 5013.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 4223 Quantitative Supply Chain Management in Agribusiness
Prerequisites: ("C" or better in AGEC 3213) and (MATH 2103 or MATH 2123 or MATH 2144).
Description: Challenge in food supply chain management. Tools to solve logistics problems including traveling salesperson, vehicle routing, and distribution center problems. Forecasting sales and queuing theory. Introduction to specialized software used in supply chain management. May not be used for Degree Credit with AGEC 5023.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 4243 Researching Consumer Food Preferences
Prerequisites: (AGEC 1113 or ECON 2003 or ECON 2103) and (ANSI 1124 or FDSC 1133) and (STAT 2013 or STAT 2023 or STAT 4013).
Description: Design, implementation, and interpretation of research in consumer food preferences. Includes design of consumer surveys, conducting consumer interviews, preparing food and questionnaires for taste-test experiments, targeting and recruiting scientifically valid samples, the statistical analysis of data, and communication of results. Previously offered as FDSC 4243.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 4333 Commodity Futures Markets
Prerequisites: ("C" or better in AGEC 3213 and AGEC 3333).
Description: The economics of commodity futures markets. The vocabulary of futures markets and the mechanics of trading and hedging. Basis and producer marketing strategies. Fundamental analysis and statistical analysis of data. Technical analysis, behavioral finance, efficient market hypothesis and basics of option pricing. May not be used for degree credit with AGEC 5033.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 4343 International Agricultural Markets and Trade (I)
Prerequisites: ECON 3023 OR ECON 3113.
Description: Contemporary international agricultural trade theory and applications. Tools to identify, evaluate critically, and seek solutions to complex international trade and development problems, such as gains from trade, comparative advantage, impacts of trade barriers on social welfare, export promotion effectiveness, trade impacts on environment and land degradation, free trade areas and impacts of genetically modified crops on trade.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Agricultural Economics
General Education and other Course Attributes: International Dimension

AGEC 4403 Advanced Farm and Ranch Management
Prerequisites: ("C" or better in AGEC 3423) and (AGEC 3603 or concurrent).
Description: The development of problem solving and risk management skills needed on the modern farm or ranch. Use of spreadsheets to perform production planning and analysis of farm and ranch problems with linear programming, simulations, and other tools. Analysis of the acquisition of resources and the use of information systems in managing the individual farm or ranch business. May not be used for Degree Credit with AGEC 5043.
Credit hours: 3
Contact hours: Lecture: 1 Contact: 3 Other: 2
Levels: Undergraduate
Schedule types: Discussion, Combined lecture & discussion, Lecture
Department/School: Agricultural Economics

AGEC 4423 Advanced Agribusiness Management
Prerequisites: AGEC 3333 and (AGEC 3603 or concurrent).
Description: Application of modern decision theory in the uncertain environment that the agricultural business operates. Planning, organizing, implementing, coordinating, and controlling problems associated with establishing an agricultural business, achieving firm growth and operating the firm through time. Use of spreadsheets to perform production planning and analysis related to agricultural business operation with linear programming, simulations, and other tools. Analysis of the interaction of resources, prices and production alternatives. Previously offered as AGEC 4323. May not be used for Degree Credit with AGEC 5423.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 4503 Environmental Economics and Resource Development
Prerequisites: AGEC 3503 or ECON 3023 or ECON 3113 or consent of instructor.
Description: Economic, social, and political factors relating to conservation, natural resource development, and environmental quality. Valuation of priced and non-priced natural and environmental resources. Analysis of environmental and natural resource policy and the role of public and private agencies in conservation and development. May not be used for Degree Credit with AGEC 5053.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 4513 Farm Appraisal
Prerequisites: AGEC 3423.
Description: Estimating the market value of agricultural real estate using the three approaches to value - sales comparison, cost and income approaches. Analysis of sales to value the different characteristics of the farm. May not be used for Degree Credit with AGEC 5513.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Agricultural Economics

AGEC 4613 Advanced Agricultural Finance
Prerequisites: (AGEC 3603 or FIN 3113 with a grade of "B" or better), (ECON 3023 or ECON 3113), and (STAT 2013 or STAT 2023 or STAT 2053 or STAT 4013 or STAT 4053).
Description: Advanced time value of money and financial management concepts as applied to the management of agricultural firms. Incorporating risk into agricultural investment and financial management decisions. Introduction to risk modeling. May not be used for degree credit with AGEC 5603.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 4703 American Agricultural Policy
Prerequisites: ("C" or better in AGEC 3333), (MATH 2103 or MATH 2123 or MATH 2144), and (ECON 3023 or ECON 3113 or concurrent).
Description: Economic characteristics and problems of agriculture; evolution and significance of programs and policies. May not be used for Degree Credit with AGEC 5703.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 4723 Rural Economics Development
Prerequisites: AGEC 3213.
Description: Concepts, theories, and applications of regional and community economics, including the theories of economic development, analytic techniques, infrastructure and community services, targeted development and associated policies. Focus on domestic rural areas. May not be used for Degree Credit with AGEC 5073.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 4990 Problems of Agricultural Economics
Prerequisites: Consent of instructor.
Description: Research on special problems in agricultural economics. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Agricultural Economics

AGEC 5000 Master's Thesis/Report
Description: For students working on an MS degree in agricultural economics. Independent research and thesis under the direction and supervision of a major professor. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Graduate
Schedule types: Independent Study
Department/School: Agricultural Economics

AGEC 5010 Professional Experience in Agricultural Economics or Agribusiness
Prerequisites: Approval of internship committee and advisor.
Description: Supervised professional experience with approved public and private employers in agricultural economics or agribusiness. Designed for Master of Agriculture program. Graded on pass-fail basis. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Graduate
Schedule types: Independent Study
Department/School: Agricultural Economics

AGEC 5013 Advanced Quantitative Methods in Agricultural Economics
Prerequisites: ("C" or better in AGEC 3213) and (MATH 2103 or MATH 2123 or MATH 2144).
Description: Quantitative analysis of agricultural production and markets including risk and uncertainty. Introduction to simulation. Development of statistical and software skills. Written presentation of an analysis of data. May not be used for degree credit with AGEC 4213.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 5023 Quantitative Supply Chain Management in Agribusiness
Prerequisites: ("C" or better in AGEC 3213) and (MATH 2103 or MATH 2123 or MATH 2144).
Description: Challenge in food supply chain management. Tools to solve logistics problems including traveling salesperson, vehicle routing, and distribution center problems. Forecasting sales and queuing theory. Introduction to specialized software used in supply chain management. May not be used for degree credit with AGEC 4223.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 5033 Commodity Futures Markets
Prerequisites: ("C" or better in AGEC 3213 and AGEC 3333).
Description: The economics of commodity futures markets. The vocabulary of futures markets and the mechanics of trading and hedging. Basis and producer marketing strategies. Fundamental analysis and statistical analysis of data. Technical analysis, behavioral finance, efficient market hypothesis and basics of option pricing. May not be used for degree credit with AGEC 4333.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 5043 Advanced Farm and Ranch Management
Prerequisites: ("C" or better in AGEC 3423) and (AGEC 3603 or concurrent).
Description: The development of problem solving and risk management skills needed on the modern farm or ranch. Use of spreadsheets to perform production planning and analysis of farm and ranch problems with linear programming, simulations, and other tools. Analysis of the acquisition of resources and the use of information systems in managing the individual farm or ranch business. May not be used for Degree Credit with AGEC 4403.
Credit hours: 3
Contact hours: Lecture: 1 Contact: 3 Other: 2
Levels: Graduate
Schedule types: Discussion, Combined lecture & discussion, Lecture
Department/School: Agricultural Economics

AGEC 5053 Environmental Economics and Resource Development
Prerequisites: AGEC 3503 or ECON 3023 or ECON 3113 or consent of instructor.
Description: Economic, social, and political factors relating to conservation, natural resource development, and environmental quality. Valuation of priced and non-priced natural and environmental resources. Analysis of environmental and natural resource policy and the role of public and private agencies in conservation and development. May not be used for degree credit with AGEC 4503.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 5073 Rural Economics Development
Prerequisites: AGEC 3213.
Description: Concepts, theories, and applications of regional and community economics, including the theories of economic development, analytic techniques, infrastructure and community services, targeted development and associated policies. Focus on domestic rural areas. May not be used for degree credit with AGEC 4723.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 5101 Research Methodology
Prerequisites: Selection of a thesis advisor and a thesis topic.
Description: Using the scientific method to solve problems related to agriculture. Preparation of a thesis proposal required.
Credit hours: 1
Contact hours: Lecture: 1 Contact: 1
Levels: Graduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 5103 Mathematical Economics
Prerequisites: MATH 2103 or MATH 2123 or MATH 2144, and ECON 3113.
Description: Mathematical tools necessary for formulation and application of economic theory and economic models.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 5113 Applications of Mathematical Programming
Prerequisites: AGEC 5103 or AGEC 5403.
Description: The application of concepts and principles of existing linear and nonlinear programming techniques to agricultural problems.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 5203 Advanced Agricultural Prices
Prerequisites: AGEC 5103, STAT 4043.
Description: Demand and price structures, price discovery, time series and agricultural price research methods.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 5213 Econometric Methods
Prerequisites: AGEC 5103 and ECON 4213 or STAT 4043.
Description: Application of econometric techniques to agricultural economic problems, theory and estimation of structural economic parameters.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 5233 Primary Data Analysis in Economic Research
Prerequisites: AGEC 5213 or concurrent enrollment.
Description: Sampling theory and model-based hypothesis testing for the analysis and reporting of economic models of observational or experimental data. Introduction of classes of general linear models, including qualitative and limited dependent variable models, commonly used to analyze economic problems. Differences and commonalities between frequentist and Bayesian estimation methods and interpretation. Examples pertain to food and fiber markets and production agriculture.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 5303 Agricultural Market Policy and Organization
Prerequisites: ECON 3112, MATH 2103 or MATH 2144, and STAT 2023 or equivalent.
Description: Role of markets in the food system; Price variation across space, time, and form; Structure, conduct and performance of agricultural industries; Interregional trade theory; and government policies that influence decisions. Previously offered as AGEC 5311.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 5321 Agricultural Marketing and Economic Development
Prerequisites: AGEC 5311.
Description: Role of marketing in economic development, focusing on international economics; role of institutions in a market economy.
Credit hours: 1
Contact hours: Lecture: 1 Contact: 1
Levels: Graduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 5331 Agricultural Marketing: Advanced Concepts
Prerequisites: AGEC 5311.
Description: Advanced topics in price variation across space, time, and form. Market and firm efficiency. Market structure, conduct and performance; role of information in a market economy; and other selected topics.
Credit hours: 1
Contact hours: Lecture: 1 Contact: 1
Levels: Graduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 5343 International Agricultural Markets and Trade
Description: Contemporary international agricultural trade theory and applications. Broaden students' understanding of contemporary cultural and economic issues outside the U.S. that affect global demand. Gains from trade and the theory of comparative advantage. No credit for students with credit in AGEC 4343.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 5403 Production Economics
Prerequisites: AGEC 5103.
Description: Analysis of micro-static production economics problems; factor-product, factor-factor and product-product relationships; functional forms for technical unit and aggregate production functions; maximizing and minimizing choice rules; firm cost structure; scale relationships.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 5423 Agribusiness Management
Prerequisites: AGEC 3333 and (AGEC 3603 or concurrent).
Description: Application of quantitative analysis to the evaluation of business plans for agribusiness firms. Preparation of business plans, including mission statements, financial analyses, marketing plans, personnel and organization requirements of the firm, production and operations plans as well as a contingency plan. Analysis of risk factors associated with agriculturally-based companies. No credit for students with credit in AGEC 4423.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 5463 Advanced Agricultural Cooperatives
Prerequisites: AGEC 3463 or consent of instructor.
Description: Advanced understanding of cooperative business model and management skills. Advanced cooperative finance including profit center analysis, equity management, working capital management, budgeting and capital budgeting.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 5483 Bio-Energy Feasibility and Commercialization
Prerequisites: AGEC 1113 or ECON 2103.
Description: Feasibility and commercialization of bio-fuel and bio-based projects. Issues and processes in transitioning a project from pilot scale into commercialization.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate, Undergraduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 5503 Economics of Natural and Environmental Resource Policy
Prerequisites: AGEC 4503, ECON 3113, or ECON 3023; and MATH 2103.
Description: Economics of long-term resource use with particular emphasis on agricultural and environmental problems. Methods for estimation of nonmarket prices. Cost benefits analysis of long-term natural resource use and environmental policy. Elementary computer simulation of long-term resource use and environmental policy.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 5513 Farm Appraisal
Prerequisites: AGEC 3423.
Description: Estimating the market value of agricultural real estate using the three approaches to value - sales comparison, cost and income approaches. Analysis of sales to value the different characteristics of the farm. May not be used for degree credit with AGEC 4513.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Agricultural Economics

AGEC 5603 Advanced Agricultural Finance
Prerequisites: AGEC 3603 or FIN 3113, ECON 3023 or ECON 3113 and STAT 2023 or equivalent.
Description: Advanced investment and financial management concepts applied firms that operate in the agricultural sector. Incorporating uncertainty and risk into financial modeling and decision making via stochastic simulation and other tools. Risk/return tradeoff for stocks, portfolio management and business investments. May not be used for degree credit with AGEC 4613. Same course as AGEC 4613.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 5703 American Agricultural Policy
Prerequisites: ("C" or better in AGEC 3333), (MATH 2103 or MATH 2123 or MATH 2144), and (ECON 3023 or ECON 3113 or concurrent).
Description: Economic characteristics and problems of agriculture; evolution and significance of programs and policies. May not be used for degree credit with AGEC 4703.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 5713 Rural Regional Analysis
Prerequisites: AGEC 5103.
Description: Concepts of market and nonmarket based rural welfare; theories of regional growth as applied to rural areas; methods of regional analysis including computable general equilibrium; analysis of policies and programs for improving welfare of rural population groups.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 5723 Plan & Pol Devlpmnt
Prerequisites: Master's-level microeconomics, macroeconomics and regression analysis.
Description: Economics of market-based planning and policy analysis for developing countries, topics and tools in macro- and microeconomics of development, and social cost-benefit and project analysis with emphasis on agricultural and public policy. Hands-on application of econometrics, input-output analysis and cost-benefit analysis using econometric software.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 5733 Food Import Demand and Trade Policy
Description: Global welfare analysis of national food and agricultural trade and development policies of developed and developing countries. Analysis of import demand systems using real world data and incorporating economic and demographic variables.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 5783 Bio-Energy Economics and Sustainability
Prerequisites: AGEC 1113 or ECON 2103.
Description: Economic issues related to supply chains producing bio-energy and bio-based products. Economic, sustainability and social dimensions of these industries. Triple bottom line objectives, life cycle analysis and the principles of feasibility analysis.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate, Undergraduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 5990 Advanced Studies
Prerequisites: Consent of instructor.
Description: Investigation in designated areas of agricultural economics. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Graduate
Schedule types: Independent Study
Department/School: Agricultural Economics

AGEC 6000 Doctoral Dissertation
Description: Open to students pursuing graduate study in agricultural economics beyond the requirements for a master's degree. Independent research and thesis under the direction and supervision of a major professor. Offered for variable credit, 1-15 credit hours, maximum of 24 credit hours.
Credit hours: 1-15
Contact hours: Contact: 1-15 Other: 1-15
Levels: Graduate
Schedule types: Independent Study
Department/School: Agricultural Economics

AGEC 6102 Teaching Practicum in Agricultural Economics
Prerequisites: Two semesters of graduate study in agricultural economics.
Description: Philosophies of resident and nonresident teaching, general tasks performed, review, evaluation and lecture organization, preparation and presentation.
Credit hours: 2
Contact hours: Contact: 2 Other: 2
Levels: Graduate
Schedule types: Independent Study
Department/School: Agricultural Economics

AGEC 6103 Advanced Applications of Mathematical Programming
Prerequisites: AGEC 5103, AGEC 5113.
Description: General presentation of nonlinear optimization theory and methods followed by applications of nonlinear programming. Use of GAMS/MINOS optimization software package.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 6213 Advanced Econometrics
Prerequisites: AGEC 5213 or ECON 5243; STAT 4203 and AGEC 4213 recommended.
Description: Using advanced econometric techniques in applied research. Linear and nonlinear hypothesis testing; non-nested hypothesis tests; Monte Carlo hypothesis testing; stochastic simulation; misspecification testing. Extensive use of SAS statistical software package.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 6222 Spatial Econometrics
Description: Develop concept of spatial dependence. Introduce tools and techniques used to explore spatial dependence including spatial statistics and regression. Use of geographic information system (GIS) software in spatial analysis.
Credit hours: 2
Contact hours: Lecture: 2 Contact: 2
Levels: Graduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 6300 Agricultural Marketing Seminar
Prerequisites: Consent of instructor.
Description: Current developments in theory, techniques for evaluating marketing behavior, market legislation and market development. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Lecture: 1-6 Contact: 1-6
Levels: Graduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 6303 Advanced Agricultural Marketing
Prerequisites: AGEC 5303.
Description: Marketing theory, market structure and performance, governmental regulation and policy and bargaining in agricultural markets.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 6400 Seminar in Farm Management and Production Economics
Prerequisites: AGEC 5403 or consent of instructor.
Description: Scientific research methodology applied to problems of resource efficiency. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Graduate
Schedule types: Independent Study
Department/School: Agricultural Economics

AGEC 6403 Advanced Production Economics
Prerequisites: AGEC 5403.
Description: Formulating and solving applied economic optimization problems in agricultural production economics. Expected profit maximization; analyzing data from agronomic experiments; credit scoring; risk models such as stochastic dominance and expected utility.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Agricultural Economics

AGEC 6700 Agricultural Policy and Rural Resource Development Seminar
Description: Frontier issues in agricultural policy, natural resources and rural development. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Graduate
Schedule types: Independent Study
Department/School: Agricultural Economics

Undergraduate Programs

- Agribusiness, BSAG (p. 2444)
- Agribusiness: Accounting Double Major, BSAG (p. 2446)
- Agribusiness: Agricultural Communications Double Major, BSAG (p. 2448)
- Agribusiness: Community and Regional Analysis, BSAG (p. 2450)
- Agribusiness: Crop and Soil Sciences, BSAG (p. 2452)
- Agribusiness: Farm and Ranch Management, BSAG (p. 2454)
- Agribusiness: International, BSAG (p. 2456)
- Agribusiness: Natural Resources, BSAG (p. 2458)
- Agribusiness: Pre-Law, BSAG (p. 2460)
- Agribusiness: Pre-Veterinary Business Management, BSAG (p. 2462)
- Agricultural Economics, BSAG (p. 2465)

Graduate Programs

The department offers graduate work leading to the Master of Science, the Master of Agriculture and the Doctor of Philosophy degrees. Both thesis and non-thesis options are available at the MS level. PhD students complete a teaching practicum in addition to the research thesis as a part of the degree requirements.

The graduate program stresses development of superior professional competence, suited to the demands of the modern business, academic, government and research environments. Advanced courses concentrate on economic analysis applied to problems of production, distribution and consumption of agricultural products. Courses in economic theory, econometrics, mathematical programming and statistics are an integral part of the program. Primary data analysis, natural resource use, international trade, planning, policy and development are also important topics included in graduate courses.

The faculty provide direction and individual guidance to student research in marketing, production, management of agricultural enterprises, demand and price analysis, land and water use and development, non-market valuation, rural development and planning, agricultural finance, international trade, farm appraisal, agricultural policy, econometrics and experimental economics. Students specialize through course electives and research topics. In addition, an advisory committee guides each student in preparing the program of study to ensure that the student's background, graduate coursework, and research program together lead to the desired depth and breadth of proficiency.

Admission Requirements

Prerequisites to advanced training in agricultural economics are:

1. the desire to understand and solve the complex and changing economic problems faced by agriculture and rural society, and
2. the desire and ability to learn methods of rigorous logical analysis.

In addition, differential calculus, statistics and intermediate macro- and micro-economic theory constitute a minimum background for advanced study in agricultural economics. In certain cases, a student can take part of this work after admission but the work will not count toward a graduate degree.

Acceptance by an advisor in the department is not required prior to admission to the departmental graduate program. GRE test scores are required for admission to the program.

Minors

- Agricultural Economics and Agribusiness (AEAB), Minor (p. 2464)
- Agricultural Real Estate Appraisal (AREA), Minor (p. 2467)
- Environmental Economics, Politics and Policy (EEPP), Minor (p. 2468)

Faculty

Cheryl S. DeVuyst, PhD—Professor and Department Head
Regents Professors: B. Wade Brorsen, PhD; Damona G. Doye, PhD; Phil Kenkel, PhD; Jayson Lusk, PhD
Professors: Chanjin Chung, PhD; Cynda R. Clary, PhD; Eric DeVuyst, PhD; Shannon Ferrell, JD; Rodney Holcomb, PhD; Rodney Jones, PhD; Dayton Lambert, PhD; F. Bailey Norwood, PhD; Derrell S. Peel, PhD; Kellie Raper, PhD; Brian Whitacre, PhD
Associate Professors: Amy Hagerman, PhD; Deepthi Kolady, PhD; John Michael Riley, PhD; Jeff Vitale, PhD
Assistant Professors: Courtney Bir, PhD; Lixia He Lambert, PhD; K. Aleks Schaefer, PhD; Hannah Shear, PhD; Bhawna Thapa, PhD
Non-Tenure Track Teaching Assistant Professors: Elizabeth Norwood, PhD
Non-Tenure Track Extension Associates: J.C. Hobbs, MS; Roger Sahs, MS

Agribusiness, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p. 977)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
Select one of the following:		3
MATH 2103	Business Calculus (A) [1, 5]	
MATH 2123	Calculus for Technology Programs I (A) [1,5]	
MATH 2144	Calculus I (A) [1,5]	
STAT 2023	Elementary Statistics for Business and Economics (A) (or equivalent STAT course designated A) [1, 5]	3
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Seven hours from:		7
One course in CHEM or other course designated L/N [1,5]		
One course designated (N) [1,5]		
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1, 5]	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		6
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
Agricultural Sciences and Natural Resources		
UNIV 1111	First Year Seminar (or other approved first year seminar course) [5]	1
From two of the following groups, select one course:		6
Group 1		
PLNT 1213	Introduction to Plant and Soil Systems (N)	
HORT 1013	Principles of Horticultural Science (LN)	
NREM 1113	Elements of Forestry	
Group 2		
SOIL 1113	Land, Life and the Environment (N)	
SOIL 2124	Fundamentals of Soil Science (N)	
Group 3		
ANSI 1124	Introduction to the Animal Sciences	
FDSC 1133	Fundamentals of Food Science	
ENTO 2993	Introduction to Entomology (LN)	
ENTO 3003	Livestock Entomology	
Group 4		
NREM 1014	Introduction to Natural History (LN)	
NREM 2013	Ecology of Natural Resources	
NREM 3013	Applied Ecology and Conservation	
ENVR 1113	Elements of Environmental Science (N)	
BIOC 2344	Chemistry and Applications of Biomolecules	
BIOC 3713	Biochemistry I	
LA 1013	Introduction to Landscape Architecture	
Written & Oral Communications		
Select one of the following:		3
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources [5]	
AGCM 3113	Writing and Editing for Agricultural Publications [5]	
BCOM 3113	Written Communication [5]	
BCOM 3443	Business Communication for International Students [5]	
ENGL 3323	Technical Writing [2, 5]	
Select one of the following: [3]		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [5]	
SPCH 2713	Introduction to Speech Communication (S) [5]	
SPCH 3733	Elements of Persuasion (S) [5]	
Hours Subtotal		**13**
Major Requirements		
Core Courses		
Six credit hours of ACCT classes covering Financial and Managerial Accounting. Students cannot use a combination of both ACCT 2103 and ACCT 2003. [5]		6
AGEC 1101	Agricultural Economics and Agribusiness Experience [5]	1
AGEC 3101	Professional Career Development [5]	1
AGEC 3213	Quantitative Methods in Agricultural Economics [5]	3
AGEC 3333	Agricultural Marketing and Price Analysis [5]	3
AGEC 3423	Farm and Agribusiness Management [5]	3
AGEC 3603	Agricultural Finance [5]	3
AGEC 3713	Agricultural Law [5]	3
Select 9 hours from AGEC 4000 level excluding AGEC 4990 [5]		9
ECON 2203	Introduction to Macroeconomics [5]	3

ECON 3113	Intermediate Microeconomics [5]	3
or ECON 3023	Managerial Economics	
Select 6 upper division hours from the following:		6
AGEC, ECON, AGCM 3213, MKTG 3213 or MGMT 3013		
Related Courses		
Check with your Advisor about using these hours and electives to minor in an area in Ferguson College of Agriculture or Spears School of Business (SSB)		
12 hours from Ferguson College of Agriculture or SSB courses not used elsewhere with at least 9 of the 12 hours upper division		12
Hours Subtotal		**56**
Electives		
Select 11 hours or hours to complete required total for degree [4]		11
Hours Subtotal		**11**
Total Hours		**120**

1

College & Departmental requirements that may be used to meet General Education requirements.

2

If ENGL 3323 Technical Writing is substituted for ENGL 1213 Composition II above; hours in this block are reduced by 3.

3

If used as (S) course above, hours in this block reduced by 3.

4

MATH 1483 Mathematical Functions and Their Uses (A) or MATH 1513 College Algebra (A) may need to be taken as prerequisite to required Calculus course.

5

Hours meeting the Major core.

Other Requirements

- Exit interview with Head of Department of Agricultural Economics.
- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Agribusiness: Accounting Double Major, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 144

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p. 977)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
ENGL 1213	Composition II	3
or ENGL 1413	Critical Analysis and Writing II	
or ENGL 3323	Technical Writing	
American History & Government		
HIST 1103	Survey of American History	3
or HIST 1483	American History to 1865 (H)	
or HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
MATH 2103	Business Calculus (A) [8]	3
or MATH 2123	Calculus for Technology Programs I (A)	
or MATH 2144	Calculus I (A)	
STAT 2023	Elementary Statistics for Business and Economics (A) (or equivalent STAT course designated A) [1,2,5,6,8]	3
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
CHEM 1314	Chemistry I (LN) [1,8]	4
or CHEM 1215	Chemical Principles I (LN)	
or CHEM 1014	Chemistry In Civilization (LN)	
Any course designated (N)		3
Social & Behavioral Sciences (S)		
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [1]	3
or SPCH 2713	Introduction to Speech Communication (S)	
MGMT 3013	Fundamentals of Management (S) [1,3]	3
MKTG 3213	Marketing (S) [1,3]	3
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
At least one Diversity (D) course		
At least one International Dimension (I) course		
College/Departmental Requirements		
Agricultural Sciences and Natural Resources		
Courses cannot be used here and as (N) course		
UNIV 1111	First Year Seminar (or other approved first year seminar course) [8]	1
Select one course from two groups:		6
Group 1:		
PLNT 1213	Introduction to Plant and Soil Systems (N)	
HORT 1013	Principles of Horticultural Science (LN)	
NREM 1113	Elements of Forestry	
Group 2:		
SOIL 1113	Land, Life and the Environment (N)	
SOIL 2124	Fundamentals of Soil Science (N)	
Group 3:		
ANSI 1124	Introduction to the Animal Sciences	
FDSC 1133	Fundamentals of Food Science	
ENTO 2993	Introduction to Entomology (LN)	
ENTO 3003	Livestock Entomology	
Group 4:		
NREM 1014	Introduction to Natural History (LN)	
NREM 2013	Ecology of Natural Resources	
NREM 3013	Applied Ecology and Conservation	
ENVR 1113	Elements of Environmental Science (N)	
BIOC 2344	Chemistry and Applications of Biomolecules	
BIOC 3713	Biochemistry I	
LA 1013	Introduction to Landscape Architecture	
Written Communications		
BCOM 3113	Written Communication [1,2,5,6]	3
or BCOM 3443	Business Communication for International Students	
Hours Subtotal		**10**
Major Requirements		
Agribusiness Core Courses		
AGEC 1101	Agricultural Economics and Agribusiness Experience [8]	1
AGEC 3101	Professional Career Development [8]	1
AGEC 3213	Quantitative Methods in Agricultural Economics [8]	3
AGEC 3333	Agricultural Marketing and Price Analysis [8]	3
AGEC 3423	Farm and Agribusiness Management [8]	3
AGEC 3603	Agricultural Finance [8]	3
9 hours from AGEC 4000-level excluding AGEC 4990 [8]		9
ECON 3113	Intermediate Microeconomics [2,5,6,8]	3
or ECON 3023	Managerial Economics	
Accounting Required Courses		
Common Body [3]		
A GPA of 2.20 is required in the Common Body courses		
Select one of the following options:		3
ACCT 2003	Survey of Accounting [8]	
ACCT 2103 & ACCT 2203	Financial Accounting and Managerial Accounting [8]	
ACCT 3004	Foundational Accounting and Data Skills [8]	4
AGEC 1113	Introduction to Agricultural Economics (S) [4]	3
or ECON 2103	Introduction to Microeconomics (S)	
or ECON 2003	Microeconomic Principles for Business	

BADM 3113	Practical Business and Interpersonal Skills	3
ECON 2203	Introduction to Macroeconomics [4,8]	3
EEE 2023	Introduction to Entrepreneurship	3
FIN 3113	Finance	3
LSB 3213	Legal and Regulatory Environment of Business [4,8]	3
or AGEC 3713	Agricultural Law	
MGMT 4513	Strategic Management	3
MSIS 2103	Business Data Science Technologies	3
MSIS 3223	Principles of Data Analytics	3
School of Accounting Major Requirements		
ACCT 3001	Practicum in Professional Accounting I [5,6,7]	1
ACCT 3013	Federal Income Taxation [5,6,7]	3
ACCT 3104	Intermediate Accounting I and Data Analysis [5,6,7]	4
ACCT 3113	Intermediate Accounting II [5,6,7]	3
ACCT 3203	Cost Accounting [5,6,7]	3
ACCT 3603	Accounting Information Systems and Data Analytic Tools [5,6,7]	3
ACCT 4133	Advanced Accounting [5,6,7]	3
ACCT 4503	External Auditing [5,6,7]	3
ACCT 4553	Ethics for Public Accountants [5,6,7]	3
ACCT 4901	Advanced Accounting Tools and Technologies [5,6,7]	1
ACCT 4911	Practicum in Professional Accounting II [5,6,7]	1
LSB 4323	Law of Commercial Transactions and Debtor-Creditor Relationships	3
MSIS 4123	Cybersecurity Systems Management [5,6]	3
Hours Subtotal		**94**
Electives		
(or hours to complete required total for degree)		
MATH 1483 or MATH 1513 may need to be taken as prerequisite to required Calculus course		
Hours Subtotal		**0**
Total Hours		**144**

1

College or departments requirements that meet GE requirements and cannot be waived with an Associate's degree

2

Nine hours School of Accounting core courses are used elsewhere.

3

MGMT 3013 and MKTG 3213 are common body requirements, but are counted in general education requirements

4

15 hours Agribusiness core courses included in Accounting Common Body

5

A grade of "C" or better must be earned in these courses

6

A GPA of 2.20 is required in these 39 hours. 18 of these 39 hours must be taken in residence at OSU

7

15 of 21 required 3000- and 4000-level accounting hours must be taken in residence at OSU

8

Hours meeting the Major core.

Other Requirements

- Exit interview with Head of Department of Agricultural Economics.
- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Agribusiness: Agricultural Communications Double Major, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 130

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p. 977)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
Select one of the following:		3
MATH 2103	Business Calculus (A) [1,5]	
MATH 2123	Calculus for Technology Programs I (A) [1,5]	
MATH 2144	Calculus I (A) [1,5]	
STAT 2023	Elementary Statistics for Business and Economics (A) (or equivalent STAT course designated A) [1,5]	3
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Seven hours from:		7
One course in CHEM or designated (L/N) [1,5]		
One course designated (N) [1,5]		
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1,5]	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		6
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
Agricultural Sciences and Natural Resources		
Course cannot be used here and as an (N)		
UNIV 1111	First Year Seminar (or other approved first year seminar course) [5]	1
ANSI 1124	Introduction to the Animal Sciences	4
PLNT 1213	Introduction to Plant and Soil Systems (N)	3
Oral Communications		
Select one of the following: [2]		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S)	
SPCH 2713	Introduction to Speech Communication (S)	
SPCH 3733	Elements of Persuasion (S)	
Hours Subtotal		**11**
Major Requirements		
Agribusiness Core Courses		
6 credit hours of ACCT classes covering Financial and Managerial Accounting. Students cannot use a combination of both ACCT 2103 and ACCT 2003. [5]		6
AGEC 1101	Agricultural Economics and Agribusiness Experience [5]	1
AGEC 3101	Professional Career Development [5]	1
AGEC 3213	Quantitative Methods in Agricultural Economics [5]	3
AGEC 3323	Agricultural Product Marketing and Sales	3
AGEC 3333	Agricultural Marketing and Price Analysis [5]	3
AGEC 3423	Farm and Agribusiness Management [5]	3
AGEC 3603	Agricultural Finance [5]	3
AGEC 3713	Agricultural Law [5]	3
AGEC 4343	International Agricultural Markets and Trade (I) [3]	3
AGEC 4503	Environmental Economics and Resource Development [3]	3
AGEC 4703	American Agricultural Policy [3]	3
ECON 2203	Introduction to Macroeconomics [5]	3
ECON 3113	Intermediate Microeconomics [5]	3
or ECON 3023	Managerial Economics	
Agricultural Communications Core Courses		
AGCM 2113	Introduction to Agricultural Communications	3
AGCM 3113	Writing and Editing for Agricultural Publications	3
AGCM 3123	Audio and Video Storytelling in Agricultural Communications	3
AGCM 3213	Layout and Design for Agricultural Publications	3
AGCM 3223	Digital and Online Media in Agricultural Communications	3
AGCM 3233	Basic Photography and Photo Editing for Agriculture	3
or AGCM 4233	Agricultural Photography Tour	
AGCM 3503	Issues Management and Crisis Communications in Agriculture and Natural Resources	3
AGCM 4113	Features Writing and Editing for Agricultural Publications	3
AGCM 4203	Professional Development in Agricultural Communications	3

AGCM 4300	Internships in Agricultural Communications (2 hours)	2
AGCM 4403	Planning Campaigns for Agriculture and Natural Resources	3
AGCM 4413	Agricultural Communications Capstone	3
Select 3 hours from the following:		3
FDSC 1133	Fundamentals of Food Science	
FDSC 2102	Regional Diversity in Food Production, Selection and Consumption (D)	
ANSI 2233	The Meat We Eat	
ANSI 2253	Meat Animal and Carcass Evaluation	
NSCI 2013	Principles of Human Nutrition (N)	
NSCI 3543	Food and the Human Environment (IS)	
Hours Subtotal		**79**
Electives		
or hours to complete required total for degree [4]		
Hours Subtotal		**0**
Total Hours		**130**

1

College & Departmental requirements that may be used to meet General Education requirements.

2

If used as (S) course above, hours in this block reduced by 3.

3

AGEC 4503 Environmental Economics and Resource Development satisfies environmental science requirement and AGEC 4703 American Agricultural Policy satisfies policy requirement for the Agricultural Communications major. AGEC 4343 International Agricultural Markets and Trade (I) satisfies international dimension requirements. If another course is taken for these requirements, a different 4000-level AGEC course except AGEC 4990 Problems of Agricultural Economics may be taken. At least nine hours of 4000-level AGEC besides 4990 required for AGBU major.

4

MATH 1483 Mathematical Functions and Their Uses (A) or MATH 1513 College Algebra (A) may need to be taken as prerequisite to required Calculus course.

5

Hours meeting the Major core.

Other Requirements

- Exit interview with Head of Department of Agricultural Economics.
- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.
- The student must earn a minimum grade of “C” in all AGCM courses.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Agribusiness: Community and Regional Analysis, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p. 977)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
ENGL 1213	Composition II	3
or ENGL 1413	Critical Analysis and Writing II	
or ENGL 3323	Technical Writing	
American History & Government		
HIST 1103	Survey of American History	3
or HIST 1483	American History to 1865 (H)	
or HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought		
MATH 2103	Business Calculus (A) [1, 2]	3
or MATH 2123	Calculus for Technology Programs I (A)	
or MATH 2144	Calculus I (A)	
STAT 2023	Elementary Statistics for Business and Economics (A) (or equivalent STAT course designated A) [1,2]	3
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Seven hours from:		7
One course in CHEM or other course designated L/N [1,2]		
One course designated (N) [1,2]		
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1, 2]	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		6
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
At least one Diversity (D) course		
At least one International Dimension (I) course		
College/Departmental Requirements		
Agricultural Sciences and Natural Resources		
Course cannot be used here and as an (N)		
UNIV 1111	First Year Seminar (or other approved first year seminar course) [2]	1
From two of the following groups, select one course:		6
Group 1:		
PLNT 1213	Introduction to Plant and Soil Systems (N)	
HORT 1013	Principles of Horticultural Science (LN)	
NREM 1113	Elements of Forestry	
Group 2:		
SOIL 1113	Land, Life and the Environment (N)	
SOIL 2124	Fundamentals of Soil Science (N)	
Group 3:		
ANSI 1124	Introduction to the Animal Sciences	
FDSC 1133	Fundamentals of Food Science	
ENTO 2993	Introduction to Entomology (LN)	
ENTO 3003	Livestock Entomology	
Group 4:		
NREM 1014	Introduction to Natural History (LN)	
NREM 2013	Ecology of Natural Resources	
NREM 3013	Applied Ecology and Conservation	
ENVR 1113	Elements of Environmental Science (N)	
BIOC 2344	Chemistry and Applications of Biomolecules	
BIOC 3713	Biochemistry I	
LA 1013	Introduction to Landscape Architecture	
Written and Oral Communications		
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources [2]	3
or AGCM 3113	Writing and Editing for Agricultural Publications	
or BCOM 3113	Written Communication	
or BCOM 3443	Business Communication for International Students	
or ENGL 3323	Technical Writing	
If ENGL 3323 is substituted for ENGL 1213 above, hours in this block are reduced by 3.		
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [2]	3
or SPCH 2713	Introduction to Speech Communication (S)	
or SPCH 3733	Elements of Persuasion (S)	
If used as (S) course above, hours in this block reduced by 3.		
Hours Subtotal		**13**
Major Requirements		
Core Courses		
6 credit hours of ACCT classes covering Financial and Managerial Accounting. Students cannot use a combination of both ACCT 2103 and ACCT 2003. [2]		6
AGEC 1101	Agricultural Economics and Agribusiness Experience [2]	1
AGEC 3101	Professional Career Development [2]	1
AGEC 3213	Quantitative Methods in Agricultural Economics [2]	3
AGEC 3333	Agricultural Marketing and Price Analysis [2]	3
AGEC 3423	Farm and Agribusiness Management [2]	3
AGEC 3603	Agricultural Finance [2]	3
AGEC 3713	Agricultural Law [2]	3
AGEC 4723	Rural Economics Development	3
6 additional hours from AGEC 4000-level excluding AGEC 4990 [2]		6
ECON 2203	Introduction to Macroeconomics [2]	3

ECON 3113	Intermediate Microeconomics [2]	3
or ECON 3023	Managerial Economics	
6 upper division hours from:		6
AGEC, ECON, MKTG 3213 or MGMT 3013		
Related Courses		
ECON 3423	Public Finance	3
9 hours from the following courses:		9
ECON 4643	International Economic Development (IS)	
ECON 4913	Urban and Regional Economics	
GEOG 3123	Urban Geography (S)	
GEOG 3163	Economic Geography (S)	
GEOG 3183	Transportation Geography	
GEOG 3333	Spatial Analysis (A)	
GEOG 4123	Geographical Aspects of Urban Planning	
GEOG 4143	Geography of Travel and Tourism	
GEOG 4153	Geography of Outdoor Recreation	
GEOG 4373	Geographic Information Systems in Public Health	
GEOG 4443	Sustainable Tourism and Geography	
POLS 2033	Introduction to Public Administration	
POLS 3493	Public Policy	
POLS 3613	State and Local Government	
POLS 4403	Urban Politics and Management	
POLS 4413	Government Budgeting	
SOC 3423	Urban Sociology	
SOC 4533	World Population Problems	
Hours Subtotal		**56**
Electives		
(or hours to complete required total for degree)		11
MATH 1483 or MATH 1513 may need to be taken as prerequisite to required Calculus course		
Hours Subtotal		**11**
Total Hours		**120**

1

College and Departmental requirements that meet General Education requirements

2

Hours meeting the Major core.

Other Requirements

- Exit interview with Head of Department of Agricultural Economics
- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above
- A 2.00 GPA or higher in upper-division hours

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Agribusiness: Crop and Soil Sciences, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p. 977)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
Select one of the following:		3
MATH 2103	Business Calculus (A) [1,6]	
MATH 2123	Calculus for Technology Programs I (A) [1,6]	
MATH 2144	Calculus I (A) [1,6]	
STAT 2023	Elementary Statistics for Business and Economics (A) (or equivalent STAT course designated A) [1,6]	3
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Seven hours from:		7
One course in CHEM or other course designated L/N [1,5]		
One course designated (N) [1,5]		
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1,6]	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		6
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
Agricultural Sciences and Natural Resources		
UNIV 1111	First Year Seminar (or other approved first year seminar course) [6]	1
SOIL 2124	Fundamentals of Soil Science (N) [2]	4
PLNT 1213	Introduction to Plant and Soil Systems (N) [2]	3
or HORT 1013	Principles of Horticultural Science (LN)	
or NREM 1113	Elements of Forestry	
Written & Oral Communications		
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources [3,6]	3
or AGCM 3113	Writing and Editing for Agricultural Publications	
or BCOM 3113	Written Communication	
or BCOM 3443	Business Communication for International Students	
or ENGL 3323	Technical Writing	
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [4,6]	3
or SPCH 2713	Introduction to Speech Communication (S)	
or SPCH 3733	Elements of Persuasion (S)	
Hours Subtotal		**14**
Major Requirements		
Core Courses		
6 credit hours of ACCT classes covering Financial and Managerial Accounting. Students cannot use a combination of both ACCT 2103 and ACCT 2003. [6]		6
AGEC 1101	Agricultural Economics and Agribusiness Experience [6]	1
AGEC 3101	Professional Career Development [6]	1
AGEC 3213	Quantitative Methods in Agricultural Economics [6]	3
AGEC 3323	Agricultural Product Marketing and Sales	3
AGEC 3333	Agricultural Marketing and Price Analysis [6]	3
AGEC 3423	Farm and Agribusiness Management [6]	3
AGEC 3503	Natural Resource Economics	3
AGEC 3603	Agricultural Finance [6]	3
AGEC 3713	Agricultural Law [6]	3
AGEC 4403	Advanced Farm and Ranch Management	3
Select 6 hours from AGEC 4000 level excluding AGEC 4990 [6]		6
ECON 2203	Introduction to Macroeconomics [6]	3
ECON 3113	Intermediate Microeconomics [6]	3
or ECON 3023	Managerial Economics	
Minor Areas		
Select at least one of the following minors:		22
Agronomy		
Entomology		
Forestry		
Horticulture		
Natural Resource Ecology and Management		
Pest Management		
Rangeland Ecology & Management		
Soil Science		
Take additional hours from courses in any other minor areas or MATH 1483 or MATH 1513 to complete the required total of 22 hours		
Hours Subtotal		**66**
Electives		

0 hours to complete required total for degree [5]	
Hours Subtotal	**0**
Total Hours	**120**

1

College & Departmental requirements that may be used to meet General Education requirements.

2

Depending upon minor chosen.

3

If ENGL 3323 Technical Writing is substituted for ENGL 1213 Composition II above; hours in this block are reduced by 3.

4

If used as (S) course above, hours in this block reduced by 3.

5

MATH 1483 Mathematical Functions and Their Uses (A) or MATH 1513 College Algebra (A) may need to be taken as prerequisite to required Calculus course.

6

Hours meeting the Major core.

Other Requirements

- Exit interview with Head of Department of Agricultural Economics.
- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Agribusiness: Farm and Ranch Management, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p. 977)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
Select one of the following:		3
MATH 2103	Business Calculus (A) [1,5]	
MATH 2123	Calculus for Technology Programs I (A) [1,5]	
MATH 2144	Calculus I (A) [1,5]	
STAT 2023	Elementary Statistics for Business and Economics (A) (or equivalent STAT course designated A) [1,5]	3
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Seven hours from:		7
One course in CHEM or other course designated (L/N) [1,5]		
One course designated (N) [1,5]		
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1,5]	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		6
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
Agricultural Sciences and Natural Resources		
UNIV 1111	First Year Seminar (or other approved first year seminar course) [5]	1
From two of the following groups, select one course:		6
Group 1		
PLNT 1213	Introduction to Plant and Soil Systems (N)	
HORT 1013	Principles of Horticultural Science (LN)	
NREM 1113	Elements of Forestry	
Group 2		
SOIL 1113	Land, Life and the Environment (N)	
SOIL 2124	Fundamentals of Soil Science (N)	
Group 3		
ANSI 1124	Introduction to the Animal Sciences	
FDSC 1133	Fundamentals of Food Science	
ENTO 2993	Introduction to Entomology (LN)	
ENTO 3003	Livestock Entomology	
Group 4		
NREM 1014	Introduction to Natural History (LN)	
NREM 2013	Ecology of Natural Resources	
NREM 3013	Applied Ecology and Conservation	
ENVR 1113	Elements of Environmental Science (N)	
BIOC 2344	Chemistry and Applications of Biomolecules	
BIOC 3713	Biochemistry I	
LA 1013	Introduction to Landscape Architecture	
Written & Oral Communications		
Select one of the following:		3
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources [5]	
AGCM 3113	Writing and Editing for Agricultural Publications [5]	
BCOM 3113	Written Communication [5]	
BCOM 3443	Business Communication for International Students [5]	
ENGL 3323	Technical Writing [2,5]	
Select one of the following: [3]		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [5]	
SPCH 2713	Introduction to Speech Communication (S) [5]	
SPCH 3733	Elements of Persuasion (S) [5]	
Hours Subtotal		**13**
Major Requirements		
Core Courses		
6 credit hours of ACCT classes covering Financial and Managerial Accounting. Students cannot use a combination of both ACCT 2103 and ACCT 2003. [5]		6
AGEC 1101	Agricultural Economics and Agribusiness Experience [5]	1
AGEC 3101	Professional Career Development [5]	1
AGEC 3213	Quantitative Methods in Agricultural Economics [5]	3
AGEC 3333	Agricultural Marketing and Price Analysis [5]	3
AGEC 3423	Farm and Agribusiness Management [5]	3
AGEC 3603	Agricultural Finance [5]	3
AGEC 3713	Agricultural Law [5]	3
AGEC 4403	Advanced Farm and Ranch Management	3

6 additional hours from AGEC 4000 excluding AGEC 4990 [5]		6
ECON 2203	Introduction to Macroeconomics [5]	3
ECON 3113	Intermediate Microeconomics [5]	3
or ECON 3023	Managerial Economics	
Select 6 upper division hours of the following:		6
AGEC, ECON, MKTG 3213 or MGMT 3013		
Related Courses		
15 hours from the following course prefixes that are not used elsewhere with at least 9 of the 15 hours upper division:		15
ANSI, AST, ENTO, HORT, NREM, PLNT, PLP, SOIL		
Hours Subtotal		**59**
Electives		
8 hours or hours to complete required total for degree [4]		8
Hours Subtotal		**8**
Total Hours		**120**

1

College & Departmental requirements that may be used to meet General Education requirements.

2

If ENGL 3323 Technical Writing is substituted for ENGL 1213 Composition II above; hours in this block are reduced by 3

3

If used as (S) course above, hours in this block reduced by 3.

4

MATH 1483 Mathematical Functions and Their Uses (A) or MATH 1513 College Algebra (A) may need to be taken as prerequisite to required Calculus course

5

Hours meeting the Major core.

Other Requirements

- Exit interview with Head of Department of Agricultural Economics.
- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Agribusiness: International, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p. 977)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
Select one of the following:		3
MATH 2103	Business Calculus (A) [1,7]	
MATH 2123	Calculus for Technology Programs I (A) [1,7]	
MATH 2144	Calculus I (A) [1,7]	
STAT 2023	Elementary Statistics for Business and Economics (A) (or equivalent STAT course designated A) [1,7]	3
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Seven hours from:		7
One course in CHEM or other course designated (L/N) [1,7]		
One course designated (N) [1,7]		
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1,7]	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		6
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
Agricultural Sciences and Natural Resources		
UNIV 1111	First Year Seminar (or other approved first year seminar course) [7]	1
From two of the following groups, select one course:		6
Group 1		
PLNT 1213	Introduction to Plant and Soil Systems (N)	
HORT 1013	Principles of Horticultural Science (LN)	
NREM 1113	Elements of Forestry	
Group 2		
SOIL 1113	Land, Life and the Environment (N)	
SOIL 2124	Fundamentals of Soil Science (N)	
Group 3		
ANSI 1124	Introduction to the Animal Sciences	
FDSC 1133	Fundamentals of Food Science	
ENTO 2993	Introduction to Entomology (LN)	
ENTO 3003	Livestock Entomology	
Group 4		
NREM 1014	Introduction to Natural History (LN)	
NREM 2013	Ecology of Natural Resources	
NREM 3013	Applied Ecology and Conservation	
ENVR 1113	Elements of Environmental Science (N)	
BIOC 2344	Chemistry and Applications of Biomolecules	
BIOC 3713	Biochemistry I	
LA 1013	Introduction to Landscape Architecture	
Written & Oral Communications		
Select one of the following:		3
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources [7]	
AGCM 3113	Writing and Editing for Agricultural Publications [7]	
BCOM 3113	Written Communication [7]	
BCOM 3443	Business Communication for International Students [7]	
ENGL 3323	Technical Writing [2,7]	
Select one of the following: [3]		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [7]	
SPCH 2713	Introduction to Speech Communication (S) [7]	
SPCH 3733	Elements of Persuasion (S) [7]	
Hours Subtotal		**13**
Major Requirements		
Core Courses		
6 credit hours of ACCT classes covering Financial and Managerial Accounting. Students cannot use a combination of both ACCT 2103 and ACCT 2003. [7]		6
AGEC 1101	Agricultural Economics and Agribusiness Experience [7]	1
AGEC 3101	Professional Career Development [7]	1
AGEC 3213	Quantitative Methods in Agricultural Economics [7]	3
AGEC 3333	Agricultural Marketing and Price Analysis [7]	3
AGEC 3423	Farm and Agribusiness Management [7]	3
AGEC 3603	Agricultural Finance [7]	3
AGEC 3713	Agricultural Law [7]	3
AGEC 3803	International Agricultural Economics Tour (I)	3

AGEC 4343	International Agricultural Markets and Trade (I)	3
Select 6 hours from AGEC 4000 level excluding AGEC 4990 [7]		6
ECON 2203	Introduction to Macroeconomics [7]	3
ECON 3113	Intermediate Microeconomics [7]	3
or ECON 3023	Managerial Economics	
6 upper division hours from:		6
AGEC, ECON, MKTG 3213 or MGMT 3013		
International Related Courses		
Select 12 hours from courses in same foreign language [5]		12
Select 6 additional hours from courses in above foreign language or upper-division courses designated (I)		6
Hours Subtotal		**65**
Electives		
2 hours or more to complete required total for degree [6]		2
Hours Subtotal		**2**
Total Hours		**120**

1

College & Departmental requirements that may be used to meet General Education requirements.

2

If ENGL 3323 Technical Writing is substituted for ENGL 1213 Composition II above; hours in this block are reduced by 3.

3

If used as (S) course above, hours in this block reduced by 3.

4

An international student may substitute 3 hours of AGEC 3810 Domestic Agricultural Economics Tour for AGEC 3803 International Agricultural Economics Tour (I).

5

A native speaker of a foreign language may substitute 18 hours towards one or more minors for the 18 hours in the same foreign language or upper-division courses designated (I).

6

MATH 1483 Mathematical Functions and Their Uses (A) or MATH 1513 College Algebra (A) may need to be taken as prerequisite to required Calculus course.

7

Hours meeting the Major core.

Other Requirements

- Exit interview with Head of Department of Agricultural Economics.
- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Agribusiness: Natural Resources, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p. 977)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
ENGL 1213	Composition II	3
or ENGL 1413	Critical Analysis and Writing II	
or ENGL 3323	Technical Writing	
American History & Government		
HIST 1103	Survey of American History	3
or HIST 1483	American History to 1865 (H)	
or HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
MATH 2103	Business Calculus (A) [1,4]	3
or MATH 2123	Calculus for Technology Programs I (A)	
or MATH 2144	Calculus I (A)	
STAT 2023	Elementary Statistics for Business and Economics (A) (or equivalent STAT course designated A) [1,4]	3
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Seven hours from:		7
One course in CHEM or other course designated (L/N) [1,4]		
One course designated (N) [1,4]		
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1,4]	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		6
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
At least one Diversity (D) course		
At least one International Dimension (I) course		
College/Departmental Requirements		
Agricultural Sciences and Natural Resources		
Course cannot be used here and as (N) course		
UNIV 1111	First Year Seminar (or other approved first year seminar course) [4]	1
From two of the following groups, select one course:		6
Group 1:		
PLNT 1213	Introduction to Plant and Soil Systems (N)	
HORT 1013	Principles of Horticultural Science (LN)	
NREM 1113	Elements of Forestry	
Group 2:		
SOIL 1113	Land, Life and the Environment (N)	
SOIL 2124	Fundamentals of Soil Science (N)	
Group 3:		
ANSI 1124	Introduction to the Animal Sciences	
FDSC 1133	Fundamentals of Food Science	
ENTO 2993	Introduction to Entomology (LN)	
ENTO 3003	Livestock Entomology	
Group 4:		
NREM 1014	Introduction to Natural History (LN)	
NREM 2013	Ecology of Natural Resources	
NREM 3013	Applied Ecology and Conservation	
ENVR 1113	Elements of Environmental Science (N)	
BIOC 2344	Chemistry and Applications of Biomolecules	
BIOC 3713	Biochemistry I	
LA 1013	Introduction to Landscape Architecture	
Written and Oral Communications		
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources [2,4]	3
or AGCM 3113	Writing and Editing for Agricultural Publications	
or BCOM 3113	Written Communication	
or BCOM 3443	Business Communication for International Students	
or ENGL 3323	Technical Writing	
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [3,4]	3
or SPCH 2713	Introduction to Speech Communication (S)	
or SPCH 3733	Elements of Persuasion (S)	
Hours Subtotal		**13**
Major Requirements		
Core Courses		
6 credit hours of ACCT classes covering Financial and Managerial Accounting. Students cannot use a combination of both ACCT 2103 and ACCT 2003. [4]		6
AGEC 1101	Agricultural Economics and Agribusiness Experience [4]	1
AGEC 3101	Professional Career Development [4]	1
AGEC 3213	Quantitative Methods in Agricultural Economics [4]	3
AGEC 3333	Agricultural Marketing and Price Analysis [4]	3
AGEC 3423	Farm and Agribusiness Management [4]	3
AGEC 3503	Natural Resource Economics	3
AGEC 3603	Agricultural Finance [4]	3
AGEC 3713	Agricultural Law [4]	3
AGEC 4503	Environmental Economics and Resource Development	3
6 additional hours from AGEC 4000-level excluding AGEC 4990 [4]		6
ECON 2203	Introduction to Macroeconomics [4]	3
ECON 3113	Intermediate Microeconomics [4]	3

or ECON 3023	Managerial Economics	
3 upper division hours from:		3
AGEC, ECON, MKTG 3213 or MGMT 3013		
Related Courses:		
GEOG 4203	Fundamentals of Geographic Information Systems	3
9 hours from the following courses:		9
AST 4112	Land Measurement and Site Analysis	
AST 4203	Agricultural Water Management	
ECON 3903	Economics of the Environment	
ECON 4113	Energy Economics: Traditional and Renewable Energy Markets	
ENVR 4112	Land Measurement and Site Analysis	
ENVR 4363	Environmental Soil Science	
GEOG 3023	Climatology (N)	
GEOG 3033	Meteorology (N)	
GEOG 3063	Economic Meteorology	
GEOG 3153	Conservation of Natural Resources (S)	
GEOG 3163	Economic Geography (S)	
GEOG 4053	Biogeography, Biodiversity, and Humankind	
GEOG 4073	Climate Change: Past, Present, and Future	
GEOG 4083	Grasslands and Savannas: Evolution and Environmental Issues	
GEOG 4153	Geography of Outdoor Recreation	
GEOG 4163	Resource Management in the National Parks	
GEOG 4323	Mapping in Modern Society	
GEOG 4333	Remote Sensing	
GEOG 4343	Geographic Information Systems: Resource Management Applications	
GEOG 4353	Geographic Information Systems: Socioeconomic Applications	
GEOL 1014	Geology and Human Affairs (LN)	
GEOL 3043	Geology of the National Parks	
GEOL 3503	Environmental Geology (N)	
NREM any upper-division		
PLNT 4033	Applied Agricultural Meteorology	
POLS 4363	Environmental Law And Policy	
POLS 4593	Natural Resources and Environmental Policy	
RM 4473	Recreation in the Natural Environment	
RM 4553	Tourism in Recreation Settings	
SOC 4433	Environmental Sociology (S)	
SOIL 4363	Environmental Soil Science	
SOIL 4463	Soil and Water Conservation	
SOIL 4683	Soil, Water, and Weather	
SOIL 4893	Environmental Soil Chemistry	
Hours Subtotal		**56**
Electives		**11**
(or hours to complete required total for degree)		
MATH 1483 or MATH 1513 may need to be taken as prerequisite to required Calculus course		
Hours Subtotal		**11**
Total Hours		**120**

[1]

College and Departmental requirements that meet General Education requirements

[2]

If ENGL 3323 is substituted for ENGL 1213 above, hours in this block are reduced by 3

[3]

If used as (S) course above, hours in this block reduced by 3

[4]

Hours meeting the Major core.

Other Requirements:

- Exit interview with Head of Department of Agricultural Economics
- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above
- A 2.00 GPA or higher in upper-division hours

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Agribusiness: Pre-Law, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p. 977)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
Select one of the following:		3
MATH 2103	Business Calculus (A) [1,5]	
MATH 2123	Calculus for Technology Programs I (A) [1,5]	
MATH 2144	Calculus I (A) [1,5]	
STAT 2023	Elementary Statistics for Business and Economics (A) (or equivalent STAT course designated A) [1,5]	3
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Seven hours from:		7
One course in CHEM or other course designated (L/N) [1,5]		
One course designated (N) [1,5]		
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1,5]	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		6
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
Agricultural Sciences and Natural Resources		
UNIV 1111	First Year Seminar (or other approved first year seminar course) [5]	1
From two of the following groups, select one course:		6
Group 1:		
PLNT 1213	Introduction to Plant and Soil Systems (N)	
HORT 1013	Principles of Horticultural Science (LN)	
NREM 1113	Elements of Forestry	
Group 2:		
SOIL 1113	Land, Life and the Environment (N)	
SOIL 2124	Fundamentals of Soil Science (N)	
Group 3:		
ANSI 1124	Introduction to the Animal Sciences	
FDSC 1133	Fundamentals of Food Science	
ENTO 2993	Introduction to Entomology (LN)	
ENTO 3003	Livestock Entomology	
Group 4:		
NREM 1014	Introduction to Natural History (LN)	
NREM 2013	Ecology of Natural Resources	
NREM 3013	Applied Ecology and Conservation	
ENVR 1113	Elements of Environmental Science (N)	
BIOC 2344	Chemistry and Applications of Biomolecules	
BIOC 3713	Biochemistry I	
LA 1013	Introduction to Landscape Architecture	
Written & Oral Communications		
Select one of the following:		3
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources [5]	
AGCM 3113	Writing and Editing for Agricultural Publications [5]	
BCOM 3113	Written Communication [5]	
BCOM 3443	Business Communication for International Students [5]	
ENGL 3323	Technical Writing [2,5]	
Select one of the following:		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [3,5]	
SPCH 2713	Introduction to Speech Communication (S) [3,5]	
SPCH 3733	Elements of Persuasion (S) [3,5]	
Hours Subtotal		**13**
Major Requirements		
Core Courses		
6 credit hours of ACCT classes covering Financial and Managerial Accounting. Students cannot use a combination of both ACCT 2103 and ACCT 2003. [5]		6
AGEC 1101	Agricultural Economics and Agribusiness Experience [5]	1
AGEC 3101	Professional Career Development [5]	1
AGEC 3213	Quantitative Methods in Agricultural Economics [5]	3
AGEC 3333	Agricultural Marketing and Price Analysis [5]	3
AGEC 3423	Farm and Agribusiness Management [5]	3
AGEC 3603	Agricultural Finance [5]	3
AGEC 3713	Agricultural Law [5]	3
Select 9 hours of AGEC 4000 level excluding AGEC 4990 [5]		9
ECON 2203	Introduction to Macroeconomics [5]	3

ECON 3113	Intermediate Microeconomics [5]	3
or ECON 3023	Managerial Economics	
Related Courses		
Select Alternative A, B or C (p. 2461)		21
Hours Subtotal		**59**
Electives		
8 hours or hours to complete required total for degree [4]		8
Hours Subtotal		
Total Hours		**120**

1

College & Departmental requirements that may be used to meet General Education requirements.

2

If ENGL 3323 Technical Writing is substituted for ENGL 1213 Composition II above; hours in this block are reduced by 3.

3

If used as (S) course above, hours in this block reduced by 3.

4

MATH 1483 Mathematical Functions and Their Uses (A) or MATH 1513 College Algebra (A) may need to be taken as prerequisite to required Calculus course. PHIL 1313 Logic and Critical Thinking (A) is recommended.

5

Hours meeting the Major core.

Alternatives

Alternative A

Select 6 upper division hours from AGEC, ECON, MKTG 3213, or MGMT 3013

Select 15 additional hours with 12 hours upper-division from: ACCT, AGEC, ECON, FIN, LSB, MGMT, MKTG, MSIS, POLS or a minor

Alternative B

Select 3 upper division hours from AGEC, ECON, MKTG 3213, or MGMT 3013

Select 18 additional hours to complete Law and Legal Studies Minor:

Code	Title	Hours
Minor Requirements		
POLS 2023	The Individual And The Law	3
or HONR 2013	Honors Law and Legal Institutions (S)	
POLS 3983	Courts and Judicial Process (S)	3
POLS 3993	Legal Research And Analysis	3
Select 9 hours of the following:		9
AGEC 3713	Agricultural Law	
ENGR 4103	Impact of Law on Engineering Practice	
ENGR 4133	Environmental Regulation for Technical Professionals (S)	
LSB 3213	Legal and Regulatory Environment of Business	
PHIL 3843	Philosophy of Law (H)	
POLS 3033	International Law	
POLS 3963	State Courts and the Bar	
POLS 4353	Administrative Law	
POLS 4363	Environmental Law And Policy	
POLS 4963	U.S. Constitution: Civil Rights and Civil Liberties	
POLS 4973	U.S. Constitution: Separation of Powers	
POLS 4980	Advanced Topics in Public Law	
PSYC 4143	Psychology and Law	
SOC 4313	Sociology of Law	
Total Hours		**18**

Alternative C

With approval of Advisor and Department Head a maximum of 29 hours from an accredited doctoral law program may be used as related courses and electives.

Other Requirements

- Exit interview with Head of Department of Agricultural Economics.
- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2029.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Agribusiness: Pre-Veterinary Business Management, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p. 977)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
Select one of the following:		3
MATH 2103	Business Calculus (A) [1,5]	
MATH 2123	Calculus for Technology Programs I (A) [1,5]	
MATH 2144	Calculus I (A) [1,5]	
STAT 2023	Elementary Statistics for Business and Economics (A) (or equivalent STAT course designated A) [1,5]	3
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN)	4
or BIOL 1114	Introductory Biology (LN)	
CHEM 1314	Chemistry I (LN) [1]	4
CHEM 1515	Chemistry II (LN)	5
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1,5]	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		0
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
Agricultural Sciences and Natural Resources		
UNIV 1111	First Year Seminar (or other approved first year seminar course) [5]	1
From two of the following groups, select one course: [2]		6
Group 1:		
PLNT 1213	Introduction to Plant and Soil Systems (N)	
HORT 1013	Principles of Horticultural Science (LN)	
NREM 1113	Elements of Forestry	
Group 2:		
SOIL 1113	Land, Life and the Environment (N)	
SOIL 2124	Fundamentals of Soil Science (N)	
Group 3:		
ANSI 1124	Introduction to the Animal Sciences	
FDSC 1133	Fundamentals of Food Science	
ENTO 2993	Introduction to Entomology (LN)	
ENTO 3003	Livestock Entomology	
Group 4:		
NREM 1014	Introduction to Natural History (LN)	
NREM 2013	Ecology of Natural Resources	
NREM 3013	Applied Ecology and Conservation	
ENVR 1113	Elements of Environmental Science (N)	
BIOC 2344	Chemistry and Applications of Biomolecules	
BIOC 3713	Biochemistry I	
LA 1013	Introduction to Landscape Architecture	
Written & Oral Communications		
Select one of the following:		3
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources [5]	
AGCM 3113	Writing and Editing for Agricultural Publications [5]	
BCOM 3113	Written Communication [5]	
BCOM 3443	Business Communication for International Students [5]	
ENGL 3323	Technical Writing [3,5]	
Select one of the following:		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [5]	
SPCH 2713	Introduction to Speech Communication (S) [5]	
SPCH 3733	Elements of Persuasion (S) [5]	
Hours Subtotal		**13**
Major Requirements		
Core Courses		
Select one of the following options:		3
ACCT 2003	Survey of Accounting [5]	
ACCT 2103 & ACCT 2203	Financial Accounting and Managerial Accounting [5]	
AGEC 1101	Agricultural Economics and Agribusiness Experience [5]	1
AGEC 3101	Professional Career Development [5]	1
AGEC 3213	Quantitative Methods in Agricultural Economics [5]	3
AGEC 3333	Agricultural Marketing and Price Analysis [5]	3

AGEC 3423	Farm and Agribusiness Management [5]	3
AGEC 3603	Agricultural Finance [5]	3
AGEC 3713	Agricultural Law [5]	3
ANSI 3423	Animal Genetics	3
or BIOL 3023	General Genetics	
or PLNT 3554	Plant Genetics and Biotechnology	
ANSI 3543	Principles of Animal Nutrition	3
BIOC 3653	Survey of Biochemistry	3
Select 5 hours of upper division organic chemistry:		5
CHEM 3013 & CHEM 3012	Survey of Organic Chemistry and Survey of Organic Chemistry Laboratory	
or		
CHEM 3053 & CHEM 3153 & CHEM 3112	Organic Chemistry I and Organic Chemistry II and Organic Chemistry Laboratory	
MICR 2123	Introduction to Microbiology	3
MICR 2132	Introduction to Microbiology Laboratory	2
PHYS 1114	College Physics I (LN)	4
PHYS 1214	College Physics II (LN)	4
BIOL 1604	Animal Biology	4
or BIOL 3204	Physiology	
or ANSI 3414	Form and Function of Livestock and Poultry	
Alternatives		
Choose one of two alternatives (p. 2463)		16
Hours Subtotal		**67**
Electives		
0 hours to complete required total for degree [4]		
Total Hours		**120**

1

College & Departmental requirements that may be used to meet General Education requirements.

2

Course cannot be used here and as an (N).

3

If ENGL 3323 Technical Writing is substituted for ENGL 1213 Composition II above; hours in this block are reduced by 3.

4

MATH 1483 Mathematical Functions and Their Uses (A) or MATH 1513 College Algebra (A) may need to be taken as prerequisite to required Calculus course.

5

Hours meeting the Major core.

Alternatives

I. First Year of Professional Program

With the approval of the advisor, department head, and dean the student may use hours from an accredited dental, medical, optometry, osteopathic, pharmacy, podiatry, or veterinary medical school to complete degree

II. Without First Year of Professional Program

Code	Title	Hours
AGEC 4403	Advanced Farm and Ranch Management	3
or AGEC 4423	Advanced Agribusiness Management	
ECON 2203	Introduction to Macroeconomics [5]	3
Select one of the following:		3
ECON 3113	Intermediate Microeconomics [5]	
or ECON 3023	Managerial Economics	
6 additional hours from AGEC 4000-level excluding AGEC 4990 [5]		6
1 additional hour		1

Other Requirements

- Exit interview with Head of Department of Agricultural Economics.
- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Agricultural Economics and Agribusiness (AEAB), Minor

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Total Hours: 21

Code	Title	Hours
Minor Requirements		
AGEC 1113	Introduction to Agricultural Economics (S)	3
or ECON 2103	Introduction to Microeconomics (S)	
ACCT 2103	Financial Accounting [1]	3
or ACCT 2003	Survey of Accounting	
Select 15 hours in five upper-division (3 hour) AGEC courses [2]		15
Total Hours		**21**

1

AGEC 3183 Agribusiness Accounting and Taxation may be substituted for ACCT 2103 Financial Accounting

2

Excluding AGEC 3010 Internship in Agricultural Economics, AGEC 3101 Professional Career Development, AGEC 3183 Agribusiness Accounting and Taxation, AGEC 3810, AGEC 3990 Special Problems in Agricultural Economics, AGEC 4101 Agricultural Economics Seminar, AGEC 4990 Problems of Agricultural Economics

Other Requirements

- At least nine hours of upper division AGEC courses must be taken at OSU.
- A grade-point average of 2.0 for courses that count for the minor.

Additional OSU Requirements

Undergraduate Minors

- An undergraduate minor must include between fifteen and thirty hours, inclusive of undergraduate coursework.
- A minimum of six credit hours for the minor must be earned in residence at OSU.
- The courses required for a minor may be included in the course requirements for any undergraduate degree or they may be in addition to degree requirements, depending on the overlap between the minor and degree requirements. However, an undergraduate minor must be earned in an academic field other than the student's declared degree option. The minor may not duplicate the degree major or option (for example, a student who earns a BA in Art with an Art History option may earn a minor in Studio Art but not Art History).
- A student generally follows the minor requirements associated with his or her matriculation year or newer requirements that have been established since matriculation. The time limit for following requirements from a given academic year is six years.

For additional information on requirements on minors, click here (https://adminfinance.okstate.edu/site-files/documents/policies/requirements-for-undergraduate-and-graduate-minors.pdf).

Agricultural Economics, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p. 977)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
MATH 2144	Calculus I (A) [1]	4
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
Select one of the following:		4
CHEM 1314	Chemistry I (LN) [1]	
CHEM 1215	Chemical Principles I (LN) [1]	
CHEM 1014	Chemistry In Civilization (LN) [1]	
Any course designated (N)		3
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1]	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		8
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
Agricultural Sciences and Natural Resources		
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
From two of the following groups, select one course:		6
Group 1:		
PLNT 1213	Introduction to Plant and Soil Systems (N)	
HORT 1013	Principles of Horticultural Science (LN)	
NREM 1113	Elements of Forestry	
Group 2:		
SOIL 1113	Land, Life and the Environment (N)	
SOIL 2124	Fundamentals of Soil Science (N)	
Group 3:		
ANSI 1124	Introduction to the Animal Sciences	
FDSC 1133	Fundamentals of Food Science	
ENTO 2993	Introduction to Entomology (LN)	
ENTO 3003	Livestock Entomology	
Group 4:		
NREM 1014	Introduction to Natural History (LN)	
NREM 2013	Ecology of Natural Resources	
NREM 3013	Applied Ecology and Conservation	
ENVR 1113	Elements of Environmental Science (N)	
BIOC 2344	Chemistry and Applications of Biomolecules	
BIOC 3713	Biochemistry I	
LA 1013	Introduction to Landscape Architecture	
Written & Oral Communications		
Select one of the following:		3
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources	
BCOM 3113	Written Communication	
BCOM 3443	Business Communication for International Students	
ENGL 3323	Technical Writing [2]	
Select one of the following: [3]		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S)	
SPCH 2713	Introduction to Speech Communication (S)	
SPCH 3733	Elements of Persuasion (S)	
Hours Subtotal		**13**
Major Requirements		
Core Courses		
Select from one of the following pairs of courses:		6
ACCT 2103	Financial Accounting	
ACCT 2203	Managerial Accounting	
or		
ACCT 2003	Survey of Accounting	
ACCT 3004	Foundational Accounting and Data Skills	
AGEC 1101	Agricultural Economics and Agribusiness Experience	1
AGEC 3101	Professional Career Development	1
AGEC 3213	Quantitative Methods in Agricultural Economics	3
AGEC 3333	Agricultural Marketing and Price Analysis	3
AGEC 3423	Farm and Agribusiness Management	3
AGEC 3603	Agricultural Finance	3
AGEC 3713	Agricultural Law	3
ECON 2203	Introduction to Macroeconomics	3
ECON 3113	Intermediate Microeconomics	3
ECON 3123	Intermediate Macroeconomics	3
MATH 2153	Calculus II (A)	3
MATH 3013	Linear Algebra (A)	3

STAT 4013	Statistical Methods I (A)	3
STAT 4043	Applied Regression Analysis	3
or ECON 4223	Business and Economic Forecasting	
15 additional hours from upper-division AGEC with at least 12 hours 4000-level except AGEC 4990		15
Related Courses		
Hours Subtotal		**59**
Electives		
Select 8 hours or hours to complete required total for degree [4]		8
Hours Subtotal		**8**
Total Hours		**120**

1

College & Departmental requirements that may be used to meet General Education requirements.

2

If ENGL 3323 Technical Writing is substituted for ENGL 1213 Composition II above; hours in this block are reduced by 3.

3

If used as (S) course above, hours in this block reduced by 3.

4

MATH 1483 Mathematical Functions and Their Uses (A) or MATH 1513 College Algebra (A) may need to be taken as prerequisite to required Calculus course.

Other Requirements

- Exit interview with Head of Department of Agricultural Economics.
- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Agricultural Real Estate Appraisal (AREA), Minor

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Total Hours: 24

Code	Title	Hours
Minor Requirements		
Select from one of the following pairs of courses:		6
ACCT 2103	Financial Accounting	
ACCT 2203	Managerial Accounting	
OR		
ACCT 2003	Survey of Accounting	
ACCT 3003	Foundational Accounting Skills	
or ACCT 3004	Foundational Accounting and Data Skills	
AGEC 3213	Quantitative Methods in Agricultural Economics	3
AGEC 3423	Farm and Agribusiness Management	3
AGEC 3603	Agricultural Finance	3
AGEC 3713	Agricultural Law	3
AGEC 4513	Farm Appraisal	3
STAT 2023	Elementary Statistics for Business and Economics (A)	3
Total Hours		**24**

Other Requirements

- At least nine hours of the AGEC courses must be taken at OSU.
- A grade-point average of 2.0 for courses that count for the minor.

Additional OSU Requirements

Undergraduate Minors

- An undergraduate minor must include between fifteen and thirty hours, inclusive of undergraduate coursework.
- A minimum of six credit hours for the minor must be earned in residence at OSU.
- The courses required for a minor may be included in the course requirements for any undergraduate degree or they may be in addition to degree requirements, depending on the overlap between the minor and degree requirements. However, an undergraduate minor must be earned in an academic field other than the student's declared degree option. The minor may not duplicate the degree major or option (for example, a student who earns a BA in Art with an Art History option may earn a minor in Studio Art but not Art History).
- A student generally follows the minor requirements associated with his or her matriculation year or newer requirements that have been established since matriculation. The time limit for following requirements from a given academic year is six years.

For additional information on requirements on minors, click here (https://adminfinance.okstate.edu/site-files/documents/policies/requirements-for-undergraduate-and-graduate-minors.pdf).

Environmental Economics, Politics and Policy (EEPP), Minor

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Total Hours: 21

Code	Title	Hours
Minor Requirements		
AGEC 1113	Introduction to Agricultural Economics (S)	3
or ECON 2103	Introduction to Microeconomics (S)	
AGEC 3503	Natural Resource Economics	3
or ECON 3903	Economics of the Environment	
AGEC 4503	Environmental Economics and Resource Development	3
Select at least 12 hours of the following:		12
AGEC 3703	Issues in Agricultural Policy	
AGEC 3713	Agricultural Law	
AGEC 4703	American Agricultural Policy	
ECON 3113	Intermediate Microeconomics	
ENVR 4512	Introduction to National Environmental Policy Act	
ENVR 4573	Ethical Issues in Agriculture and the Environment	
GEOG 3153	Conservation of Natural Resources (S)	
GEOG 4233	Human Dimensions of Global Environmental Change	
HIST 4523	American Environmental History (H)	
NREM 4053	Natural Resource Recreation	
or RM 4473	Recreation in the Natural Environment	
NREM 4093	Natural Resources, People and Sustainable Development (I)	
POLS 3493	Public Policy	
POLS 4363	Environmental Law And Policy	
POLS 4593	Natural Resources and Environmental Policy	
SOC 4433	Environmental Sociology (S)	
SOC 4473	Oklahoma Environmental Sociology	
SOC 4533	World Population Problems	
Total Hours		**21**

Other Requirements

- At least nine upper-division hours must be taken at OSU.
- A grade-point average of 2.0 for courses that count for the minor.

Additional OSU Requirements

Undergraduate Minors

- An undergraduate minor must include between fifteen and thirty hours, inclusive of undergraduate coursework.
- A minimum of six credit hours for the minor must be earned in residence at OSU.
- The courses required for a minor may be included in the course requirements for any undergraduate degree or they may be in addition to degree requirements, depending on the overlap between the minor and degree requirements. However, an undergraduate minor must be earned in an academic field other than the student's declared degree option. The minor may not duplicate the degree major or option (for example, a student who earns a BA in Art with an Art History option may earn a minor in Studio Art but not Art History).
- A student generally follows the minor requirements associated with his or her matriculation year or newer requirements that have been established since matriculation. The time limit for following requirements from a given academic year is six years.

For additional information on requirements on minors, click here (https://adminfinance.okstate.edu/site-files/documents/policies/requirements-for-undergraduate-and-graduate-minors.pdf).

Agricultural Education

The programs of study offered in Agricultural Education are designed to provide both comprehensive and specialized training to prepare graduates for careers in a wide range of fields of agriculture. In addition to being prepared for licensure as teachers, graduates are professionally prepared for work in cooperative extension and other federal and state programs and services, as well as international education endeavors. Graduates also may find employment as educational directors and consultants with agribusiness firms and organizations. Studies may culminate in the BS, MAg, MS, or PhD degrees.

The undergraduate teaching option is designed to qualify the bachelor's degree recipient for the Oklahoma Agricultural Education Teaching License. The program is accredited by the Council for the Accreditation of Educator Preparation (CAEP). This license is recognized as meeting requirements for initial employment as a teacher in most states. Graduates look forward to careers ranging from agricultural education teacher and cooperative extension educator to agricultural sales, marketing, and production positions. The undergraduate Agricultural Education major is structured to provide educational experiences in general education, agriculture, and professional education.

Courses

AGED 2011 Topics and Issues in Agricultural Education
Description: An exploration into the world of teaching secondary agricultural education with a focus on the role and purpose of the comprehensive agricultural education program. Observation of teachers in an experiential manner by actively interviewing agricultural education teachers, school principals, and appropriate state staff; assisting with FFA activities; and observing students' SAE opportunities.
Credit hours: 1
Contact hours: Lecture: 1 Contact: 1
Levels: Undergraduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGED 3101 Laboratory and Clinical Experiences in Agricultural Education
Description: Preprofessional clinical experiences in agricultural education teaching and related careers. Requirement for admission to professional education, student teaching, and internships. Previously offered as AGED 3510.
Credit hours: 1
Contact hours: Lecture: 1 Contact: 1
Levels: Undergraduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGED 3103 Foundations and Philosophies of Teaching Agricultural Education
Prerequisites: 21 semester credit hours of agriculture with a 2.50 GPA.
Description: Roles and responsibilities of the agricultural education teacher; types of program offerings; steps of the teaching-learning process; place of agricultural education in relation to other educational programs in school systems.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Ag Ed, Comm & Leadership

AGED 3201 Planning and Conducting Agricultural Youth Organization Events
Description: A service-learning course focused on the processes and procedures required to host competitive events for agricultural youth organizations. Emphasis on roles of event hosts such as planning, coordination, volunteer management, and facilitation.
Credit hours: 1
Contact hours: Lecture: 1 Contact: 1
Levels: Undergraduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGED 3203 Advising Agricultural Student Organizations and Supervising Experiential Learning
Prerequisites: AGED 3103.
Description: Determining resources and trends of local communities with respect to agricultural production and agribusiness. Emphasis on agricultural education program policies, FFA chapter advisement, planning and managing the instructional program, identification and completion of records and reports required of a teacher of agricultural education in Oklahoma. May not be used for degree credit with AGED 5323.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Ag Ed, Comm & Leadership

AGED 4103 Methods of Teaching Agricultural Education
Prerequisites: AGED 3101 and AGED 3203.
Description: Facets of the teaching and learning process including teaching methods, basic teaching skills, proper classroom management techniques, and motivational techniques and ideas. Preparation for student teaching.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Ag Ed, Comm & Leadership

AGED 4113 Inquiry Based Instruction in Agricultural Education
Prerequisites: AGED 3103
Description: Inquiry-based instruction in agricultural education to prepare future school-based agricultural education teachers to teach inquiry-based science, technology, engineering, and math (STEM) curriculum.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Ag Ed, Comm & Leadership

AGED 4200 Student Teaching in Agricultural Education
Prerequisites: AGED 4103; EPSY 3213 or EPSY 3413; SPED 3202; Concurrent enrollment in AGED 4113; full admission to the University Professional Education program.
Description: Full-time directed experience in an approved agricultural education department. Applications of methods and skills in agricultural education as related to selecting, adapting, utilizing, and evaluating curriculum materials and experiences to meet educational goals and facilitate learning for individual students. Roles, responsibilities, and organization and operation of school systems. Offered for variable credit, 1-9 credit hours, maximum of 9 credit hours.
Credit hours: 1-9
Contact hours: Contact: 1-9 Other: 1-9
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Ag Ed, Comm & Leadership

AGED 4203 Professional Development in Agricultural Education
Prerequisites: AGED 4103; EPSY 3213 or EPSY 3413; SPED 3202.
Description: Professional preparation and development for careers as agricultural educators. Professional correspondences, interviewing, networking, and other employability skills. Reflection and evaluation of instruction, project supervision and advising of youth leadership development organizations. May not be used for degree credit with AGED 5333.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGED 4300 Agricultural Education Internship
Prerequisites: Consent of instructor.
Description: Supervised internship experience with approved enterprises in agriculture, natural resources, and/or youth development. Regular written reports and final presentation required. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Ag Ed, Comm & Leadership

AGED 4713 International Programs in Agricultural Education and Extension (I)
Description: World hunger and its root causes. The function of international agencies, organizations, foundation and churches in improving the quality of life for people of the developing nations. Roles of agricultural education and extension at all levels for enhancing the effectiveness of indigenous programs of rural development and adult education.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGED 4990 Seminar and Problems in Agricultural Education
Description: Small group and/or individual study and research in problems relating to programs of occupational education in agriculture. Offered for variable credit, 1-3 credit hours, maximum of 6 credit hours.
Credit hours: 1-3
Contact hours: Contact: 1-3 Other: 1-3
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Ag Ed, Comm & Leadership

AGED 5102 Creative Component in Agricultural Education
Prerequisites: AGED 5983 or equivalent; consent of instructor.
Description: Independent research or project management under the direction and supervision of a major adviser.
Credit hours: 2
Contact hours: Lecture: 2 Contact: 2
Levels: Graduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGED 5123 Adult Programs in Agricultural and Extension Education
Description: Determining adult needs, priorities, participation in educational activities, and adoption of new ideas and practices. Designing, organizing, conducting, and evaluating adult education programs in agricultural and extension education.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGED 5203 Grant Seeking
Prerequisites: Graduate standing or consent of instructor.
Description: External funding proposal development for foundation and government agencies. Conceptualizing projects, identifying funding sources, and develop proposals that follow RFP guidelines including a literature review, need for the project, approach, timeline and budget. Previously offered as AGED 5202.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGED 5300 Extension Tchg Meth
Credit hours: 1-24
Contact hours: Lecture: 1-24 Contact: 1-24
Levels: Graduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGED 5311 Laboratory and Clinical Experiences in Agricultural Education for Graduate Students
Prerequisites: Graduate Standing.
Description: Preprofessional clinical experiences in agricultural education teaching and related careers. Study of research literature related to school-based agricultural education. Requirement for admission to professional education and student teaching. For graduate students pursuing teacher certification.
Credit hours: 1
Contact hours: Lecture: 1 Contact: 1
Levels: Graduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGED 5313 Foundations and Philosophies of Teaching Agricultural Education for Graduate Students
Prerequisites: Graduate Standing.
Description: Study of educational philosophers impacting school-based agricultural education, roles and responsibilities of the agricultural education teacher, types of program offerings, steps of the teacher-learning process, and the place of agricultural education in relation to other educational programs in school systems. For graduate students pursuing teacher certification. Same course as AGED 3013.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Ag Ed, Comm & Leadership

AGED 5323 Advising Agricultural Student Organizations & Supervising Experimental Learning for Graduate Student
Prerequisites: Graduate Standing.
Description: Determining resources and trends of local communities with respect to agricultural production and agribusiness. Emphasis on agricultural education program policies, FFA chapter advisement, and supervision of experiential learning projects. Development of project for teaching agriculture. For graduate students pursuing teacher certification. Same course as AGED 3203.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Ag Ed, Comm & Leadership

AGED 5333 Methods of Teaching Agricultural Education for Graduate Students
Prerequisites: Graduate standing.
Description: Facets of the teaching and learning process with an emphasis on the identification and integration of teaching methods in the school-based agricultural education curriculum. Preparation for the student teaching internship. For graduate students pursuing teacher certification. Includes exploration and application of research about teaching school-based agricultural education. Previously offered as AGED 5103.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Ag Ed, Comm & Leadership

AGED 5343 Professional Development in Agricultural Education
Prerequisites: AGED 4103; EPSY 3213 or EPSY 3413; SPED 3202.
Description: Professional preparation and development for careers as agricultural educators. Professional correspondences, interviewing, networking, and other employability skills. Reflection and evaluation of instruction, project supervision and advising of youth leadership development organizations. May not be used for degree credit with AGED 4203.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGED 5500 Directing Programs of Supervised Experience
Prerequisites: Consent of instructor.
Description: Determining the supervised training needs and opportunities of individual students. Planning for supervision of agricultural education training programs and 4-H club projects. Analysis of training opportunities in production agriculture, agricultural businesses and individual career development. Offered for variable credit, 1-3 credit hours, maximum of 6 credit hours.
Credit hours: 1-3
Contact hours: Contact: 1-3 Other: 1-3
Levels: Graduate
Schedule types: Independent Study
Department/School: Ag Ed, Comm & Leadership

AGED 5623 Volunteer Management in Agricultural and Extension Education
Prerequisites: Graduate standing.
Description: Concepts, theories and practices relevant to the management of volunteers with an emphasis on recruiting, managing, and training in formal or non-formal educational settings.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGED 5703 Cultural Competency for Working in Agricultural and Extension Education
Prerequisites: Graduate standing.
Description: Examination of strategies to increase intercultural intelligence, and cultural competence. Focus on concepts of cultural values and stereotypes, intercultural sensitivity, cultural differences, cultural transitions, and intercultural theories for agricultural and extension educators.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGED 5813 College Teaching of Agriculture and Natural Resources
Prerequisites: Consent of instructor.
Description: Facets of the teaching-learning process used to teach agriculture and natural resources in higher education including teaching methods, instructional skills, application of instructional technology, student motivation, and evaluation of learning. Previously offered as AGED 6120.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGED 5823 Advanced Methods of Teaching Agriculture
Description: Advanced concepts and methods relevant for both formal and informal presentations. Effects methods may have on individuals involved in the learning experience. Demonstrations of proficiency in use of various advanced methodologies, technologies and concepts.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGED 5900 Graduate Internship in Agriculture
Prerequisites: Admission to Master of Agriculture program; consent of graduate coordinator.
Description: Supervised internship in agricultural education, government agency, industry, Cooperative Extension, or not-for-profit organizations. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Graduate
Schedule types: Independent Study
Department/School: Ag Ed, Comm & Leadership

AGED 5990 Problems in Agricultural and Extension Education
Description: Securing and analyzing data related to special problems or investigation in designated areas of agricultural education. Offered for variable credit, 1-3 credit hours, maximum of 8 credit hours.
Credit hours: 1-3
Contact hours: Contact: 1-3 Other: 1-3
Levels: Graduate
Schedule types: Independent Study
Department/School: Ag Ed, Comm & Leadership

AGED 6103 History and Philosophical Foundations of Agricultural and Extension Education
Prerequisites: Graduate standing.
Description: History and philosophical foundations of agricultural and extension education. Philosophy and its role in life, rise of education in America, philosophical foundations of education in America, legislation having an impact on agricultural and extension education, education in agriculture and current issues in agricultural extension education. Previously offered as AGED 5820.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGED 6983 Qualitative Research Methods in Agricultural Education
Prerequisites: Graduate standing, AGED 5983 or other graduate level social science research methods course.
Description: A comprehensive examination of qualitative research methods including identifying a problem, data collection, interpretative analysis, ensuring trustworthiness, theory construction and reporting. Previously offered as AGED 5303.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

Undergraduate Programs

- Agricultural Education: Multidisciplinary, BSAG (p. 2474)

Graduate Programs

Graduate programs in Agricultural Education are designed to:

1. Prepare students for entry into or advancement in teaching careers, and
2. Provide for further development of professional leadership skills for other educational careers in agriculture, agribusiness, government service, extension, or adult education.

To meet the needs of both international and domestic students, plans of study are developed for academic excellence specific to students' career goals. The selection and organization of courses are made in consultation with the advisor and the student's advisory committee.

The Master of Agriculture degree is an advanced studies program for practitioners seeking to develop their knowledge related to education, leadership, and their applications to the agricultural industry. Graduates pursue careers in teaching, school administration, Extension, government, corporate agriculture, and human resources and training. The Master of Agriculture program requires 32 approved semester hours of coursework including a 17-hour area of emphasis.

The Master of Science degree in Agricultural Education and Leadership offers students two options for completion of the degree: thesis option or formal report option. The thesis option requires 30 approved credit hours of coursework that includes a six-credit hour formal thesis following the graduate college format. The formal report option requires 32 approved semester credit hours of coursework, including a two-credit hour formal report.

The Doctor of Philosophy program in Agricultural Education, Communications and Leadership is designed to prepare graduates for careers in professional education, supervision, administration, curriculum development and other areas of professional leadership in agriculture, agricultural Extension, career and technology, and agricultural communications. Within the minimum 60-credit hour requirement, 15 credit hours must be completed in the core area. In addition, 15 credit hours must be completed in an area of specialization such as agricultural Extension, technical agriculture, educational administration, or other similar areas. The additional hours include 15 hours of research design and statistics and 15 hours for the dissertation.

Admission Requirements

Students seeking admission to the master's degree programs must have earned a bachelor's degree in agricultural education or a closely related field. A student with background deficiencies must compensate for such deficiencies before completing the Master of Science degree. Evidence of academic ability (2.80 GPA or above) in undergraduate coursework is required. Three letters of reference and a statement of purpose are also required. Graduate Record Exam (GRE) scores are required for students seeking admission to the Master of Science degree program.

Admission to the doctoral degree program is based upon evidence the applicant meets the general requirements of the Graduate College, has demonstrated superior achievement, and can successfully complete a doctoral program as evidenced by three letters of recommendation, GRE scores, a minimum of 2.80 undergraduate grade-point average and 3.00 graduate grade-point average, and a philosophy statement and goals. Students interested in specializing in agricultural education must have three years of successful professional experience. Alternative criteria may be considered by the graduate committee for those who submit ample supportive evidence of other exemplary qualifications.

Faculty

J. Shane Robinson, PhD—Professor and Head
Professors: D. Dwayne Cartmell, PhD; M. Craig Edwards, PhD; Shelly R. Legg, PhD; Jon W. Ramsey, PhD; Robert Terry, Jr., PhD
Associate Professor: Angel Riggs, PhD; Quisto Settle, PhD
Assistant Professors: Courtney Brown, PhD; Lauren Cline, PhD; Bradley Coleman, PhD; Chris Eck, PhD; Audrey King, PhD

Lecturers: Kenna Sandburg, MS; Nathan Smith, MS; Kaylee Travis, MS

Agricultural Education: Multidisciplinary, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.50
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p. 977)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
MATH (A) or STAT (A) [1]		3
(Suggested: MATH 1483 or MATH 1513)		
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
CHEM 1314	Chemistry I (LN) [2]	4
or CHEM 1215	Chemical Principles I (LN)	
Any course designated (N)		3
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [2]	3
SPCH 2713	Introduction to Speech Communication (S) [2]	3
or AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S)	
Additional General Education		
Courses designated (A), (H), (N), or (S) [3]		6
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course (included in Major Requirements)		
Select at least one International Dimension (I) course (included in Major Requirements)		
College/Departmental Requirements		
Agricultural Sciences and Natural Resources		
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
AECL 1101	Orientation to Agricultural Education, Communications and Leadership	1
ANSI 1023 & ANSI 1021	Introduction to the Animal Sciences and Introduction to the Animal Sciences Lab	4
or ANSI 1124	Introduction to the Animal Sciences	
Select one of the following:		3
FDSC 1133	Fundamentals of Food Science	
FDSC 2233	The Meat We Eat	
FDSC 2253	Meat Animal and Carcass Evaluation	
HORT 1013	Principles of Horticultural Science (LN)	3
AST 3011	Ag Structures	1
AST 3211	Engines and Power	1
AST 3222	Metals and Welding	2
AST 4101	Ag Electrification	1
PLNT 1213	Introduction to Plant and Soil Systems (N)	3
SOIL 2124	Fundamentals of Soil Science (N)	4
Biological Sciences		
Select four hours from the following:		4
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN) [4]	
BIOL 1114	Introductory Biology (LN) [4]	
Written & Oral Communications		
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources	3
or ENGL 3323	Technical Writing	
Hours Subtotal		**31**
Major Requirements		
Enrichment Courses		
To include courses from four of the following areas:		12
Agricultural Communications, Agricultural Economics, Agricultural Education, Agricultural Leadership, Agricultural Systems Technology, Animal Science, Biochemistry, Entomology, Environmental Science, Food Science, Forestry, Horticulture, Natural Resource Ecology and Management, Plant Pathology, Plant Science, and Soil Science		
International Agriculture		
Select one of the following:		3
AGED 4713	International Programs in Agricultural Education and Extension (I)	
AGLE 3803	Global Leadership in Agriculture (I)	
ANSI 3903	Agricultural Animals of the World (I)	
AECL 4800	International Study Tour in Agricultural Education, Communications and Leadership (I)	
Professional Core		
AGED 3101	Laboratory and Clinical Experiences in Agricultural Education	1
AGED 3103	Foundations and Philosophies of Teaching Agricultural Education	3
AGED 3203	Advising Agricultural Student Organizations and Supervising Experiential Learning	3
AGED 4103	Methods of Teaching Agricultural Education	3

AGED 4113	Inquiry Based Instruction in Agricultural Education	3
AGED 4203	Professional Development in Agricultural Education [5]	3
CIED 4133	Introduction to K-12 English Language Learners	3
AGED 4200	Student Teaching in Agricultural Education [5]	9
EPSY 3213	Psychology of Adolescence	3
or EPSY 3413	Child and Adolescent Development	
SPED 3202	Educating Exceptional Learners (D)	2
Hours Subtotal		**48**
Electives		
1 hour or hours to complete required total for degree [6]		1
Hours Subtotal		**1**
Total Hours		**120**

1

Suggested: MATH 1483 Mathematical Functions and Their Uses (A) or MATH 1493 Applications of Modern Mathematics (A) or MATH 1513 College Algebra (A)

2

College & Departmental requirements that may be used to meet General Education requirements.

3

Suggested: STAT 2013 Elementary Statistics (A); PSYC 1113 Introductory Psychology (S)

4

If used as (N) course above, hours in this block reduced by 4.

5

AGED 4203 Professional Development in Agricultural Education & AGED 4200 Student Teaching in Agricultural Education are taken during student teaching semester.

6

These hours may be applied to the foreign language proficiency requirement per teacher certification (see below)

Required for Graduation and Recommendation for Licensure/Standard Certification

1. 2.50 overall GPA;
2. 2.50 GPA in Major Requirements; and
3. 2.50 GPA in Professional Requirements.

The student must earn minimum grades of “C” in each course in the College/Departmental Requirements, Major Requirements, and Professional Core Requirements.

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Agricultural Leadership

The Agricultural Leadership curriculum is guided by five core values: commitment to agriculture, authentic leadership, diversity, critical thinking, and professionalism. Agricultural Leadership faculty align course objectives, learning opportunities and student experiences with the five core values. Beginning students study historical and theoretical foundations in leadership, authentic leadership, and transformational leadership before exploring contemporary leadership issues, leadership program facilitation and current scholarship in the discipline. Specific topics within coursework include leadership styles, power, decision-making, ethical leadership, motivational theories, and team processes.

In addition to leadership coursework, the curriculum provides a broad introduction to the agricultural sciences and natural resources and allows students to develop an area of emphasis or pursue a minor in areas such as Animal Science, Soil Science or Agricultural Economics.

Minor in Leadership Education

The minor is designed to prepare students to serve as leaders in the context of their chosen major. Students develop an understanding of their leadership style and philosophy, acquire knowledge about leadership theories, explore contemporary issues in leadership, evaluate current leadership research and learn to design and facilitate leadership training. Requirements of the minor include 15 hours of leadership coursework.

Courses

AGLE 1511 Introduction to Leadership in Agricultural Sciences and Natural Resources
Description: Introduction to the concept of leadership as a field of study. Emphasis placed on the application of acquired knowledge to practical problems. Previously offered as AGED 1511.
Credit hours: 1
Contact hours: Lecture: 1 Contact: 1
Levels: Undergraduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGLE 2303 Agricultural Leaders in Society (S)
Description: Analysis of agricultural leaders and societal impacts. Theories of authentic leadership and values-based leadership. Organizational, community, and workforce changes including diversity, technology, and globalization and the relationship to leader behavior.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership
General Education and other Course Attributes: Social & Behavioral Sciences

AGLE 2403 Agricultural Leadership in a Multicultural Society (DS)
Description: The study of leadership as it relates to a multicultural society. Cultural changes in the agricultural workplace and future impact on the industry. Personal barriers to fulfilling leadership roles in the agricultural sciences and natural resources. Skills related to managing teams in a diverse workplace specifically related to differences in gender, race and ethnicity.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership
General Education and other Course Attributes: Diversity, Social & Behavioral Sciences

AGLE 3101 Introduction to Agricultural Leadership
Prerequisites: Major in AGLE or consent of instructor.
Description: Exploring leadership in the context of agriculture. Specific topics will include authentic leadership, independent thinking, commitment to agriculture, open minds and professionalism. Graded on a pass/fail basis.
Credit hours: 1
Contact hours: Lecture: 1 Contact: 1
Levels: Undergraduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGLE 3303 Agricultural Leadership: Theory and Practice
Description: A study of the concepts and theories of leadership with emphasis on the development of leadership abilities in the individual for different group situations. Previously offered as AGED 3303.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGLE 3333 Contemporary Issues in Leadership
Prerequisites: AGLE 2303, AGLE 3303.
Description: Explore current issues in the study of leadership. Themes based on current leadership research and writings that reveal new understandings of the leader's role as a servant, facilitator and collaborator. Previously offered as AGED 3333.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGLE 3403 Facilitating Social Change in Agriculture
Description: Examination of processes by which professional agriculturists influence the introduction, adoption, and diffusion of technological change. Previously offered as AGED 3403.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGLE 3503 Introduction to Cooperative Extension
Description: Cooperative Extension mission, philosophy, history, organization, structure, administration, and program areas. Extension program development, Extension teaching and delivery methods, and the involvement and use of volunteers.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGLE 3803 Global Leadership in Agriculture (I)
Description: Contemporary global leadership in the context of agriculture. Challenges, cross-cultural conflict, managing diversity, and ethical behavior. Exploration of global leaders including Africans, Asians, Europeans, and Middle Easterners.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership
General Education and other Course Attributes: International Dimension

AGLE 4101 Seminar in Leadership Education
Prerequisites: AGLE 2303, AGLE 3303.
Description: In-depth exploration of leadership topics related to agricultural sciences and natural resources.
Credit hours: 1
Contact hours: Lecture: 1 Contact: 1
Levels: Undergraduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGLE 4203 Professional Development in Agriculture
Prerequisites: AGLE 3101; junior standing.
Description: Preparation of professionals in agricultural business and industry and related areas who have career goals directed toward service, leadership, management, communications, production, processing, marketing, and education outside the public school setting. Development of professionalism through relationship building, networking, interviews, community involvement, business correspondence, websites and the resume. Previously offered as AGED 4203.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGLE 4300 Agricultural Leadership Internship
Prerequisites: AGLE 3101, AGLE 4203 and consent of instructor.
Description: Supervised full-time internships in approved agribusinesses, governmental agencies or country extension offices. Requires written reports and a final presentation. Previously offered as AGED 4300. Offered for variable credit, 3-6 credit hours, maximum of 6 credit hours.
Credit hours: 3-6
Contact hours: Contact: 3-6 Other: 3-6
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Ag Ed, Comm & Leadership

AGLE 4303 Facilitating Leadership Education Programs
Prerequisites: AGLE 2303, AGLE 3303.
Description: Identification and application of methods and techniques for teaching leadership education programs in formal and non-formal educational settings. Focus on using experiential methods of teaching leadership.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGLE 4803 International Agricultural Leadership Tour
Description: An experiential approach to the study of contemporary culture, agriculture, and leadership in a region outside the United States. Contemporary leadership of the region and implications related to agriculture. Comparison of leadership and agricultural practices in the designated region to that of the United States. Includes a two-week international travel component.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGLE 4990 Problems in Agricultural Leadership
Prerequisites: Consent of instructor.
Description: Small group and/or individual study and research in problems related to agricultural leadership. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Ag Ed, Comm & Leadership

AGLE 5102 Creative Component in Agricultural Leadership and Extension Education
Prerequisites: Consent of instructor.
Description: Independent project under the direction and supervision of a major advisor. Creative component projects address an agricultural leadership and/or extension education issue with the goal to inform or improve practice based upon scholarship. Open to students pursuing a Master of Agriculture degree (M.Ag.) with an option in Agricultural Leadership.
Credit hours: 2
Contact hours: Contact: 2 Other: 2
Levels: Graduate
Schedule types: Independent Study
Department/School: Ag Ed, Comm & Leadership

AGLE 5303 Foundations of Leadership Theory
Description: Study of leadership theory including definitions of leadership, a history of modern leadership theory, and current trends in leadership practice and research. Models of leadership including contingency models, situational leadership and transformational leadership. Previously offered as AGED 5303.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGLE 5353 Leadership in Agriculture
Prerequisites: AGLE 5303 or consent of instructor.
Description: Concepts, principles, and philosophies of leadership applied to agricultural contexts. Importance of traits, perceptions, and behaviors to success of agricultural professionals in leadership roles. Dimensions and style of leadership for varying situations. Previously offered as AGED 5353.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

AGLE 5990 Problems in Agricultural Leadership and Extension Education
Prerequisites: Consent of instructor.
Description: Investigation in designated areas of agricultural leadership and/or extension education. Offered for variable credit, 1-3 credit hours, maximum of 6 credit hours.
Credit hours: 1-3
Contact hours: Contact: 1-3 Other: 1-3
Levels: Graduate
Schedule types: Independent Study
Department/School: Ag Ed, Comm & Leadership

AGLE 6203 Extension Program Development
Description: A systematic study of the history, culture and functions of the Cooperative Extension System in America. Focus on program planning, including needs assessments, involvement of local constituent groups, use of the logic model, teaching methods, program evaluations, marketing and planning for the future. Previously offered as AGED 6200.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Ag Ed, Comm & Leadership

Undergraduate Programs

- Agricultural Leadership, BSAG (p. 2480)
- Agricultural Leadership: Extension Education, BSAG (p. 2482)
- Agricultural Leadership: International Studies, BSAG (p. 2484)

Graduate Programs

Students may pursue graduate studies in agricultural leadership through a Master of Agriculture in Agricultural Education and Leadership, the Master of Science degree in Agricultural Education and Leadership, or the department's Doctor of Philosophy degree programs.

The Master of Agriculture degree is an advanced studies program for practitioners seeking to develop their knowledge related to education, leadership, and their applications to the agricultural industry. Graduates pursue careers in teaching, school administration, Extension, government, corporate agriculture, and human resources and training. The Master of Agriculture program requires 32 approved semester hours of coursework including a 17-hour area of emphasis.

The Master of Science degree in Agricultural Education and Leadership offers students two options for completion of the degree: thesis option or formal report option. The thesis option requires 30 approved credit hours of coursework, which includes a six-credit hour formal thesis following the graduate college format. The formal report option requires 32 approved semester credit hours of coursework, including a two-credit hour formal report.

The Doctor of Philosophy program in Agricultural Education, Communications and Leadership is designed to prepare graduates for careers in professional education, supervision, administration, curriculum development and other areas of professional leadership in Agriculture, Agricultural Extension, Career and Technology, and Agricultural Communications. Within the minimum 60-credit hour requirement, 15 credit hours must be completed in the core area. In addition, 15 credit hours must be completed in an area of specialization such as Agricultural Extension, Technical Agriculture, Educational Administration, or other similar areas. The additional hours include 15 hours of research design and statistics and 15 hours for the dissertation.

Admission Requirements

Students seeking admission to the master's degree programs must have earned a bachelor's degree in agricultural leadership or a closely related field. A student with background deficiencies must compensate for such deficiencies before completing the Master of Science degree. Evidence of academic ability (2.80 GPA or above) in undergraduate coursework is required. Three letters of reference and a statement of purpose are also required. Graduate Record Exam (GRE) scores are required for students seeking admission to the Master of Science degree program.

Admission to the doctoral degree program is based upon evidence the applicant meets the general requirements of the Graduate College, has demonstrated superior achievement, and can successfully complete a doctoral program as evidenced by three letters of recommendation, GRE scores, a minimum of 2.80 undergraduate grade-point average and 3.00 graduate grade-point average, and a philosophy statement and goals. Alternative criteria may be considered by the graduate committee for those who submit ample supportive evidence of other exemplary qualifications.

Minors

- Agricultural Leadership (AGLE), Minor (p. 2479)

Faculty

J. Shane Robinson, PhD—Professor and Head
Professors: D. Dwayne Cartmell, PhD; M. Craig Edwards, PhD; Shelly R. Legg, PhD; Jon W. Ramsey, PhD; Robert Terry, Jr., PhD
Associate Professor: Angel Riggs, PhD; Quisto Settle, PhD
Assistant Professors: Courtney Brown, PhD; Lauren Cline, PhD; Bradley Coleman, PhD; Chris Eck, PhD; Audrey King, PhD
Lecturers: Kenna Sandburg, MS; Nathan Smith, MS; Kaylee Travis, MS

Agricultural Leadership (AGLE), Minor

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Total Hours: 15

Code	Title	Hours
Minor Requirements		
AGLE 2303	Agricultural Leaders in Society (S)	3
AGLE 2403	Agricultural Leadership in a Multicultural Society (DS)	3
AGLE 3303	Agricultural Leadership: Theory and Practice	3
AGLE 3403	Facilitating Social Change in Agriculture	3
AGLE 3803	Global Leadership in Agriculture (I)	3
Total Hours		**15**

- A grade-point average of 2.0 for courses that count for the minor.

Additional OSU Requirements

Undergraduate Minors

- An undergraduate minor must include between fifteen and thirty hours, inclusive of undergraduate coursework.
- A minimum of six credit hours for the minor must be earned in residence at OSU.
- The courses required for a minor may be included in the course requirements for any undergraduate degree or they may be in addition to degree requirements, depending on the overlap between the minor and degree requirements. However, an undergraduate minor must be earned in an academic field other than the student's declared degree option. The minor may not duplicate the degree major or option (for example, a student who earns a BA in Art with an Art History option may earn a minor in Studio Art but not Art History).
- A student generally follows the minor requirements associated with his or her matriculation year or newer requirements that have been established since matriculation. The time limit for following requirements from a given academic year is six years.

For additional information on requirements on minors, click here (https://adminfinance.okstate.edu/site-files/documents/policies/requirements-for-undergraduate-and-graduate-minors.pdf).

Agricultural Leadership, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p. 977)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
MATH (A) or STAT (A)		3
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
Select one of the following:		4
CHEM 1014	Chemistry In Civilization (LN) [1]	
CHEM 1314	Chemistry I (LN) [1]	
CHEM 1215	Chemical Principles I (LN) [1]	
SOIL 1113	Land, Life and the Environment (N) [1]	3
or SOIL 2124	Fundamentals of Soil Science (N)	
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1]	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		9
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course (Included in Major Requirements)		
Select at least one International Dimension (I) course (Included in Major Requirements)		
College/Departmental Requirements		
Agricultural Sciences and Natural Resources		
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
ANSI 1124	Introduction to the Animal Sciences	4
ENTO 2003	Insects and Society (N)	3
or ENTO 3003	Livestock Entomology	
Select one of the following:		3
FDSC 1133	Fundamentals of Food Science	
FDSC 2233	The Meat We Eat	
FDSC 2253	Meat Animal and Carcass Evaluation	
PLNT 1213	Introduction to Plant and Soil Systems (N)	3
or HORT 1013	Principles of Horticultural Science (LN)	
Written & Oral Communications		
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources [2]	3
or ENGL 3323	Technical Writing	
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [3]	3
or SPCH 2713	Introduction to Speech Communication (S)	
Hours Subtotal		**20**
Major Requirements		
Core Courses		
AGLE 1511	Introduction to Leadership in Agricultural Sciences and Natural Resources	1
AGLE 2303	Agricultural Leaders in Society (S)	3
AGLE 2403	Agricultural Leadership in a Multicultural Society (DS)	3
AGLE 3101	Introduction to Agricultural Leadership	1
AGLE 3303	Agricultural Leadership: Theory and Practice	3
AGLE 3403	Facilitating Social Change in Agriculture	3
AGLE 3803	Global Leadership in Agriculture (I)	3
AGLE 4101	Seminar in Leadership Education	1
AGLE 4203	Professional Development in Agriculture	3
AGLE 4300	Agricultural Leadership Internship (6 hours)	6
Select 6 hours of the following:		6
AGLE 3333	Contemporary Issues in Leadership	
AGLE 3503	Introduction to Cooperative Extension	
AGLE 4303	Facilitating Leadership Education Programs	
Additional Requirements		
Select 3 hours of upper-division AGEC		3
Select 3 hours of NREM		3
Related Courses		
To be selected from areas related to agriculture and/or agricultural leadership including any courses with prefixes in Ferguson College of Agriculture, plus EPSY, PSYC, and MGMT.		15
Hours Subtotal		**54**
Electives		
Select 6 hours or hours to complete required total for degree		6
Hours Subtotal		**6**
Total Hours		**120**

1

College & Departmental requirements that may be used to meet General Education requirements.

2

If ENGL 3323 Technical Writing is substituted for ENGL 1213 Composition II above; hours in this block are reduced by 3.

3

If used as (S) course above, then hours are reduced by three.

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Agricultural Leadership: Extension Education, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p. 977)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
MATH (A) or STAT (A)		3
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
Select one of the following:		4
CHEM 1014	Chemistry In Civilization (LN) [1]	
CHEM 1215	Chemical Principles I (LN) [1]	
CHEM 1314	Chemistry I (LN) [1]	
SOIL 1113	Land, Life and the Environment (N) [1]	3
or SOIL 2124	Fundamentals of Soil Science (N)	
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1]	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		9
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course (Included in Major Requirements)		
Select at least one International Dimension (I) course (Included in Major Requirements)		
College/Departmental Requirements		
Agricultural Sciences and Natural Resources		
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
ANSI 1124	Introduction to the Animal Sciences	4
ENTO 2003	Insects and Society (N)	3
or ENTO 3003	Livestock Entomology	
Select one of the following:		3
FDSC 1133	Fundamentals of Food Science	
FDSC 2233	The Meat We Eat	
FDSC 2253	Meat Animal and Carcass Evaluation	
PLNT 1213	Introduction to Plant and Soil Systems (N)	3
or HORT 1013	Principles of Horticultural Science (LN)	
Written & Oral Communications		
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources [2]	3
or ENGL 3323	Technical Writing	
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [3]	3
or SPCH 2713	Introduction to Speech Communication (S)	
Hours Subtotal		**20**
Major Requirements		
Core Courses		
AGLE 1511	Introduction to Leadership in Agricultural Sciences and Natural Resources	1
AGLE 2303	Agricultural Leaders in Society (S)	3
AGLE 2403	Agricultural Leadership in a Multicultural Society (DS)	3
AGLE 3101	Introduction to Agricultural Leadership	1
AGLE 3303	Agricultural Leadership: Theory and Practice	3
AGLE 3403	Facilitating Social Change in Agriculture	3
AGLE 3803	Global Leadership in Agriculture (I)	3
AGLE 4101	Seminar in Leadership Education	1
AGLE 4203	Professional Development in Agriculture	3
AGLE 4300	Agricultural Leadership Internship (6 hours)	6
Select 6 hours of the following:		6
AGLE 3333	Contemporary Issues in Leadership	
AGLE 3503	Introduction to Cooperative Extension	
AGLE 4303	Facilitating Leadership Education Programs	
Additional Requirements		
AGEC 4723	Rural Economics Development	3
EPSY 3213	Psychology of Adolescence	3
or EPSY 3413	Child and Adolescent Development	
Select 3 hours of NREM		3
NSCI 2013 & NSCI 2011	Principles of Human Nutrition (N) and Applied Principles of Human Nutrition	4
SPED 3202	Educating Exceptional Learners (D)	2
Related Courses		
To be selected from areas related to youth development, extension education, agriculture and/or agricultural leadership including any courses with prefixes in Ferguson College of Agriculture, plus EPSY, PSYC, and MGMT.		12
Hours Subtotal		**60**
Electives		

Select 0 hours or hours to complete required total for degree	0
Total Hours	**120**

1

College & Departmental requirements that may be used to meet General Education requirements.

2

If ENGL 3323 Technical Writing is substituted for ENGL 1213 Composition II above; hours in this block are reduced by 3.

3

If used as (S) course above, then hours are reduced by three.

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Agricultural Leadership: International Studies, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p. 977)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
MATH (A) or STAT (A)		3
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
Select one of the following:		4
CHEM 1014	Chemistry In Civilization (LN) [1]	
CHEM 1215	Chemical Principles I (LN) [1]	
CHEM 1314	Chemistry I (LN) [1]	
SOIL 1113	Land, Life and the Environment (N) [1]	3
or SOIL 2124	Fundamentals of Soil Science (N)	
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1]	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		9
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course (Included in Major Requirements)		
Select at least one International Dimension (I) course (Included in Major Requirements)		
College/Departmental Requirements		
Agricultural Sciences and Natural Resources		
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
ANSI 1124	Introduction to the Animal Sciences	4
ENTO 2003	Insects and Society (N)	3
or ENTO 3003	Livestock Entomology	
Select one of the following:		3
FDSC 1133	Fundamentals of Food Science	
FDSC 2233	The Meat We Eat	
FDSC 2253	Meat Animal and Carcass Evaluation	
PLNT 1213	Introduction to Plant and Soil Systems (N)	3
or HORT 1013	Principles of Horticultural Science (LN)	
Written & Oral Communications		
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources [2]	3
or ENGL 3323	Technical Writing	
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [3]	3
or SPCH 2713	Introduction to Speech Communication (S)	
Hours Subtotal		**20**
Major Requirements		
Core Courses		
AGLE 1511	Introduction to Leadership in Agricultural Sciences and Natural Resources	1
AGLE 2303	Agricultural Leaders in Society (S)	3
AGLE 2403	Agricultural Leadership in a Multicultural Society (DS)	3
AGLE 3101	Introduction to Agricultural Leadership	1
AGLE 3303	Agricultural Leadership: Theory and Practice	3
AGLE 3403	Facilitating Social Change in Agriculture	3
AGLE 3803	Global Leadership in Agriculture (I)	3
AGLE 4101	Seminar in Leadership Education	1
AGLE 4203	Professional Development in Agriculture	3
AGLE 4300	Agricultural Leadership Internship (6 hours)	6
Select 6 hours of the following:		6
AGLE 3333	Contemporary Issues in Leadership	
AGLE 3503	Introduction to Cooperative Extension	
AGLE 4303	Facilitating Leadership Education Programs	
Additional Requirements		
AGLE 4803	International Agricultural Leadership Tour (or approved international experience)	3
Select 3 hours of NREM		3
Select 3 hours of the following:		3
AGEC 4343	International Agricultural Markets and Trade (I)	
AGED 4713	International Programs in Agricultural Education and Extension (I)	
ANSI 3903	Agricultural Animals of the World (I)	
or NSCI 3543	Food and the Human Environment (IS)	
Select 9 hours from courses in the same foreign language		9
Related Courses		
To be selected from areas related to youth development, extension education, agriculture and/or agricultural leadership including any courses with prefixes in Ferguson College of Agriculture, plus EPSY, PSYC, and MGMT.		9

Hours Subtotal	**60**
Total Hours	**120**

1

College & Departmental requirements that may be used to meet General Education requirements.

2

If ENGL 3323 Technical Writing is substituted for ENGL 1213 Composition II above; hours in this block are reduced by 3.

3

If used as (S) course above, then hours are reduced by three.

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Animal and Food Sciences

Animal science focuses on the science and business of the production of beef cattle, dairy cattle, horses, poultry, sheep, goats, swine, and pet/companion animals. An animal scientist is concerned with the application of the principles of the biological, physical, and social sciences associated with domestic animal production and management. Sustainability of livestock production systems is critical to feed the world safe, high-quality protein. Thus, meat production is a critical component of animal sciences.

The food industry is one of the largest and most important industries in the United States. Food scientists are concerned with the processing, safety, quality, and marketing of food, as well as the research and development of new products or improved processes to feed the continued growing world's population.

Undergraduate students may elect to pursue a Bachelor of Science degree in the department by majoring in either animal science or food science. Internship programs providing one to six months of off-campus work experience are available in all animal science options and are part of the curriculum for food science. Participation in undergraduate organizations (Leaders of Excellence in Animal and Food Sciences, Block and Bridle, Dairy Science, Horsemen's Association, Food Science Club, Meat Science Association, Oklahoma Collegiate Cattlewomen, Oklahoma Collegiate Cattlemen, Pre-Vet Club, Swine Club), judging teams (dairy cattle, horses, livestock, meat, or meat animal evaluation) and academic programs (honors, undergraduate research scholars, and academic quadrathlon) improve social, communication, leadership and academic skills and abilities.

Animal Science

Within the Animal Science major undergraduate students elect one of four options (predefined emphasis areas) of study: 1) General Animal Science, (2) Business/ Pre-Law, 3) Pre-Veterinary/ Pre-Medical, 4) Production and Operations. In addition, students have an opportunity to concentrate their studies on one or more animal species.

Students interested in veterinary medicine may complete the pre-veterinary medicine requirements at the same time they are working toward a BS degree in Animal Science. In addition, pre-vet students gain valuable insight into the care and management of domestic animals throughout the Animal Science curriculum.

Undergraduate students follow a similar curriculum during the first two years which includes basic courses in the physical, biological, and social sciences, and a series of introductory courses in agriculture and business. Upper-class students take a basic core of advanced Animal Science courses, including anatomy and physiology, genetics, reproductive physiology, and nutrition. As seniors, students complete a series of advanced Animal Science courses designed to apply knowledge obtained in previous courses to livestock systems. Every opportunity is taken to utilize the excellent herds and flocks owned or operated by the department.

Students completing an Animal Science degree have a wide choice of challenging careers, including ownership or management of farms, ranches or feedlots; employment with state and federal agencies concerned with inspection, grading or regulation; banking and financial activities, sales and service positions with companies involved with feeds, pharmaceuticals or other animal products; biotechnology; opportunities in Agricultural Extension or teaching; and work in the processing, distributing and merchandising of dairy, poultry and meat products. In addition, students have an opportunity to pursue advanced degrees in animal science or other professional degrees, including veterinary medicine, human medicine, dentistry, pharmacy, and law.

Minor in Animal Science

As a supplement to their chosen major, Animal Science coursework required for the minor will provide students with the knowledge to be competitive and succeed in the animal agriculture industry. The requirements include ANSI 1023 and ANSI 1021 Introduction to the Animal Sciences and 18 additional hours of Animal Science courses the student can select to personalize their programs. The basic core of advanced Animal Science courses includes anatomy and physiology, genetics, reproductive physiology, and nutrition. Students can then take advanced Animal Science courses designed to apply knowledge obtained in previous courses to animal systems.

Food Science

Food Science is an applied field. A food scientist is someone who applies the basic sciences: biology, physics, chemistry, and mathematics to further their understanding of the factors that affect food quality, safety, and nutrition. Food science is applied to the selection, preservation, processing, packaging, distribution, and use of safe, nutritious, and wholesome foods.

There are four study emphasis areas within the food science major: Science, Industry, Meat Science and Food Safety.

The Science emphasis gives students a well-rounded background in chemistry, physics, mathematics, and biology as well as Food Science. Students who elect this emphasis area usually have a primary interest in science and will be prepared to enter graduate education programs in Food Science.

This Science emphasis is also an excellent choice for students interested in professional schools such as medical school, dental school, pharmacy, or physical therapy. Students who elect not to pursue a graduate degree or a professional degree are prepared to work in any facet of the food industry, especially those jobs focused on research, product development and food analysis.

The Industry emphasis provides a basic understanding of the chemical and physical processes of food processing. Students pursuing this option are prepared to enter food plant management, quality assurance, quality control, product development and sales.

The Meat Science emphasis provides a background knowledge and understanding in live animal production, slaughter and fabrication, and meat processing, along with a basic understanding of chemical and physical processes of meat production. Students pursuing this option are prepared to enter the meat industry working in quality assurance, slaughter/fabrication, meat processing, product development and sales.

The Food Safety emphasis provides knowledge and experience in food safety issues and practices affecting all sectors of the food industry from production agriculture to wholesale and retail distribution channels. Students pursuing this option are prepared to enter the food industry with expertise in food safety programs, auditing, and quality assurance.

Minor in Food Science

The minor includes the core courses in Food Science. Requirements include FDSC 1133 Fundamentals of Food Science and 17 additional

hours of Food Science courses the student can select from to personalize their programs. The core of Food Science courses includes food chemistry, food microbiology, quality control and food analysis. There are also courses in specialized areas (e.g., meat science, dairy products) for students interested those industries. Students can complete their program with advanced courses in these areas.

Undergraduate Certificates

Undergraduate students in any OSU major can participate in our Equine Enterprise Management Certificate Program. This certificate program gives students an education focused on equine while preparing them to be knowledgeable professionals in the horse industry through advanced training and hands-on learning. The program is designed to ensure students are career-ready by equipping them with the knowledge and skills necessary to enter the horse industry.

Students from any OSU major can complete our Food Safety Certificate Program. The certificate program participants receive hands-on regulatory and customer-driven food safety programs training to prepare them for careers in the food industry. Students will have the opportunity to receive six internationally recognized certificates on HACCP, FSMA, and audit programs as part of their coursework. The program is designed to provide the food industry well-trained, qualified quality assurance professionals.

Courses

ANSI 1021 Introduction to the Animal Sciences Lab
Prerequisites: Concurrent enrollment in ANSI 1023.
Description: Laboratory to accompany ANSI 1023 - species adaptability, product standards and requirements areas and types of production, processing and distribution of products, includes meat animals, dairy and poultry.
Credit hours: 1
Contact hours: Lab: 2 Contact: 2
Levels: Undergraduate
Schedule types: Lab
Department/School: Animal & Food Sciences

ANSI 1023 Introduction to the Animal Sciences
Prerequisites: Concurrent enrollment in ANSI 1021.
Description: Species adaptability, product standards and requirements areas and types of production, processing and distribution of productions, includes meat animals, dairy and poultry. Previously offered as ANSI 1124.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 1124 Introduction to the Animal Sciences
Description: Species adaptability, product standards and requirements, areas and types of production, processing and distribution of products, includes meat animals, dairy and poultry.
Credit hours: 4
Contact hours: Lecture: 3 Lab: 2 Contact: 5
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Animal & Food Sciences

ANSI 1401 Equine Behavior and Handling
Description: Equine management techniques - understanding equine behavior and anatomy. Basic equine handling, management principles, hoof care, dental care, first aid and wound care. Introduction to behavior and training of the horse, techniques of safe handling based on the principles of equine behavior.
Credit hours: 1
Contact hours: Lab: 2 Contact: 2
Levels: Undergraduate
Schedule types: Lab
Department/School: Animal & Food Sciences

ANSI 2111 Animal and Food Science Professional Development
Description: Student development through study of career goals specific to animal or food science, eventual career development through resume building, internships, and networking. Previously offered as ANSI 1111.
Credit hours: 1
Contact hours: Lecture: 1 Contact: 1
Levels: Undergraduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 2112 Live Animal Evaluation
Prerequisites: ANSI 1124.
Description: Using tools for selection including performance records, pedigree information and visual appraisal, in the evaluation of cattle, swine, sheep, horses and poultry.
Credit hours: 2
Contact hours: Lab: 4 Contact: 4
Levels: Undergraduate
Schedule types: Lab
Department/School: Animal & Food Sciences

ANSI 2123 Livestock Feeding
Description: Nutrients and their functions, nutrient requirements of the various classes of livestock; composition and classification of feed stuffs and ration formulation. Not required of animal science majors.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 2233 The Meat We Eat
Description: Overview of all animal, poultry, and fish protein sources used for human consumption, but focusing on red meat. Examination of each phase of production, inspection, safety, grading, processing, preparation, and current issues of the industries. Development of an understanding of the importance of meat in the diet and part of global agriculture. Same course as FDSC 2233.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 2253 Meat Animal and Carcass Evaluation
Description: Evaluation of carcasses and wholesale cuts of beef, pork, and lamb. Factors influencing grades, yields and values in cattle, swine and sheep. Same course as FDSC 2253.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Animal & Food Sciences

ANSI 3123 Livestock Health and Diseases
Prerequisites: ANSI 1124.
Description: Diseases of farm animals, both infectious and noninfectious, parasites, parasitic diseases, and the establishment of immunity through the use of biological products, prevention and/or treatment.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 3212 Advanced Dairy Cattle Evaluation
Description: Advanced evaluation of type traits as they relate to longevity and profitability in the dairy cow.
Credit hours: 2
Contact hours: Contact: 4 Other: 4
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Animal & Food Sciences

ANSI 3222 Advanced Equine Evaluation
Description: Advanced evaluation of halter and performance horses. Includes both Western and English disciplines.
Credit hours: 2
Contact hours: Lab: 4 Contact: 4
Levels: Undergraduate
Schedule types: Lab
Department/School: Animal & Food Sciences

ANSI 3232 Advanced Meat Evaluation
Description: Advanced evaluation of carcasses and wholesale cuts of beef, pork and lamb. Same course as FDSC 3232.
Credit hours: 2
Contact hours: Lab: 4 Contact: 4
Levels: Undergraduate
Schedule types: Lab
Department/School: Animal & Food Sciences

ANSI 3242 Advanced Livestock Evaluation
Prerequisites: ANSI 2112.
Description: Advanced evaluation of beef cattle, sheep, and swine.
Credit hours: 2
Contact hours: Lab: 4 Contact: 4
Levels: Undergraduate
Schedule types: Lab
Department/School: Animal & Food Sciences

ANSI 3252 Advanced Wool Evaluation
Description: Advanced instruction in wool grading.
Credit hours: 2
Contact hours: Lab: 4 Contact: 4
Levels: Undergraduate
Schedule types: Lab
Department/School: Animal & Food Sciences

ANSI 3310 Advanced Competitive Evaluation
Prerequisites: Consent of instructor.
Description: Advanced instruction in animal and/or product evaluation. For students competing on collegiate judging teams. Same course as FDSC 3310. Offered for fixed credit, 2 credit hours, maximum of 6 credit hours.
Credit hours: 2
Contact hours: Lab: 6 Contact: 6
Levels: Undergraduate
Schedule types: Clinical
Department/School: Animal & Food Sciences

ANSI 3312 Advanced Meat Animal Evaluation
Description: Advanced evaluation and pricing of meat animals. For students competing on the Meat Animal Evaluation Team.
Credit hours: 2
Contact hours: Contact: 4 Other: 4
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Animal & Food Sciences

ANSI 3322 Applied Meat Animal Selection
Prerequisites: ANSI 3310 and consent of instructor.
Description: Applied selection of meat animals using principles of genetics, animal breeding, and phenotypic evaluation in real world selection scenarios to predict the value of breeding and market livestock.
Credit hours: 2
Contact hours: Contact: 6 Other: 6
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Animal & Food Sciences

ANSI 3333 Meat Science
Description: Anatomical and basic chemical and physical characteristics of meat animals studied. The application of scientific principles to the processing and economical utilization of meat animals, as well as in the manufacture of meat products emphasized in the laboratory. Same course as FDSC 3333. May not be used for degree credit with ANSI 5433.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Animal & Food Sciences

ANSI 3402 Equine Training Methods
Description: Basic techniques of equine training. Performance of various maneuvers including halter breaking, saddling, longing, driving, and riding. Course previously offered as ANSI 3202.
Credit hours: 2
Contact hours: Lab: 4 Contact: 4
Levels: Undergraduate
Schedule types: Lab
Department/School: Animal & Food Sciences

ANSI 3410 Peer-Led Team Learning in Animal Science
Prerequisites: Consent of instructor.
Description: Selected undergraduate students work as peer leaders for learning teams for Animal Science courses. Development of oral and written communication skills of technical concepts in animal science. Duties include meeting regularly with discussion and laboratory sessions, participating in instructional activities and evaluating class performance. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours. Lab 1-5.
Credit hours: 1-6
Contact hours: Lecture: 1 Lab: 2-10 Contact: 3-11
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Animal & Food Sciences

ANSI 3414 Form and Function of Livestock and Poultry
Prerequisites: ANSI 1124 and BIOL 1114 or (BIOL 1113 and BIOL 1111) or consent of instructor.
Description: Form and function of livestock and poultry. Major systems (muscle, skeletal, neural, endocrine, cardiovascular, respiratory and gastrointestinal) with emphasis on comparative anatomy and integrated function related to livestock in agricultural production systems.
Credit hours: 4
Contact hours: Lecture: 3 Lab: 2 Contact: 5
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Animal & Food Sciences

ANSI 3420 Undergraduate Research in Animal and Food Science
Description: Designed for students participating in undergraduate research in Animal and Food Sciences. Students actively participate in research methodologies, including foundational research theories and protocols. Previously offered as ANSI 1223. Offered for variable credit, 1-4 credit hours, maximum of 4 credit hours.
Credit hours: 1-4
Contact hours: Contact: 1-4 Other: 1-4
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Animal & Food Sciences

ANSI 3423 Animal Genetics
Prerequisites: Undergraduate level BIOL 1114 or (BIOL 1113 and BIOL 1111), minimum grade of C.
Description: The basic principles of heredity including: kinds of gene action, random segregation, independent assortment, physical and chemical basis of heredity, mutations, sex-linkage, chromosome mapping, multiple alleles and chromosomal abnormalities. Also a brief introduction to quantitative inheritance and population genetics.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 3433 Animal Breeding
Prerequisites: ANSI 3423.
Description: The application of genetic principles to livestock improvement; study of the genetic basis of selection and systems of mating; development of breeding programs based on principles of population genetics.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Animal & Food Sciences

ANSI 3444 Animal Reproduction
Prerequisites: Introductory biology.
Description: Physiological processes of reproduction in farm animals including male and female anatomy, gonad function, endocrine relationships, fertility, and factors affecting reproduction efficiency. In the laboratory, emphasis on artificial insemination, estrous synchronization, embryo production via multiple ovulation embryo transfer (MOET) and in vitro fertilization (IVF), cryopreservation of gametes or embryos, and pregnancy determination. Previously offered as ANSI 3443.
Credit hours: 4
Contact hours: Lecture: 3 Lab: 2 Contact: 5
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Animal & Food Sciences

ANSI 3453 Canine and Feline Genetics
Prerequisites: BIOL 1114 or (BIOL 1113 and BIOL 1111) or consent of instructor.
Description: Overview of fundamental genetic principles and the control of genetic variation in coat color, various disorders and other inherited feline and canine characteristics. Inherited conditions, the underlying genetic mutation if known, genomic technologies used to identify the mutations if unknown, and development of genetic tools to assist in canine and feline genetic testing and selection programs.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 3463 Equine Genetics
Description: Basic Mendelian genetics with direct application to horses. Genetic principles and inheritance of particular equine characteristics and common genetic disorders.
Credit hours: 3
Contact hours: Contact: 3 Other: 3
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Animal & Food Sciences

ANSI 3533 Equine Management and Production
Description: Current topics and trends in the horse industry. Basic principles of equine nutrition, reproduction, marketing, exercise physiology, health care, coat-color genetics, behavior and welfare.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 3543 Principles of Animal Nutrition
Prerequisites: CHEM 1215 or equivalent.
Description: Basic principles of animal nutrition including digestion, absorption, and metabolism of the various food nutrients; characteristics of the nutrients; measure of body needs; ration formulation.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 3623 Livestock Behavior and Environmental Interactions
Prerequisites: ANSI 1124.
Description: Animal behavior and animal-environment interactions related to health, productivity, and overall well-being of food animals. Concepts to improve housing accommodations, management strategies for animals to improve animal and human well-being and to use behavior as a tool for assessing welfare and improving human-animal interactions.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 3633 Equine Sales Preparation
Description: Discussion and application of equine behavior modification and training techniques. Sale preparation, marketing techniques. Students will be responsible for completing safe and successful groundwork and riding of an OSU 2-year-old. Riding experience required.
Credit hours: 3
Contact hours: Lab: 6 Contact: 6
Levels: Undergraduate
Schedule types: Lab
Department/School: Animal & Food Sciences

ANSI 3643 Equine Breeding and Foaling
Description: Discussion and application of current management practices in horse reproduction. Breeding methods and foaling procedures, safety and biosecurity, health and nutrition, reproductive anatomy and hormones, behavior and handling.
Credit hours: 3
Contact hours: Lecture: 1 Lab: 4 Contact: 5
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Animal & Food Sciences

ANSI 3651 Applied Animal Nutrition Lab
Prerequisites: ANSI 3543 and ANSI 3653 (or concurrent enrollment in ANSI 3653).
Description: Basic nutritional calculations and ration formulation for various classes of livestock; Formulation of rations and supplements to meet specific requirements using spreadsheet based formulators.
Credit hours: 1
Contact hours: Lab: 2 Contact: 2
Levels: Undergraduate
Schedule types: Lab
Department/School: Animal & Food Sciences

ANSI 3653 Applied Animal Nutrition
Prerequisites: ANSI 3543.
Description: Composition, characteristics, and nutritive value of feeds and feed additives; feed labeling and regulation; qualitative and quantitative nutrient requirements of various classes of livestock; theory of feeding and supplementing various classes of livestock to meet specific nutrient requirements.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 3703 Animal Management Techniques
Description: Animal handling and management practices. Basic husbandry procedures for domestic animals in farm, ranch, and/or other production settings or environments. Emphasis on practical handling, restraint, health evaluation, medication and treatment practices.
Credit hours: 3
Contact hours: Lecture: 1 Lab: 4 Contact: 5
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Animal & Food Sciences

ANSI 3753 Basic Nutrition for Pets
Description: Nutrients, nutrient requirements, feeding practices, food sources, and diet management for pets and companion animals as well as exotic animals and birds.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 3903 Agricultural Animals of the World (I)
Description: The production and utilization of agricultural animals by human societies.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Animal & Food Sciences
General Education and other Course Attributes: International Dimension

ANSI 4023 Poultry Science
Prerequisites: ANSI 1124 or (ANSI 1023 and ANSI 1021) and ANSI 3543.
Description: Application of poultry physiology to the management and production of commercial broilers, layers, and turkeys using a science-based approach to evaluate industry practices, compare economic factors, and welfare standards between breeds and housing systems.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Animal Science

ANSI 4132 Welfare Assessment and Audit of Farm Animals
Prerequisites: ANSI 3623.
Description: Reliable, science-based, on-farm and slaughter welfare assessment systems for cattle, pigs and poultry as well as a methodology to convey welfare measures into understandable product information.
Credit hours: 2
Contact hours: Lecture: 2 Contact: 2
Levels: Undergraduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 4203 Rangeland and Pasture Utilization
Description: Investigation of livestock and forage interactions that impact productivity in the utilization of rangeland and improved pastures. Same course as NREM 4603. May not be used for Degree Credit with ANSI 5203.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Animal & Food Sciences

ANSI 4213 Advances in Meat Science
Prerequisites: ANSI 3333 or FDSC 3333.
Description: Development of muscle and its transformation to meat. Properties of meat and their influence on water-binding, pigment formation, texture and fiber characteristics.Same course as FDSC 4213.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 4333 Processed Meat
Prerequisites: ANSI 3033 or ANSI 3333.
Description: Meat and meat product composition. Techniques in the molding and forming of meat; sausage formulation; curing; quality control; and cost analysis. Same course as FDSC 4333. May not be used for Degree Credit with ANSI 5833.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Animal & Food Sciences

ANSI 4423 Horse Science
Prerequisites: ANSI 3423 and ANSI 3543.
Description: Current concepts and production principles related to the horse industry including nutrition, reproduction, herd health, functional anatomy and implications, social behavior, and applying principles of psychology in horse management and training.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Animal & Food Sciences

ANSI 4523 Pet and Companion Animal Management
Prerequisites: ANSI 1124.
Description: Current concepts, management principles related to pet and companion animal species and their roles in society. Discussion of the human-animal bond, service animals, kennel and cattery management, anatomy, internal and external parasites, toxins, restraint and handling, reproduction, nutrition, genetics, and breeding. Previously offered as ANSI 3523.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 4543 Dairy Cattle Science
Prerequisites: ANSI 3423 and ANSI 3543.
Description: Current concepts and production principles of the dairy cattle industry including value of milk products, milk marketing, physiology of lactation, reproduction, nutrition, mastitis, and housing. Analysis and active learning of dairy production systems using farm visits and field techniques laboratories. May not be used for Degree Credit with ANSI 5543.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Animal & Food Sciences

ANSI 4553 Sheep Science
Prerequisites: ANSI 3423 and ANSI 3543.
Description: Breeding, feeding, management, and marketing of commercial and purebred sheep. May not be used for degree credit with ANSI 5653.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Animal & Food Sciences

ANSI 4613 Beef Cow-Calf Management
Prerequisites: ANSI 3423 and ANSI 3543.
Description: Application of farm and ranch land procurement and management principles with beef cattle acquisition, breeding, nutrition, reproduction, health, life cycle management, marketing, and economic analysis of the commercial cow-calf enterprise. Same course as ANSI 4612. May not be used for Degree Credit with ANSI 5813.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Animal & Food Sciences

ANSI 4633 Stocker and Feedlot Cattle Management
Prerequisites: ANSI 3612, ANSI 3653.
Description: Application of scientific knowledge, management principles, and research advances to modern stocker and feedlot cattle operations. Same course as ANSI 4632. May not be used for Degree Credit with ANSI 5633.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Animal & Food Sciences

ANSI 4643 Swine Science
Prerequisites: ANSI 3423 and ANSI 3543.
Description: Application of genetic, physiological, microbiological, nutritional, and engineering principles to the efficient production of swine. May not be used for Degree Credit with ANSI 5643.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Animal & Food Sciences

ANSI 4703 Equine Enterprise Management
Prerequisites: ANSI 3433 and ANSI 3443 and ANSI 3653.
Description: Principles of equine enterprise management including ethical and legal issues, marketing, facility management, business structures, economic analysis and careers. May not be used for Degree Credit with ANSI 5703.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 4713 Beef Seedstock Management and Sales
Prerequisites: ANSI 3423 and ANSI 3543.
Description: Principles of beef cattle seedstock acquisition, breeding, nutrition, reproduction, health, life cycle management and economic analysis. Special emphasis on advertising, promotion, marketing and sales. Course previously offered as ANSI 4632.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Animal & Food Sciences

ANSI 4803 Animal Growth and Performance
Prerequisites: An upper-division course in animal science.
Description: Physiological and endocrine factors affecting growth and performance of domestic animals. May not be used for Degree Credit with ANSI 5803.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 4823 Animal Genomics
Prerequisites: ANSI 3423 or equivalent.
Description: Introduction to analyzing genomes of common livestock species. Understanding the theory of next generation sequencing methods, and how these are applied in the field of livestock genomics, genome resequencing, analysis of genomic variant data, annotating a genome sequence using transcriptomics and proteomics and epigenomics. An introduction to assigning function to genes and genomic regions, exposure to the principles in molecular, comparative and evolutionary genetics/genomics and the application of these principles to livestock genomics.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 4843 Applications of Biotechnology in Animal Science
Prerequisites: ANSI 3423 and BIOC 3653.
Description: Training in current biotechniques used in protein, hormone, and molecular genetic research in food and animal science. Theory and applications of the various techniques.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Animal & Food Sciences

ANSI 4863 Capstone for Animal Agriculture
Prerequisites: Senior standing.
Description: Examination of the role of animal agriculture in society and the importance of research and current issues. Oral and written reports.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Animal & Food Sciences

ANSI 4900 Special Problems
Prerequisites: Consent of instructor.
Description: A detailed study of an assigned problem by a student wishing additional information on a special topic. Offered for variable credit,1-6 credits, maximum or 6 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Animal & Food Sciences

ANSI 4910 Animal Industry Internship
Prerequisites: Consent of instructor.
Description: Full-time internship at an approved production, processing or agribusiness unit or other agency serving animal agriculture. Maximum credit requires a six-month internship in addition to a report and final examination. Graded on a pass-fail basis. May not be used for degree credit with ANSI 5910. Offered for variable credit, 1-12 credit hours, maximum of 12 credit hours.
Credit hours: 1-12
Contact hours: Contact: 1-12 Other: 1-12
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Animal & Food Sciences

ANSI 4913 Animal Waste Management
Prerequisites: SOIL 2124.
Description: Aspects of animal waste management related to animal nutrition, system design, land application, socioeconomic issues and environmental impacts. Same course as SOIL 4913, ENVR 4913. May not be used for Degree Credit with ANSI 5913.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 4973 Rangeland Resources Planning
Prerequisites: NREM 3613.
Description: Inventory or ranch resources, survey and evaluation of ranch practices, and economic analysis. Development of a comprehensive ranch management plan. Managing rangeland and ranch resources in a social context. Written and oral reports. Field trips required. Same course as NREM 4613.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 5000 Master's Research and Thesis
Prerequisites: MS degree.
Description: Independent research planned, conducted, and reported in consultation with a major professor. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Graduate
Schedule types: Independent Study
Department/School: Animal & Food Sciences

ANSI 5010 Special Problems
Description: Special problems in areas of animal science other than those covered by the individual graduate student as a part of his/her research and thesis program. Offered for variable credit, 1-3 credit hours, maximum of 6 credit hours.
Credit hours: 1-3
Contact hours: Contact: 1-3 Other: 1-3
Levels: Graduate
Schedule types: Independent Study
Department/School: Animal & Food Sciences

ANSI 5102 Ethics and Professionalism in Animal and Food Science
Description: Discussion of regulations, laws, and resources; insights on complex ethical issues, including but not limited to research misconduct, how to address, report and find resources during cases of misconduct, conflicts of interest, and authorship; communication of research and accurately and objectively to different audiences. Same course as FDSC 5102.
Credit hours: 2
Contact hours: Lecture: 2 Contact: 2
Levels: Graduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 5110 Seminar
Description: A critical review and study of the literature; written and oral reports and discussion on select subjects. Same course as ANSI 6110. Offered for 1 credit hour, maximum of 3 credit hours.
Credit hours: 1
Contact hours: Contact: 1 Other: 1
Levels: Graduate
Schedule types: Independent Study
Department/School: Animal & Food Sciences

ANSI 5113 Basic Reproductive Physiology
Prerequisites: ANSI 3443 or equivalent.
Description: Female and male reproductive processes, endocrine control of reproductive functions, and the application of reproductive physiology to animal production.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 5123 Functional and Molecular Endocrinology
Prerequisites: An upper division physiology course.
Description: Endocrine regulation of growth, stress, metabolism, and reproduction in domestic farm animals including commercial applications. Focus on the influence of hormones at the systemic and cellular level.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 5203 Rangeland and Pasture Utilization
Prerequisites: NREM 3613.
Description: Investigation of livestock and forage interactions that impact productivity in the utilization of rangeland and improved pastures. May not be used for Degree Credit with ANSI 4203.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Animal & Food Sciences

ANSI 5213 Advances in Meat Science
Prerequisites: ANSI 3333 or FDSC 3333.
Description: Development of muscle and its transformation to meat. Properties of meat and their influence on water-binding, pigment formation, texture and fiber characteristics. Same course as FDSC 5213.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 5303 Advanced Animal Breeding
Prerequisites: ANSI 3433 or equivalent and STAT 4013.
Description: Basic concepts of population genetics as related to theoretical animal breeding, including heritability, genetic correlations, selection methods, inbreeding and heterosis.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 5313 Marker Assisted Selection in Livestock
Prerequisites: ANSI 3433 or equivalent and STAT 4013.
Description: Use of molecular genetics information to capture variation of quantitative traits in farm animals and to enhance selection improvement programs. Discussion of current DNA based technologies, such as detecting, locating and measuring effects of quantitative trait loci (QTL), genetic markers, gene mapping methods and whole genome selection. Examination of emerging genomics technologies.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 5333 Carcass Value Estimation Systems
Prerequisites: Graduate classification.
Description: Analysis of scientific literature regarding carcass composition, quality and palatability. Overview of technology used to evaluate carcass quality factors. Same course as FDSC 5333.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 5423 Animal Stress and Environmental Physiology
Description: Interrelationship between the stress axis and other biological systems that can impact health and well-being of animals. General concepts of stress physiology, brain mechanisms, cellular pathways, and intercommunication of physiology, behavior, immunology, growth and development, reproduction/lactation, health, and disease.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 5433 Meat Science
Description: Anatomical and basic chemical and physical characteristics of meat animals studied. The application of scientific principles to the processing and economical utilization of meat animals, as well as in the manufacture of meat products emphasized in the laboratory. Mya not be used for degree credit with ANSI 3333 and FDSC 3333.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Animal & Food Sciences

ANSI 5543 Dairy Cattle Science
Prerequisites: ANSI 3433, ANSI 3443 and ANSI 3653.
Description: Current concepts and production principles of the dairy cattle industry including value of milk products, milk marketing, physiology of lactation, reproduction, nutrition, mastitis, and housing. Analysis and active learning of dairy production systems using farm visits and field techniques laboratories. May not be used for degree credit with ANSI 4543.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 3 Contact: 5
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Animal & Food Sciences

ANSI 5553 Interpreting Animal and Food Science Research
Prerequisites: STAT 5013 or concurrent enrollment.
Description: Critical evaluation and knowledgeable communication on the design, analyses, and reporting of animal science and food science research. Same course as FDSC 5553.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 5573 Techniques in Animal Molecular Biology
Prerequisites: BIOC 4113.
Description: Principles of major basic animal molecular biology techniques in gene cloning and expression. Hands-on experience with basic molecular biology techniques, including DNA cloning and quantitative measurement of mRNA and protein expression in eukaryotic cells.
Credit hours: 3
Contact hours: Lecture: 1 Lab: 4 Contact: 5
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Animal & Food Sciences

ANSI 5613 Advanced Beef Production
Description: Beef cattle breeding, nutrition, reproduction, health and disease prevention, life cycle management of the calf crop, as well as marketing alternatives for the producer. Farm and Ranch acquisition, management, including the stocker and/or feedlot phase.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 5623 Livestock Behavior and Environmental Interaction
Description: Integrated approach to animal behavior and animal-environment interactions as it relates to health, productivity, and overall well-being to food animals. Concepts related to practical ways to improve housing accommodations, management strategies for animals that improve animal and human well-being use of behavior to assess the adaptability of animals in their environments. ANSI 5623 was used to denote Exp Methods Animal Res prior to Fall 1995. May not be used for degree credit with ANSI 3623.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 5633 Stocker and Feedlot Cattle Management
Prerequisites: ANSI 3653.
Description: Application of scientific knowledge, management principles, and research advances to modern stocker and feedlot cattle operations. May not be used for degree credit with ANSI 4633.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Animal & Food Sciences

ANSI 5643 Swine Science
Prerequisites: ANSI 3423 and ANSI 3543.
Description: Application of genetic, physiological, microbiological, nutritional, and engineering principles to the efficient production of swine. May not be used for degree credit with ANSI 4643.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Animal & Food Sciences

ANSI 5653 Sheep Science
Prerequisites: ANSI 3423 and ANSI 3543.
Description: Breeding, feeding, management, and marketing of commercial and purebred sheep. May not be used for degree credit with ANSI 4553.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Animal & Food Sciences

ANSI 5703 Equine Enterprise Management
Prerequisites: ANSI 3433 and ANSI 3443 and ANSI 3653.
Description: Principles of equine enterprise management including ethical and legal issues, marketing, facility management, business structures, economic analysis and careers. May not be used for degree credit with ANSI 4703.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 5733 Advanced Ruminant Nutrition
Prerequisites: ANSI 3653.
Description: Factors influencing nutrient requirements of ruminants for maintenance, growth, reproduction and lactation, and their implications with regard to husbandry practices and nutritional management of livestock. Application of current concepts of ruminant livestock nutrition; use of microcomputer programs in diet evaluation and formulation, beef gain simulation and problem solving.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 5743 Rumenology
Prerequisites: ANSI 3653 or equivalent.
Description: Physiology of development of the ruminant digestive tract; the nature of, and factors controlling digestion and absorption from the tract to include the relative nature and roles of the rumen bacteria and protozoa. Same course as ANSI 5743.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 5753 Animal Nutrition Techniques and Laboratory Methods
Prerequisites: CHEM 3015 or equivalent.
Description: Collection, handling, and processing of biological materials. Record keeping, pipetting, preparation of reagents, and conducting routine nutritional analysis. Theory of operation of major laboratory equipment. Application of current techniques to problem solving in animal nutrition research.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Animal & Food Sciences

ANSI 5763 Advanced Nonruminant Nutrition
Prerequisites: BIOC 3653.
Description: An in-depth study of the digestion, absorption, and metabolism of nutrients in nonruminant domesticated farm animals. Unique metabolic characteristics of nonruminant species contrasted with ruminant animals. Fundamentals of energetics as related to animal performance. Same course as ANSI 5762.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 5773 Protein Nutrition
Prerequisites: BIOC 3653.
Description: Nutritional, biochemical and clinical aspects of protein metabolism as it relates to nutritional status. Same course as ANSI 5772.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 5783 Vitamin and Mineral Nutrition
Prerequisites: BIOC 5753.
Description: Development of the concept of dietary essential minerals and vitamins. Individual minerals and vitamins discussed for animal species from the standpoint of chemical form, availability, requirements, biochemical systems, deficiencies and excesses and estimation in foods and feed. Same course as ANSI 5782.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 5803 Animal Growth and Performance
Prerequisites: An upper-division course in animal science.
Description: Physiological and endocrine factors affecting growth and performance of domestic animals. May not be used for degree credit with ANSI 4803.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 5813 Beef Cow-Calf Management
Prerequisites: ANSI 3423 and ANSI 3543.
Description: Application of farm and ranch land procurement and management principles with beef cattle acquisition, breeding, nutrition, reproduction, health, life cycle management, marketing, and economic analysis of the commercial cow-calf enterprise. May not be used for Degree Credit with ANSI 4613.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Animal & Food Sciences

ANSI 5823 Animal Genomics
Prerequisites: ANSI 3423 or equivalent.
Description: Introduction to analyzing genomes of common livestock species. Understanding the theory of next generation sequencing methods, and how these are applied in the field of livestock genomics, genome resequencing, analysis of genomic variant data, annotating a genome sequence using transcriptomics and proteomics and epigenomics. An introduction to assigning function to genes and genomic regions, exposure to the principles in molecular, comparative and evolutionary genetics/genomics and the application of these principles to livestock genomics. Same course as ANSI 4823.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 5833 Processed Meat
Prerequisites: ANSI 3033 or ANSI 3333.
Description: Meat and meat product composition. Techniques in the molding and forming of meat; sausage formulation; curing; quality control; and cost analysis. May not be used for degree credit with ANSI 4333.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Animal & Food Sciences

ANSI 5910 Animal Industry Internship
Prerequisites: Consent of instructor.
Description: Full-time internship at an approved production, processing or agribusiness unit or other agency serving animal agriculture. Maximum credit requires a six-month internship in addition to a report and final examination. Graded on a pass-fail basis. May not be used for degree credit with ANSI 4910. Offered for variable credit, 1-12 credit hours, maximum of 12 credit hours.
Credit hours: 1-12
Contact hours: Contact: 1-12 Other: 1-12
Levels: Graduate
Schedule types: Independent Study
Department/School: Animal & Food Sciences

ANSI 5913 Animal Waste Management
Prerequisites: SOIL 2124.
Description: Aspects of animal waste management related to animal nutrition, system design, land application, socioeconomic issues and environmental impacts. May not be used for degree credit with ANSI 4913.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Animal & Food Sciences

ANSI 6000 Doctoral Research and Dissertation
Prerequisites: MS degree.
Description: Independent research planned, conducted and reported in consultation with, and under the direction of, a major professor. Open only to students continuing beyond the level of the MS degree. Offered for variable credit, 1-10 credit hours, maximum of 30 credit hours.
Credit hours: 1-10
Contact hours: Contact: 1-10 Other: 1-10
Levels: Graduate
Schedule types: Independent Study
Department/School: Animal & Food Sciences

ANSI 6010 Special Topics in Animal Breeding
Prerequisites: Consent of instructor.
Description: Advanced topics and new developments in animal breeding and population genetics. Offered for variable credit, 1-3 credit hours, maximum of 3 credit hours.
Credit hours: 1-3
Contact hours: Contact: 1-3 Other: 1-3
Levels: Graduate
Schedule types: Independent Study
Department/School: Animal & Food Sciences

ANSI 6110 Seminar
Description: A critical analysis of the objectives and methods of research in the area of animal science. Review of the literature, written and oral reports and discussion on select topics. Same course as ANSI 5110. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Graduate
Schedule types: Independent Study
Department/School: Animal & Food Sciences

Undergraduate Programs

- Animal Science: Business/Pre-Law, BSAG (p. 2499)
- Animal Science: General Option, BSAG (p. 2501)
- Animal Science: Pre-Veterinary/Pre-Medical, BSAG (p. 2503)
- Animal Science: Production and Operations, BSAG (p. 2505)
- Food Science, BSAG (p. 2510)

Graduate Programs

The Department of Animal and Food Sciences offers programs leading to the Doctor of Philosophy and Master of Science degrees in Animal Science and contributes to the interdepartmental Food Science graduate program. Research areas of emphasis are available in breeding (quantitative and molecular genetics), behavior, nutrition, grazing, management, immunology, reproduction, physiology, biotechnology, and meat science.

Prerequisites

Admission to the Animal Science graduate program requires an undergraduate major in Animal Science or a related field (such as Dairy Science, Poultry Science, Biology, Biochemistry, etc.). In addition, students with a major in Dairy Manufacturing, Microbiology, Human Nutrition, Food Science or Food Technology can qualify for the Food Science program. To be admitted, prospective students must have an agreement from an Animal and Food Sciences faculty member to serve as their graduate advisor. In all cases, the student's graduate advisor or committee may identify specific undergraduate deficiencies and require measures to attain proficiency.

Certificates

- Equine Enterprise Management, UCRT (p. 2507)
- Food Safety, UCRT (p. 2508)

Minors

- Animal Science (ANSI), Minor (p. 2498)
- Food Science (FDSC), Minor (p. 2509)

Faculty

Richard Coffey, PhD—Professor and Head
Professors: Paul Beck, PhD; Udaya DeSilva, PhD; Gerald Q. Fitch, PhD; Mark Z. Johnson, PhD; David L. Lalman, PhD; Gretchen Mafi, PhD; Peter Muriana, PhD; Ranjith Ramanathan, PhD; Ryan Reuter, PhD; Guolong Zhang, PhD
Associate Professors: Scott Carter, PhD; Steven Cooper, PhD; Ravi Jadeja, PhD; Darren Hagen, PhD; Kris Hiney, PhD; Janeen Salak-Johnson, PhD; Adele Pezeschki, PhD; Dan Stein, PhD; Blake Wilson, PhD
Assistant Professors: Andrew Foote, PhD; Mellissa Crosswhite, PhD; Parker Henley, PhD; Khursheed Iqbal, PhD; João Moraes, PhD; Morgan Pfeiffer, PhD
Teaching Instructors: Meaghan Meyer, PhD; Jason White, MS
Senior Extension Specialist: Barry Whitworth, PhD, DVM
Assistant Extension Specialist: Justin Crosswhite, MS

Animal Science (ANSI), Minor

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Total Hours: 22

Code	Title	Hours
Minor Requirements		
ANSI 1124	Introduction to the Animal Sciences	4
Select 18 hours of the following: [1]		18
ANSI 2253	Meat Animal and Carcass Evaluation	
ANSI 3333	Meat Science	
ANSI 3423	Animal Genetics	
ANSI 3433	Animal Breeding	
ANSI 3444	Animal Reproduction	
ANSI 3543	Principles of Animal Nutrition	
ANSI 3623	Livestock Behavior and Environmental Interactions	
ANSI 3653	Applied Animal Nutrition	
ANSI 3753	Basic Nutrition for Pets	
ANSI 4023	Poultry Science	
ANSI 4203	Rangeland and Pasture Utilization	
ANSI 4333	Processed Meat	
ANSI 4423	Horse Science	
ANSI 4543	Dairy Cattle Science	
ANSI 4553	Sheep Science	
ANSI 4613	Beef Cow-Calf Management	
ANSI 4633	Stocker and Feedlot Cattle Management	
ANSI 4643	Swine Science	
ANSI 4703	Equine Enterprise Management	
ANSI 4803	Animal Growth and Performance	
ANSI 4863	Capstone for Animal Agriculture	
Total Hours		**22**

1

At least 3 of these credits must be from 4000-level courses.

Other Requirements

- A grade-point average of 2.0 for courses that count for the minor.

Additional OSU Requirements

Undergraduate Minors

- An undergraduate minor must include between fifteen and thirty hours, inclusive of undergraduate coursework.
- A minimum of six credit hours for the minor must be earned in residence at OSU.
- The courses required for a minor may be included in the course requirements for any undergraduate degree or they may be in addition to degree requirements, depending on the overlap between the minor and degree requirements. However, an undergraduate minor must be earned in an academic field other than the student's declared degree option. The minor may not duplicate the degree major or option (for example, a student who earns a BA in Art with an Art History option may earn a minor in Studio Art but not Art History).
- A student generally follows the minor requirements associated with his or her matriculation year or newer requirements that have been established since matriculation. The time limit for following requirements from a given academic year is six years.

For additional information on requirements on minors, click here (https://adminfinance.okstate.edu/site-files/documents/policies/requirements-for-undergraduate-and-graduate-minors.pdf).

Animal Science: Business/Pre-Law, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p.)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
MATH 1513	College Algebra (A) [1]	3
or MATH 1483	Mathematical Functions and Their Uses (A)	
Select one of the following:		3
STAT 2013	Elementary Statistics (A) [1]	
STAT 2023	Elementary Statistics for Business and Economics (A) [1]	
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
Select four hours from the following:		4
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN) [1, 5]	
BIOL 1114	Introductory Biology (LN) [1, 5]	
Any course designated (N)		3
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1, 5]	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		6
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
UNIV 1111	First Year Seminar (or other approved first year seminar course) [5]	1
Select one of the following courses: [5]		3
HORT 1013	Principles of Horticultural Science (LN) [5]	
PLNT 1213	Introduction to Plant and Soil Systems (N) [5]	
SOIL 1113	Land, Life and the Environment (N) [5]	
Select four hours from the following:		4
ANSI 1023 & ANSI 1021	Introduction to the Animal Sciences and Introduction to the Animal Sciences Lab [5]	
ANSI 1124	Introduction to the Animal Sciences [5]	
ANSI 2111	Animal and Food Science Professional Development [5]	1
ANSI 2253	Meat Animal and Carcass Evaluation [5]	3
or ANSI 2233	The Meat We Eat	
CHEM 1215	Chemical Principles I (LN) [2]	4
or CHEM 1314	Chemistry I (LN)	
Written and Oral Communications		
Select of the following: [5]		3
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources [5]	
ENGL 3323	Technical Writing [3]	
BCOM 3113	Written Communication	
Select one of the following: [4, 5]		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [5]	
SPCH 2713	Introduction to Speech Communication (S) [4]	
SPCH 3733	Elements of Persuasion (S) [4]	
ANSI 3423	Animal Genetics [5]	3
ANSI 3433	Animal Breeding [5]	3
ANSI 3444	Animal Reproduction	4
ANSI 3543	Principles of Animal Nutrition [5]	3
ANSI 3653	Applied Animal Nutrition [5]	3
Hours Subtotal		**38**
Major Requirements		
Core Courses		
ANSI 4863	Capstone for Animal Agriculture	3
Select 6 hours of the following:		6
ANSI 3123	Livestock Health and Diseases	
ANSI 3333	Meat Science	
ANSI 3414	Form and Function of Livestock and Poultry	
ANSI 3533	Equine Management and Production	
ANSI 3623	Livestock Behavior and Environmental Interactions	
ANSI 3753	Basic Nutrition for Pets	
Select 9 hours from the following:		9
ANSI 4023	Poultry Science	
ANSI 4203	Rangeland and Pasture Utilization	
ANSI 4423	Horse Science	
ANSI 4523	Pet and Companion Animal Management	
ANSI 4543	Dairy Cattle Science	

ANSI 4553	Sheep Science	
ANSI 4613	Beef Cow-Calf Management	
ANSI 4633	Stocker and Feedlot Cattle Management	
ANSI 4643	Swine Science	
ANSI 4703	Equine Enterprise Management	
ANSI 4713	Beef Seedstock Management and Sales	
ANSI 4803	Animal Growth and Performance	
Select 3 hours of the following:		3
ANSI 3310	Advanced Competitive Evaluation	
ANSI 3312	Advanced Meat Animal Evaluation	
ANSI 3322	Applied Meat Animal Selection	
ANSI 3410	Peer-Led Team Learning in Animal Science	
ANSI 3420	Undergraduate Research in Animal and Food Science	
ANSI 4910	Animal Industry Internship	
AG 3080	International Experience	
Select one of the following Emphasis areas:		18
Business Emphasis		
ACCT 2103	Financial Accounting	
or ACCT 2003	Survey of Accounting	
Select 15 upper-division hours of AGEC, ECON, EEE, FIN, MKTG, MGMT		
Pre-Law Emphasis		
ACCT 2103	Financial Accounting	
or ACCT 2003	Survey of Accounting	
AGEC 3703	Issues in Agricultural Policy	
AGEC 3713	Agricultural Law	
or POLS 4363	Environmental Law And Policy	
Select 9 upper-division hours of AGEC, ECON, EEE, FIN, MKTG, MGMT, POLS.		
Related Courses		
Select 3 hours from any upper-division courses from Ferguson College of Agriculture		3
Hours Subtotal		**42**
Electives		
Select 0 hours or hours to complete required total for degree		0
Total Hours		**120**

1

College and Departmental requirements that may be used to meet General Education requirements.

2

If used for (N) requirement, hours in this block are reduced by CHEM course hours and related courses increased.

3

If ENGL 3323 is substituted for ENGL 1213 above, hours in this block are reduced by 3.

4

If used as (S) course above, hours in this block reduced by 3.

5

Hours meeting the major common core.

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Animal Science: General Option, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p.)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
MATH 1513	College Algebra (A) [1]	3
or MATH 1483	Mathematical Functions and Their Uses (A)	
STAT 2013	Elementary Statistics (A) [1]	3
or STAT 2023	Elementary Statistics for Business and Economics (A)	
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
Select four hours from the following:		4
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN) [1, 5]	
BIOL 1114	Introductory Biology (LN)	
Any course designated (N)		3
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1, 5]	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		6
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
Agricultural Sciences and Natural Resources		
UNIV 1111	First Year Seminar (or other approved first year seminar course) [5]	1
Select one of the following: [5]		3
HORT 1013	Principles of Horticultural Science (LN) [5]	
PLNT 1213	Introduction to Plant and Soil Systems (N) [5]	
SOIL 1113	Land, Life and the Environment (N) [5]	
SOIL 2124	Fundamentals of Soil Science (N) [5]	
Select four hours from the following:		4
ANSI 1023 & ANSI 1021	Introduction to the Animal Sciences and Introduction to the Animal Sciences Lab [5]	
ANSI 1124	Introduction to the Animal Sciences [5]	
ANSI 2233	The Meat We Eat [5]	3
or ANSI 2253	Meat Animal and Carcass Evaluation	
ANSI 2111	Animal and Food Science Professional Development [5]	1
CHEM 1215	Chemical Principles I (LN) [2]	4
or CHEM 1314	Chemistry I (LN)	
Written and Oral Communications		
Select one of the following: [3, 5]		3
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources [5]	
BCOM 3113	Written Communication [5]	
ENGL 3323	Technical Writing [3]	
Select one of the following: [4,5]		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [5]	
SPCH 2713	Introduction to Speech Communication (S) [5]	
SPCH 3733	Elements of Persuasion (S) [5]	
ANSI 3423	Animal Genetics [5]	3
ANSI 3433	Animal Breeding [5]	3
ANSI 3444	Animal Reproduction [5]	4
ANSI 3543	Principles of Animal Nutrition [5]	3
ANSI 3653	Applied Animal Nutrition [5]	3
Hours Subtotal		**38**
Major Requirements		
Core Courses		
ANSI 2112	Live Animal Evaluation	2
ANSI 4863	Capstone for Animal Agriculture	3
Select 3 hours from the following:		3
ANSI 3310	Advanced Competitive Evaluation	
or ANSI 3312	Advanced Meat Animal Evaluation	
or ANSI 3322	Applied Meat Animal Selection	
or ANSI 3410	Peer-Led Team Learning in Animal Science	
or ANSI 3420	Undergraduate Research in Animal and Food Science	
or ANSI 4910	Animal Industry Internship	
AG 3080	International Experience	
Select 6 hours from the following:		6
ANSI 3123	Livestock Health and Diseases	
ANSI 3333	Meat Science	

ANSI 3414	Form and Function of Livestock and Poultry	
ANSI 3533	Equine Management and Production	
ANSI 3623	Livestock Behavior and Environmental Interactions	
ANSI 3753	Basic Nutrition for Pets	
Select 6 hours from the following:		6
ANSI 4023	Poultry Science	
ANSI 4203	Rangeland and Pasture Utilization	
ANSI 4423	Horse Science	
ANSI 4523	Pet and Companion Animal Management	
ANSI 4543	Dairy Cattle Science	
ANSI 4553	Sheep Science	
ANSI 4613	Beef Cow-Calf Management	
ANSI 4633	Stocker and Feedlot Cattle Management	
ANSI 4643	Swine Science	
ANSI 4703	Equine Enterprise Management	
ANSI 4713	Beef Seedstock Management and Sales	
ANSI 4803	Animal Growth and Performance	
Additional Core Courses		
Select 9 upper-division hours of AGCM, AGEC, AGED		9
Related Courses		
Select 13 hours from any courses in ANSI or from Ferguson College of Agriculture.		13
Hours Subtotal		**42**
Electives		
Select 0 hours or hours to complete required total for degree		0
Total Hours		**120**

1

College and Departmental requirements that may be used to meet General Education requirements.

2

If used for (N) requirement, hours in this block are reduced by CHEM course hours and related courses increased.

3

If ENGL 3323 is substituted for ENGL 1213 above, hours in this block are reduced by 3.

4

If used as (S) course above, hours in this block reduced by 3.

5

Hours meeting the major common core.

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Animal Science: Pre-Veterinary/Pre-Medical, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p.)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Quantitative Thought & Logical Reasoning (Q)		
MATH 1513	College Algebra (A) [1]	3
Select one of the following:		3
STAT 2013	Elementary Statistics (A) [1]	
STAT 2023	Elementary Statistics for Business and Economics (A) [1]	
Understanding Humanities-Human Heritages & Cultures (H)		
Courses designated (H)		6
Reasoning in the Natural Sciences (N)		
Must include one Laboratory-Based Inquiry (L) course		
Select four hours from the following:		4
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN) [1, 5]	
BIOL 1114	Introductory Biology (LN) [1, 5]	
CHEM 1314	Chemistry I (LN) [1]	4
CHEM 1515	Chemistry II (LN) [1]	5
Exploring Society & Human Behavior (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1, 5]	3
Additional General Education		
Additional general education credit hours may be required to meet the total 40-hour minimum of general education credit if courses carry more than one general education designation and can be used to meet multiple general education designation hour requirements above.		
Courses designated (Q), (H), (N), (S), (D), (G), or (F).		0
Hours Subtotal		**40**

College/Departmental Requirements		
Agricultural Sciences and Natural Resources		
UNIV 1111	First Year Seminar (or other approved first year seminar course) [5]	1
Select one of the following:		3
HORT 1013	Principles of Horticultural Science (LN) [5]	
PLNT 1213	Introduction to Plant and Soil Systems (N) [5]	
SOIL 1113	Land, Life and the Environment (N) [5]	
Select four hours from the following:		4
ANSI 1023 & ANSI 1021	Introduction to the Animal Sciences and Introduction to the Animal Sciences Lab [5]	
ANSI 1124	Introduction to the Animal Sciences [5]	
ANSI 2111	Animal and Food Science Professional Development [5]	1
ANSI 2233	The Meat We Eat [5]	3
or ANSI 2253	Meat Animal and Carcass Evaluation	
Written and Oral Communications		
Select one of the following: [5]		3
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources	
ENGL 3323	Technical Writing [3]	
BCOM 3113	Written Communication	
Select one of the following: [4, 5]		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [5]	
SPCH 2713	Introduction to Speech Communication (S) [5]	
SPCH 3733	Elements of Persuasion (S) [5]	
ANSI 3423	Animal Genetics [5]	3
ANSI 3433	Animal Breeding [5]	3
ANSI 3444	Animal Reproduction [5]	4
ANSI 3543	Principles of Animal Nutrition [5]	3
ANSI 3653	Applied Animal Nutrition [5]	3
Hours Subtotal		**34**
Major Requirements		
Core Courses		
ANSI 3414	Form and Function of Livestock and Poultry	4
MICR 2123 & MICR 2132	Introduction to Microbiology and Introduction to Microbiology Laboratory	5
PHYS 1114	College Physics I (LN)	4
PHYS 1214	College Physics II (LN)	4
BIOC 3653	Survey of Biochemistry	3
CHEM 3012	Survey of Organic Chemistry Laboratory	2
CHEM 3013	Survey of Organic Chemistry	3
Related Courses		
Select Alternative 1 or 2: (p. 2504)		21
Hours Subtotal		**46**
Electives		

Select 0 hours or hours to complete required total for degree	0
Total Hours	**120**

1

College and Departmental requirements that may be used to meet General Education requirements.

2

If used for (N) requirement, hours in this block are reduced by CHEM course hours and related courses increased.

3

If ENGL 3323 is substituted for ENGL 1213 above, hours in this block are reduced by 3.

4

If used as (S) course above, hours in this block reduced by 3.

5

Hours meeting the major common core.

Alternatives

Alternative 1

First 2 Semesters in the College of Veterinary Medicine or College of Medicine (21 hours).

Alternative 2

Code	Title	Hours
ANSI 4863	Capstone for Animal Agriculture	3
Select 6 hours from the following:		6
ANSI 4023	Poultry Science	
ANSI 4203	Rangeland and Pasture Utilization	
ANSI 4423	Horse Science	
ANSI 4523	Pet and Companion Animal Management	
ANSI 4543	Dairy Cattle Science	
ANSI 4553	Sheep Science	
ANSI 4613	Beef Cow-Calf Management	
ANSI 4633	Stocker and Feedlot Cattle Management	
ANSI 4643	Swine Science	
ANSI 4703	Equine Enterprise Management	
ANSI 4713	Beef Seedstock Management and Sales	
ANSI 4803	Animal Growth and Performance	
ANSI 4843	Applications of Biotechnology in Animal Science	
Select 3 hours from the following courses:		3
ANSI 3310	Advanced Competitive Evaluation	
ANSI 3312	Advanced Meat Animal Evaluation	
ANSI 3322	Applied Meat Animal Selection	
ANSI 3410	Peer-Led Team Learning in Animal Science	
ANSI 3420	Undergraduate Research in Animal and Food Science	
ANSI 4910	Animal Industry Internship	
AG 3080	International Experience	
Select 9 hours from any ANSI, BIOL, CHEM, MICR courses or Ferguson College of Agriculture		9

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Animal Science: Production and Operations, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p.)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
MATH 1513	College Algebra (A) [1]	3
or MATH 1483	Mathematical Functions and Their Uses (A)	
Select one of the following:		3
STAT 2013	Elementary Statistics (A) [1]	
STAT 2023	Elementary Statistics for Business and Economics (A) [1]	
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
Select four hours from the following:		4
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN) [1]	
BIOL 1114	Introductory Biology (LN)	
Any course designated (N)		3
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1]	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		6
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
Agricultural Sciences and Natural Resources		
UNIV 1111	First Year Seminar (or other approved first year seminar course) [5]	1
Select one of the following: [5]		3
HORT 1013	Principles of Horticultural Science (LN) [5]	
PLNT 1213	Introduction to Plant and Soil Systems (N) [5]	
SOIL 1113	Land, Life and the Environment (N) [5]	
SOIL 2124	Fundamentals of Soil Science (N) [5]	
Select four hours from the following:		4
ANSI 1023 & ANSI 1021	Introduction to the Animal Sciences and Introduction to the Animal Sciences Lab [5]	
ANSI 1124	Introduction to the Animal Sciences [5]	
ANSI 2111	Animal and Food Science Professional Development [5]	1
ANSI 2253	Meat Animal and Carcass Evaluation [5]	3
or ANSI 2233	The Meat We Eat	
CHEM 1215	Chemical Principles I (LN) [2]	4
or CHEM 1314	Chemistry I (LN)	
Written and Oral Communications		
Select 3 hours of the following courses:		3
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources [5]	
ENGL 3323	Technical Writing [3]	
BCOM 3113	Written Communication [5]	
Select one of the following: [4]		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [5]	
SPCH 2713	Introduction to Speech Communication (S) [5]	
SPCH 3733	Elements of Persuasion (S) [5]	
ANSI 3423	Animal Genetics [5]	3
ANSI 3433	Animal Breeding [5]	3
ANSI 3444	Animal Reproduction [5]	4
ANSI 3543	Principles of Animal Nutrition [5]	3
ANSI 3653	Applied Animal Nutrition [5]	3
Hours Subtotal		**38**
Major Requirements		
Core Courses		
ANSI 2112	Live Animal Evaluation	2
ANSI 3414	Form and Function of Livestock and Poultry	4
ANSI 3651	Applied Animal Nutrition Lab	1
ANSI 4863	Capstone for Animal Agriculture	3
Select 6 hours from the following:		6
ANSI 3123	Livestock Health and Diseases	
ANSI 3333	Meat Science	
ANSI 3533	Equine Management and Production	
ANSI 3623	Livestock Behavior and Environmental Interactions	
ANSI 3753	Basic Nutrition for Pets	
Select 9 hours from the following:		9
ANSI 4023	Poultry Science	
ANSI 4203	Rangeland and Pasture Utilization	

ANSI 4423	Horse Science	
ANSI 4523	Pet and Companion Animal Management	
ANSI 4543	Dairy Cattle Science	
ANSI 4553	Sheep Science	
ANSI 4613	Beef Cow-Calf Management	
ANSI 4633	Stocker and Feedlot Cattle Management	
ANSI 4643	Swine Science	
ANSI 4703	Equine Enterprise Management	
ANSI 4713	Beef Seedstock Management and Sales	
ANSI 4803	Animal Growth and Performance	
Additional Core Courses		
Select 3 hours from the following:		3
ANSI 3310	Advanced Competitive Evaluation	
ANSI 3312	Advanced Meat Animal Evaluation	
ANSI 3322	Applied Meat Animal Selection	
ANSI 3410	Peer-Led Team Learning in Animal Science	
ANSI 3420	Undergraduate Research in Animal and Food Science	
ANSI 4910	Animal Industry Internship	
AG 3080	International Experience	
ENTO 3003	Livestock Entomology	3
SOIL 2124	Fundamentals of Soil Science (N)	4
Related Courses		
Selected 7 hours from any ANSI course or from Ferguson College of Agriculture		7
Hours Subtotal		**42**
Electives		
Select 0 hours or hours to complete required total for degree		0
Total Hours		**120**

1

College and Departmental requirements that may be used to meet General Education requirements.

2

If used for (N) requirement, hours in this block are reduced by CHEM course hours and related courses increased.

3

If ENGL 3323 is substituted for ENGL 1213 above, hours in this block are reduced by 3.

4

If used as (S) course above, hours in this block reduced by 3.

5

Hours meeting the major common core.

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Equine Enterprise Management, UCRT

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Total Hours: 17

Code	Title	Hours
ACCT 2003	Survey of Accounting	3
ANSI 4423	Horse Science	3
ANSI 4703	Equine Enterprise Management	3
Select one AGEC course from the following:		3
AGEC 3323	Agricultural Product Marketing and Sales	
AGEC 3423	Farm and Agribusiness Management	
AGEC 3713	Agricultural Law	
Select five credit hours from the following:		5
ANSI 1401	Equine Behavior and Handling	
ANSI 3222	Advanced Equine Evaluation	
ANSI 3310	Advanced Competitive Evaluation	
ANSI 3402	Equine Training Methods	
ANSI 3533	Equine Management and Production	
ANSI 3633	Equine Sales Preparation	
ANSI 3643	Equine Breeding and Foaling	
ANSI 4900	Special Problems	
ANSI 4910	Animal Industry Internship [1]	
Total Hours		**17**

1

Equine-Oriented

For additional information on this program, please contact Dr. Steven Cooper, Department of Animal Science, 201j Animal Science Building, 405-744-9291.

Food Safety, UCRT

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Total Hours: 18

Code	Title	Hours
Required Courses		
FDSC 3123	HACCP in the Food Industry	3
FDSC 3154	Food Microbiology	4
Guided Electives		
Select 11 hours from the following:		11
FDSC 1133	Fundamentals of Food Science	
FDSC 3133	Plant Sanitation for Food Processing Operations	
FDSC 4113	Internal Audit and Advanced HACCP	
FDSC 4143	Food Safety Modernization Act	
FDSC 4153	Advanced Food Microbiology	
FDSC 4233	Food Safety Audit Schemes	
FDSC 4253	Pre-Harvest Food Safety	
FDSC 4910	Food Industry Internship	
Total Hours		**18**

Academic Requirements:

- Student must maintain a grade-point-average of 2.0 over all courses applicable to this certificate.

Food Science (FDSC), Minor

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Total Hours: 20

Code	Title	Hours
Minor Requirements		
FDSC 1133	Fundamentals of Food Science	3
Select 17 credits of the following:		17
ANSI 3543	Principles of Animal Nutrition	
or NSCI 4123	Human Nutrition and Metabolism I	
AST 4123	Principles of Food Engineering	
FDSC 2233	The Meat We Eat	
FDSC 2253	Meat Animal and Carcass Evaluation	
FDSC 3113	Quality Control	
FDSC 3123	HACCP in the Food Industry	
FDSC 3133	Plant Sanitation for Food Processing Operations	
FDSC 3154	Food Microbiology	
FDSC 3232	Advanced Meat Evaluation	
FDSC 3310	Advanced Competitive Evaluation	
FDSC 3333	Meat Science	
FDSC 3373	Food Chemistry I	
FDSC 3603	Processing Dairy Foods	
FDSC 4113	Internal Audit and Advanced HACCP	
FDSC 4253	Pre-Harvest Food Safety	
FDSC 4333	Processed Meat	
FDSC 4763	Analysis of Food Products	
FDSC 4910	Food Industry Internship [1]	
Total Hours		**20**

1

Credits in FDSC 3310 Advanced Competitive Evaluation and FDSC 4910 Food Industry Internship may be used for this minor only if they involve activities approved by the Food Science Advisor in advance.

Other Requirements

- A grade-point average of 2.0 for courses that count for the minor.

Additional OSU Requirements

Undergraduate Minors

- An undergraduate minor must include between fifteen and thirty hours, inclusive of undergraduate coursework.
- A minimum of six credit hours for the minor must be earned in residence at OSU.
- The courses required for a minor may be included in the course requirements for any undergraduate degree or they may be in addition to degree requirements, depending on the overlap between the minor and degree requirements. However, an undergraduate minor must be earned in an academic field other than the student's declared degree option. The minor may not duplicate the degree major or option (for example, a student who earns a BA in Art with an Art History option may earn a minor in Studio Art but not Art History).
- A student generally follows the minor requirements associated with his or her matriculation year or newer requirements that have been established since matriculation. The time limit for following requirements from a given academic year is six years.

For additional information on requirements on minors, click here (https://adminfinance.okstate.edu/site-files/documents/policies/requirements-for-undergraduate-and-graduate-minors.pdf).

Food Science, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p.)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
MATH 1513	College Algebra (A) [1]	3
or MATH 1483	Mathematical Functions and Their Uses (A)	
STAT 2013	Elementary Statistics (A) [1]	3
or STAT 2023	Elementary Statistics for Business and Economics (A)	
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
Select four hours from the following:		4
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN) [1]	
BIOL 1114	Introductory Biology (LN) [1]	
Any course designated (N)		3
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1]	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		6
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
ANSI 2111	Animal and Food Science Professional Development	1
ANSI 2233	The Meat We Eat	3
or ANSI 2253	Meat Animal and Carcass Evaluation	
FDSC 1133	Fundamentals of Food Science	3
CHEM 1215	Chemical Principles I (LN) [2]	4
or CHEM 1314	Chemistry I (LN)	
Select one of the following:		3
ENVR 1113	Elements of Environmental Science (N)	
HORT 1013	Principles of Horticultural Science (LN)	
BIOC 2344	Chemistry and Applications of Biomolecules	
PLNT 1213	Introduction to Plant and Soil Systems (N)	
Written and Oral Communications		
Select one of the following:		3
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources	
ENGL 3323	Technical Writing [3]	
BCOM 3113	Written Communication	
Select one of the following: [4]		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S)	
SPCH 2713	Introduction to Speech Communication (S)	
Hours Subtotal		**21**
Major Requirements		
Core Courses		
ANSI 4863	Capstone for Animal Agriculture	3
FDSC 3123	HACCP in the Food Industry	3
FDSC 3154	Food Microbiology	4
FDSC 3373	Food Chemistry I	3
FDSC 4143	Food Safety Modernization Act	3
FDSC 4763	Analysis of Food Products	3
Additional Core		
CHEM 1225	Chemical Principles II (LN)	5
or CHEM 1515	Chemistry II (LN)	
MICR 2123 & MICR 2132	Introduction to Microbiology and Introduction to Microbiology Laboratory	5
NSCI 3543	Food and the Human Environment (IS)	3
or ANSI 3543	Principles of Animal Nutrition	
Select one of the following Emphasis areas:		21
Safety Emphasis		
FDSC 3133	Plant Sanitation for Food Processing Operations	
FDSC 4113	Internal Audit and Advanced HACCP	
FDSC 4153	Advanced Food Microbiology	
AGEC 3713	Agricultural Law	
9 hours of 4000 level FDSC		
Meats Emphasis		
ANSI 1124	Introduction to the Animal Sciences	
ANSI 3232	Advanced Meat Evaluation	
ANSI 3333	Meat Science	
FDSC 4333	Processed Meat	
9 hours of 4000 level FDSC		
Industry Emphasis		

9 hours of 3000 level FDSC		
12 hours of 4000 level FDSC		
Science Emphasis		
FDSC 4113	Internal Audit and Advanced HACCP	
PHYS 1014	Descriptive Physics (N)	
CHEM 3013	Survey of Organic Chemistry	
CHEM 3012	Survey of Organic Chemistry Laboratory	
BIOC 3653	Survey of Biochemistry	
3 hours of 3000 level FDSC		
3 hours of 4000 level FDSC		
Related Courses		
Select 6 hours from any courses from Ferguson College of Agriculture, Spears School of Business, MMJ or SC		6
Hours Subtotal		**59**
Electives		
Select 0 hours or hours to complete required total for degree		0
Total Hours		**120**

1

College & Departmental requirements that may be used to meet GE requirements.

2

If used for (N) requirement, hours in this block are reduced by CHEM course hours.

3

If ENGL 3323 Technical Writing is substituted for ENGL 1213 Composition II above; hours in this block are reduced by 3.

4

If used as (S) course above, hours in this block reduced by 3.

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Biochemistry and Molecular Biology

Biochemistry, the central scientific discipline linking the chemical, physical and biological sciences, exerts a profound influence on the progress of medicine and agriculture. By applying concepts and methods of chemistry and physics to the fundamental problems of biology, biochemists have made great progress in their effort to understand the chemistry of living organisms. Major discoveries concerning the biochemistry of genetic material provide the tools of molecular biology that are essential to contemporary life sciences research.

Biochemists and molecular biologists are concerned with living things and thus must be fluent in the concepts of biological sciences. Since a biochemist's tools include many techniques derived from the physical sciences, they must receive sound education in mathematics, physics and chemistry. Our academic programs are designed to integrate these disciplines, preparing students for a wide range of professional careers.

Challenging positions for well-trained biochemists and molecular biologists are available in colleges and universities, state and federal laboratories, research institutes, medical centers and in an increasing number of industrial organizations, particularly in the pharmaceutical and food industries. Biochemists are involved with research on the chemistry of processes occurring in plants, animals and various microorganisms, and with the discovery and development of antibiotics, vitamins, hormones, enzymes, insecticides and molecular genetics techniques.

The Department of Biochemistry and Molecular Biology administers two BS degree options in Biochemistry and Molecular Biology through the College of Agricultural Sciences and Natural Resources. In 2023, the two BS degree options administered through the College of Agricultural Sciences and Natural Resources became accredited by the American Society of Biochemistry and Molecular Biology. This provides students taking these degree options an opportunity to take the American Society of Biochemistry and Molecular Biology certification exam. An honors program is also available in undergraduate degree plans. Also available is a 4+1 Year Masters by Coursework program. The undergraduate curriculum provides a broad background in chemistry and the biological sciences and permits flexibility to meet particular interests of the student. Courses in biochemistry are based on general, organic and analytical chemistry. The undergraduate curriculum also provides students with sufficient background in the basic sciences of mathematics, physics, chemistry and biology needed for graduate study in most disciplines of contemporary science of agriculture or medicine and other allied health subjects, and is excellent for pre-professional students. The Department's research activities provide opportunities for part-time employment of undergraduate majors to improve their professional competence.

Minor in Biochemistry and Molecular Biology

This minor is designed to give students a firm background in the fundamentals of Biochemistry and Molecular Biology and to develop critical thinking skills for the interpretation of new findings in these disciplines. Students will gain primary knowledge in modern biochemistry through two lecture courses (BIOC 3713 (http://catalog.okstate.edu/search/?P=BIOC%203713) Biochemistry I and BIOC 3813 (http://catalog.okstate.edu/search/?P=BIOC%203813) Biochemistry II). Hands-on training with experimental tools of these disciplines will be emphasized during the Biochemistry and Molecular Biology laboratory course (BIOC 3723 (http://catalog.okstate.edu/search/?P=BIOC%203723) Biochemistry and Molecular Biology Laboratory). The knowledge gained by this minor gives a science educator, a laboratory technician, an industrial employee or a life sciences researcher the ability to apply these disciplines. This minor will also demonstrate competency in these disciplines to post-graduate health institutions.

Courses

BIOC 1113 Drugs, Medications and Human Well-Being (N)
Description: Influence of medications and illegal drugs on our health. Explores the medications used to treat cancers, diabetes, microbial infections, heart and mental diseases. Abused drugs, such as alcohol, caffeine, opiods and cannabis and their effects are also covered. Course is designed for non-majors.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology
General Education and other Course Attributes: Natural Sciences

BIOC 1990 Freshman Research in Biochemistry and Molecular Biology
Description: An introduction to biochemical research through guided work on a relevant experimental problem. Offered for variable credit, 1-2 credits, max 2.
Credit hours: 1
Contact hours: Lab: 2 Contact: 2
Levels: Undergraduate
Schedule types: Lab
Department/School: Biochem & Molecular Biology

BIOC 2101 The Experiments Behind the Facts of Real Science
Prerequisites: BIOL 1114 or (BIOL 1113 and BIOL 1111) and CHEM 1515.
Description: Introduction to research though the study of primary research papers.
Credit hours: 1
Contact hours: Lecture: 1 Contact: 1
Levels: Undergraduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 2202 Medicine and Molecules
Description: Examination of specific diseases at all scales, from the biology of the causal agent to global impacts. The molecular biology of the agent, interactions with the human body, and the etiology, epidemiology, history and current state of the disease, ethical considerations, and prospects and cures.
Credit hours: 2
Contact hours: Lecture: 2 Contact: 2
Levels: Undergraduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 2344 Chemistry and Applications of Biomolecules
Prerequisites: CHEM 1225 or CHEM 1515.
Description: A descriptive survey of organic functional groups and biomolecules. Mode of formation and function of these molecules in microorganisms, plants and animals as they relate to biotechnology, environmental sciences and health related issues. A terminal course for students in applied biological science education. Not recommended for pre-professional students or students planning graduate study in biological sciences.
Credit hours: 4
Contact hours: Lecture: 3 Contact: 4 Other: 1
Levels: Undergraduate
Schedule types: Discussion, Combined lecture & discussion, Lecture
Department/School: Biochem & Molecular Biology

BIOC 2352 Fundamental Biochemistry
Prerequisites: BIOC 1114 and CHEM 1515.
Description: Connect knowledge of organic chemistry to biochemistry to better understand and appreciate the chemical principles in forming bimolecular structures and functions.
Credit hours: 2
Contact hours: Lecture: 2 Contact: 2
Levels: Undergraduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 3003 Hypothesis-Driven Undergraduate Research
Prerequisites: Consent of instructor.
Description: Directed research projects with faculty members in biochemistry and molecular biology. Identify a research question, develop a hypothesis, experimental approach, perform the experiments, and summarize their results in oral and written forms.
Credit hours: 3
Contact hours: Lab: 6 Contact: 6
Levels: Undergraduate
Schedule types: Lab
Department/School: Biochem & Molecular Biology

BIOC 3153 Synthetic Biology
Prerequisites: BIOL 1114 or (BIOL 1113 and BIOL 1111) and (CHEM 3013 or CHEM 3053).
Description: Engineering of living systems at the molecular, cellular, and organismal levels: Origin of cellular life; reading and writing DNA; enzyme evolution; metabolic engineering. Applications to current and future biotechnologies in agriculture and medicine: Food and drug synthesis; biofuels; vaccines. This course is designed for both majors and non-majors of biochemistry and molecular.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 3223 Physical Chemistry for Biologists
Prerequisites: CHEM 1515, (MATH 2123 or MATH 2144), and (PHYS 1114 or PHYS 2014) or consent of instructor.
Description: Classical and statistical thermodynamics with applications to pure systems, solutions and electrochemistry; transport; chemical and enzyme kinetics, quantum chemistry of structure and chemical bond; and spectroscopy all with emphasis on biological applications. Previously offered as BIOC 4224 and BIOC 3224.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 3523 Biochemistry of Disease at the Cellular Level
Prerequisites: BIOC 3653 or BIOC 3713 and MICR 3033 and BIOL 3023 or ANSI 3423 or PLNT 3554 or consent of instructor.
Description: The biochemistry of fundamental processes in normal and disease states of eukaryotic cells. Explores the cell and molecular, and biochemical mechanisms of intracellular protein trafficking, cytoskeleton, cell adhesion, mitosis, cell cycle, cytokinesis, cellular stress responses, and apoptosis and in a variety of diseases including cancers, progeria (premature aging), Alzheimer's, Amyotrophic lateral sclerosis (ALS), high cholesterol, and diabetes. May not be used for Degree Credit with BIOC 5523. Previously offered as BIOC 4523.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 3653 Survey of Biochemistry
Prerequisites: CHEM 3013 or CHEM 3053.
Description: An introduction to the chemistry of living systems. Chemical properties of the constituents of living organisms. Modes of formation, reactions and function of these compounds in microorganisms, plants and animals. Intended for non-majors.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 3713 Biochemistry I
Prerequisites: CHEM 3053.
Description: Biochemistry of nucleic acids, proteins, amino acids, carbohydrates, and lipids with an emphasis on the kinetics, thermodynamics, catalytic and regulatory strategies of biochemical reactions and bioenergetics. Designed for biochemistry majors.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 3723 Biochemistry and Molecular Biology Laboratory
Prerequisites: BIOC 3653 or BIOC 3713 or concurrent enrollment.
Description: Integrated lecture-laboratory course on fundamental theories and techniques in biochemical, forensic, and clinical research. Hands-on experience in mass spectrometry, DNA analysis, metabolic assays, kinetic assays, and protein purification. Previously offered as BIOC 3720.
Credit hours: 3
Contact hours: Lecture: 1 Lab: 6 Contact: 7
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Biochem & Molecular Biology

BIOC 3813 Biochemistry II
Prerequisites: BIOC 3713.
Description: Continuation of Biochemistry I with focus on metabolic pathways, cycles, and control mechanisms. This course will cover bioenergetics and metabolism of carbohydrates, lipids, amino acids and nucleotides. Designed for biochemistry majors.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 4013 Biotechnology Development and Implementation
Prerequisites: BIOC 3653 or BIOC 3713 or consent of instructor.
Description: An overview of emerging biotechnology in medicine and agriculture including gene therapy, immunotherapy, antibody-drug conjugates, and genome-editing technologies. Also includes an introduction to the global biotechnology industry, idea generation, intellectual property protection, finance, and regulation and policies within the industry. May not be used for degree credit with BIOC 5013.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 4023 Molecular Biology and Stress Response of Plants
Prerequisites: MICR 2123 and (BIOC 3713 or BIOC 3653 or PLNT 3554).
Description: Topics cover the cutting-edge research areas including second messengers, phytohormones, signal transduction, microbiome, plant-microbe interactions, plant responses to climate change with focus on plant molecular biology and plant responses to biotic and abiotic stresses and their application in solving agricultural problems.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 4113 Molecular Biology
Prerequisites: BIOC 3653 or BIOC 3713 and BIOL 3023 or ANSI 3423 or PLNT 3554.
Description: Applications of biochemistry, molecular biology and genetic engineering with emphasis on protein structure and function, regulation of cell function, metabolism and disease processes. May not be used for Degree Credit with BIOC 5113.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 4213 Disease and Metabolism
Prerequisites: BIOC 3653 or BIOC 3713.
Description: Introduction to the causes, preventions and treatments for human diseases including obesity, diabetes, atherosclerosis, cancer and aging. Emphasis on the pathogenesis and the cross-talks between metabolic pathways at system level. May not be used for degree credit with BIOC 5213.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 4313 Cancer Immunology and Immunotherapy
Prerequisites: BIOC 3713 or BIOC 3653 or consent of instructor
Description: Interaction between cancers and the immune system and current immune based biotechnology tools for treatments. Basic immunology and cancer biology, interactions between the immune system and cancers and current immunological therapies in cancers. Functioning of the immune system, genesis and development of cancers, and links between these two systems.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 4413 Plant and Soil Microbiomes Can Help Feed the World
Prerequisites: (BIOC 3653 or BIOC 3713) and BIOL 3023 or consent of instructor
Description: Introduction and profiling of plant and soil microbiomes; identifying microbes with agronomic traits that improve crop productivity and support food production; nutrient cycling; and bioremediation.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 4723 Introduction to Bioinformatics
Prerequisites: BIOL 1114 or (BIOL 1113 and BIOL 1111) and MATH 1513.
Description: Providing an introduction to programming for those intending to work with large biological datasets. This course covers the basics of Shell programming, scripting languages and examples of using software and packages. May not be used for Degree Credit with BIOC 5723.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 4883 Senior Seminar in Biochemistry
Prerequisites: BIOC 3813 or concurrent enrollment or consent of instructor and senior standing.
Description: A senior capstone course for the development of scientific verbal and written communications and assessment of cumulative abilities. Focus is on problem solving, group discussion, primary literature review, oral presentation, and writing.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 4990 Undergraduate Research
Description: Training in independent work, study of relevant literature and experimental investigation of an assigned problem. Offered for variable credit, 1-6 credit hours, maximum of 10 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Biochem & Molecular Biology

BIOC 5000 Research
Description: For MS thesis. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Graduate
Schedule types: Independent Study
Department/School: Biochem & Molecular Biology

BIOC 5002 Research Compliance and Biochemistry Graduate Colloquium
Prerequisites: Graduate standing.
Description: Introduction to graduate research. Policies for laboratory safety, research compliance, and ethical conduct of scientific research are presented.
Credit hours: 2
Contact hours: Lecture: 2 Contact: 2
Levels: Graduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 5013 Biotechnology Development and Implementation
Prerequisites: (BIOC 3653 or BIOC 3713) and BIOL 3023 or consent of instructor.
Description: An overview of emerging biotechnology in medicine and agriculture including gene therapy, immunotherapy, antibody-drug conjugates, and genome-editing technologies. Also includes an introduction to the global biotechnology industry, idea generation, intellectual property protection, finance, and regulation and policies within this industry. May not be used for degree credit with BIOC 4013.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 5102 Molecular Genetics
Prerequisites: BIOC 3653 or MICR 3033 and one course in genetics or consent of instructor.
Description: An introduction to molecular genetics on the graduate level. Same course as GENE 5102.
Credit hours: 2
Contact hours: Lecture: 2 Contact: 2
Levels: Graduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 5112 Articulation of Research Logic
Prerequisites: BIOC 5753 or equivalent or permission of instructor.
Description: Techniques for effective communication of scientific reasoning, logic, and critical thinking. Explanation of rationale, hypotheses, and experimental design. Public presentations as logical arguments. The course focuses on biomolecular systems.
Credit hours: 2
Contact hours: Lecture: 2 Contact: 2
Levels: Graduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 5113 Molecular Biology
Prerequisites: BIOC 3653 or BIOC 3713 and BIOL 3023 or ANSI 3423 or PLNT 3554.
Description: Applications of biochemistry, molecular biology and genetic engineering with emphasis on protein structure and function, regulation of cell function, metabolism and disease processes. May not be used for degree credit with BIOC 4113.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 5120 Biochemistry and Molecular Biology Graduate Research Colloquium
Prerequisites: Graduate standing.
Description: Students will provide presentations to demonstrate their mastery of research literature, new research results, explanations for research roadblocks, and their ability to synthesize new knowledge and draw conclusions. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Lecture: 1-6 Contact: 1-6
Levels: Graduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 5213 Disease and Metabolism
Prerequisites: Graduate standing.
Description: Introduction to the causes, preventions and treatments for human diseases including obesity, diabetes, atherosclerosis, cancer and aging. Emphasis on the pathogenesis and the cross-talks between metabolic pathways at system level. May not be used for degree credit with BIOC 4213.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 5313 Cancer Immunology and Immunotherapy
Prerequisites: BIOC 3713 or BIOC 3653 or consent of instructor
Description: Interaction between cancers and the immune system and current immune based biotechnology tools for treatments. Basic immunology and cancer biology, interactions between the immune system and cancers and current immunological therapies in cancers. Functioning of the immune system, genesis and development of cancers, and links between these two systems.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 5523 Biochemistry of the Cell
Prerequisites: BIOC 3653 or BIOC 3713 and MICR 3033 and BIOL 3023 or ANSI 3423 or PLNT 3554 or consent of instructor.
Description: The biochemistry of fundamental processes in normal and disease states of eukaryotic cells. Primary literature based experimental approaches to the mechanisms of intracellular protein trafficking, cytoskeleton, cell adhesion, mitosis, cell cycle, cytokinesis, and apoptosis. May not be used for degree credit with BIOC 4523.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 5553 Agricultural Biochemistry
Prerequisites: CHEM 3153 or equivalent.
Description: Organism function at the biochemical level and how this relates to the more complex biological systems of plants and animals.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 5723 Introduction to Bioinformatics
Prerequisites: BIOL 1114 or (BIOL 1113 and BIOL 1111) and MATH 1513.
Description: Providing an introduction to programming for those intending to work with large biological datasets. This course covers the basics of Shell programming, scripting languages and examples of using software and packages. May not be used for degree credit with BIOC 4723.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 5753 Biochemical Principles
Prerequisites: CHEM 3153 or equivalent.
Description: Chemistry of cellular constituents; introduction to the chemical processes in living systems. The first in a series of courses for graduate students in biochemistry and related fields.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 5824 Biochemical Laboratory Methods
Prerequisites: BIOC 4113 or BIOC 5753.
Description: Lecture and laboratory course in basic biochemistry and molecular biology methods for separation and analysis of biological materials, including chromatography, electrophoresis, centrifugation, use of radioisotopes, molecular cloning and DNA sequencing.
Credit hours: 4
Contact hours: Lab: 8 Contact: 8
Levels: Graduate
Schedule types: Lab
Department/School: Biochem & Molecular Biology
Additional Fees: Biochem Consummable Mat fee of $50 applies.

BIOC 5853 Molecular and Integrative Metabolism
Prerequisites: BIOC 5753 or BIOC 4113.
Description: Reaction sequences and cycles in the enzymatic transformations of fats, proteins and carbohydrates; energy transfer, biosynthesis and integration in the metabolic pathways.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 5930 Advanced Biochemical Techniques
Prerequisites: BIOC 5753, BIOC 5824 or concurrent registration, and consent of instructor.
Description: Lecture and laboratory course in advanced research techniques, designed to supplement BIOC 5824. In subsequent semesters, individual research problems pursued in laboratories of department faculty for six weeks and one credit hour each. Offered for variable credit, 1-4 credit hours, maximum of 10 credit hours.
Credit hours: 1-4
Contact hours: Contact: 1-4 Other: 1-4
Levels: Graduate
Schedule types: Independent Study
Department/School: Biochem & Molecular Biology

BIOC 6000 Research
Description: For PhD dissertation. Offered for variable credit, 1-15 credit hours, maximum of 60 credit hours.
Credit hours: 1-15
Contact hours: Contact: 1-15 Other: 1-15
Levels: Graduate
Schedule types: Independent Study
Department/School: Biochem & Molecular Biology

BIOC 6110 Seminar
Description: Maximum 2 for PhD or 1 for MS candidates. Offered for variable credit, 1-2 credit hours, maximum of 2 credit hours.
Credit hours: 1-2
Contact hours: Contact: 1-2 Other: 1-2
Levels: Graduate
Schedule types: Independent Study
Department/School: Biochem & Molecular Biology

BIOC 6663 Molecular Plant-Microbe Interactions
Prerequisites: PLP 3343 and BIOC 3653.
Description: Focused on the biochemistry, molecular biology and molecular genetics of pathogenic and symbiotic interactions between microbes and plants to explain the mechanisms by which microbe's infection and activation of plant immunity and symbiosis signaling pathways. Same course as PLP 5723.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 6723 Signal Transduction
Description: Classical signal transduction mechanisms including MAP kinase signaling cascades, Protein kinase A, Protein kinase C pathways, JAK/STAT pathways, calcium signaling, the cell cycle, programmed cell death, and cell signaling in cancer. Strong focus on the primary literature and experimental strategies used in modern cell biology.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 6733 Functional Genomics
Prerequisites: BIOC 3653 or BIOC 3713 and BIOC 3813 or BIOC 5753 or consent of instructor.
Description: Principles and techniques of genomics technologies and their applications in basic science and applied animal and plant research. Genome sequencing, variation detection, transcriptomics, proteomics, metabolomics, metagenomics, systems biology, forward and reverse genetics.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 6740 Physical Biochemistry
Prerequisites: One semester each of biochemistry, calculus and physical chemistry.
Description: Two independent modules dealing with applications of physical chemistry and math to biological phenomena: 1) numerical analyses and selected spectroscopic methods, and 2) thermodynamics and transport properties. Modules may be taken together as two credits or individually for one credit. Offered for variable credit, 1-2 credit hours, maximum of 2 credit hours.
Credit hours: 1-2
Contact hours: Contact: 1-2 Other: 1-2
Levels: Graduate
Schedule types: Independent Study
Department/School: Biochem & Molecular Biology

BIOC 6753 Epigenetics
Prerequisites: BIOC 5102 or BIOC 5753 or consent of instructor.
Description: Principles underlying heritable changes in gene expression caused by mechanisms other than changes in the DNA sequence. The roles of chromatin structure, DNA and histone modification, and small RNAs in plant and animal development and disease. Applications of epigenetic-based therapeutics and the use of RNA interference in plants and animals.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 6763 Nucleic Acids and Protein Synthesis
Prerequisites: BIOC 4113 or BIOC 5753.
Description: Structure and biological function of nucleic acid containing structures with emphasis on recombinant DNA methodologies, information content, nucleic acid-protein interaction, regulation and rearrangement.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 6773 Protein Structure and Enzyme Function
Prerequisites: BIOC 4113 or BIOC 5753.
Description: Theory of and methods for studying the physical and chemical basis of protein structure and function; and the enzyme catalysis, including kinetics, chemical modification and model studies. Examples from current literature.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 6783 Biomembranes and Bioenergetics
Prerequisites: BIOC 5853 or consent of instructor.
Description: Components, organization and biosynthesis of plasma, mitochondrial and photosynthetic membranes, emphasizing structure-function relationships. Mechanism of metabolites, protons and electrons transport. Energy conservation in bioenergetic apparatus such as mitochondria, chloroplasts or bacterial chromatophores.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 6793 Plant Biochemistry
Prerequisites: BIOC 4113 or BIOC 5753.
Description: Biochemistry of processes and structures of special importance to plants, such as photosynthesis, cell walls, nitrogen fixation, secondary metabolites and storage proteins. Previously offered as BIOC 6792.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

BIOC 6820 Selected Topics in Biochemistry
Prerequisites: BIOC 5853.
Description: Recent developments in biochemistry. Subject matter varies from semester to semester; students should inquire at the department office before enrolling. Same course as ITOX 6820. Offered for variable credit, 1-3 credit hours, maximum of 15 credit hours.
Credit hours: 1-3
Contact hours: Contact: 1-3 Other: 1-3
Levels: Graduate
Schedule types: Independent Study
Department/School: Biochem & Molecular Biology

BIOC 6823 Quantitative Methods in Omics
Prerequisites: BIOC 1114 and MATH 1513.
Description: Statistical, computational and algorithmic components applied in genomics technologies including theories in quantitative genetics in QTL mapping and Genome-wide Association studies (GWAS), differential analysis based on read-count information and multi-dimensional module/network analysis, graph theories, hidden Markov Models and deep learning.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Biochem & Molecular Biology

Undergraduate Programs

- Biochemistry and Molecular Biology, BSAG (p. 2521)
- Biochemistry and Molecular Biology: Biotechnology, BSAG (p. 2523)
- Biochemistry and Molecular Biology: Pre-Medical or Pre-Veterinary Science, BSAG (p. 2525)

Graduate Programs

Many career opportunities in biochemistry require advanced coursework, and so part of the Department of Biochemistry and Molecular Biology's curriculum is focused on its graduate program leading to the MS or PhD degree. This graduate program is also an integral part of the extensive basic research activities supported by the Oklahoma Agricultural Experiment Station.

Prerequisites

Students with a Bachelor's degree in Biochemistry, Molecular Biology and Chemistry or with strong backgrounds in other biological or physical science disciplines are eligible to apply to the graduate programs in Biochemistry and Molecular Biology. Individuals should have at least two semesters of organic chemistry and one semester of biochemistry, molecular biology, calculus, analytical and physical chemistry. Students may be required to take appropriate undergraduate courses if major deficiencies are identified.

Degree Requirements

A more detailed description of the graduate study program in Biochemistry and Molecular Biology is available on the Department's website: https://agriculture.okstate.edu/departments-programs/biochemistry/graduate-program/. The requirements listed below complement the general graduate requirements described in the "Graduate College" section of the Catalog. All Biochemistry and Molecular Biology graduate students are expected to attend and participate in the Department's Graduate Student Association Journal Club and the Department's Seminar Series throughout the academic year.

The Master of Science Degree

Twenty-four (24) credit hours of formal graduate courses are required, including:

Code	Title	Hours
BIOC 5002	Research Compliance and Biochemistry Graduate Colloquium	2
BIOC 5753	Biochemical Principles	3
BIOC 5112	Articulation of Research Logic	2
BIOC 5120	Biochemistry and Molecular Biology Graduate Research Colloquium	1
BIOC 5853	Molecular and Integrative Metabolism	3
BIOC 5930	Advanced Biochemical Techniques	1-4

In addition, a student must present an acceptable research thesis (six hours of BIOC 5000 (http://catalog.okstate.edu/search/?P=BIOC%205000) Research) and pass a final oral examination covering their thesis work and related material. Research advisors are selected at the end of the student's first semester.

A non-thesis Master of Science degree is also available. It does not require a research thesis, but requires a report and extensive technical training in the laboratory. The non-thesis MS plan requires thirty (30) credit hours of coursework and two (2) hours of research. The non-thesis MS is not recommended for students wishing to pursue a PhD.

A formal "Plan of Study" with the credit hours of graduate coursework and research listed above must be approved by the student's advisory committee and submitted to the OSU Graduate College before completing 17 credit hours of graduate study.

The Doctor of Philosophy Degree. The PhD program course requirements are determined with the assistance and approval of the student's advisory committee and are based on whether a BS or MS has previously been earned:

1. a minimum total of (60) graduate credits are required if a student enters the PhD program having earned an MS in a related discipline, with a minimum of 15 credit hours of coursework and a minimum of 15 credit hours of research being required.
2. a minimum total of ninety (90) graduate credits are required if a student enters the PhD program having earned not higher than a BS in a related discipline, with a minimum of 30 credit hours of coursework and 15 credit hours of research being required.

A formal "Plan of Study" with the credit hours of graduate coursework and research listed above must be approved by the student's advisory committee and submitted to the OSU Graduate College before completing 28 credit hours of graduate study.

The student's advisory committee is selected at the end of the student's second semester. All graduate students must maintain a B-average in their graduate coursework. A grade of C in a single graduate course can place the student on academic probation.

The Department offers research experience in a variety of areas. Formal PhD program graduate coursework includes all of the courses listed for the MS degree, at least four of the advanced graduate courses in biochemistry (6000-level) including BIOC 6740 (http://

catalog.okstate.edu/search/?P=BIOC%206740) Physical Biochemistry, and additional courses and lab experience appropriate to the student's interests. Each student will take a series of preliminary examinations in their third semester. January if admitted in the fall; or May, if admitted in the Spring.

Each student also presents and defends their research thesis proposal sometime in their 4th-5th semester, and at the end of their program presents their research and defends their dissertation in a final oral examination. The doctoral dissertation must contain a substantial original contribution to the discipline of biochemistry and molecular biology.

Bioinformatics Graduate Certificate Program

The Department of Biochemistry and Molecular Biology also offers the Bioinformatics Graduate Certificate Program—a multi-disciplinary program that involves faculty in Departments across the University. This Program's mission is to train post-baccalaureate students in the techniques required to generate, analyze and interpret complex biologically-derived data sets. The Graduate Certificate in Bioinformatics requires completion of 16 credit hours of coursework eligible for graduate credit. A minimum of 12 credit hours must be at the 5000-level or above. Required courses include 9 credit hours from the core areas of life sciences, statistics and computer sciences. Additional information on this Certificate Program is available online: http://www.bioinformatics.okstate.edu/.

Review Process for Admission

The Department's Graduate Studies Committee reviews all eligible applications for the graduate program in Biochemistry and Molecular Biology. To be eligible for committee review, each applicant must submit an application for admission to the Graduate College, along with transcripts of all academic records, and TOEFL scores if their undergraduate education was in a language other than English. Applicants must submit to the Department three reference letters, a current resume and a statement of purpose.

Minors

- Biochemistry (BIOC), Minor (p. 2520)

Faculty

John E. Gustafson, PhD—Professor and Head
Regents Professor: Robert L. Matts, PhD
Professors: Randy D. Allen, PhD; Patricia Canaan, PhD; Junpeng Deng, PhD; Kiran Mysore, PhD; Ramanjulu Sunkar, PhD
Associate Professors: Charles Chen, PhD; Donald Ruhl, PhD; Kevin Wilson, PhD
Assistant Professors: Yong Cheng, PhD; Kelly Craven, PhD; Feng Feng, PhD; Xia Lei, PhD; Ashley Mattison, PhD
Research Associate Professor: Steve Hartson, PhD
Research Assistant Professors: Naichong Chen, PhD; Kashif Mahmood, PhD; Poonam Sharma, PhD; Xuejuan Tan, PhD
Instructor: Judy A. Hall, MS
Adjunct Faculty: Robert L. Burnap, PhD; Kitty Cardwell, PhD; Richard A. Dixon, PhD; Udaya DeSilva, PhD; Darren Hagen, PhD; Haobo Jiang, PhD; Veronique A. Lacombe, PhD; Jerry R. Malayer, PhD; Kenneth L. McNally, PhD; Smita Mohanty, PhD; Rolf A. Prade, PhD; Carey Pope, PhD; Kay Scheets, PhD; William Schneider, PhD; Lloyd Sumner, PhD; Million Tadege, PhD; Guolong (Glenn) Zhang, PhD
Professors Emeriti: Andrew Mort, PhD**;** Chang-An Yu, PhD; Margaret Essenberg, PhD; Richard Essenberg, PhD; Ulrich Melcher, PhD; Sharon Ford, PhD; Robert Gholson, PhD; Peter Hoyt, PhD

Biochemistry (BIOC), Minor

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Total Hours: 20

Code	Title	Hours
Minor Requirements		
CHEM 1515	Chemistry II (LN)	5
CHEM 3053	Organic Chemistry I	3
CHEM 3153	Organic Chemistry II	3
BIOC 3713	Biochemistry I	3
BIOC 3723	Biochemistry and Molecular Biology Laboratory	3
BIOC 3813	Biochemistry II	3
Total Hours		**20**

- A grade-point average of 2.0 for courses that count for the minor.

Additional OSU Requirements

Undergraduate Minors

- An undergraduate minor must include between fifteen and thirty hours, inclusive of undergraduate coursework.
- A minimum of six credit hours for the minor must be earned in residence at OSU.
- The courses required for a minor may be included in the course requirements for any undergraduate degree or they may be in addition to degree requirements, depending on the overlap between the minor and degree requirements. However, an undergraduate minor must be earned in an academic field other than the student's declared degree option. The minor may not duplicate the degree major or option (for example, a student who earns a BA in Art with an Art History option may earn a minor in Studio Art but not Art History).
- A student generally follows the minor requirements associated with his or her matriculation year or newer requirements that have been established since matriculation. The time limit for following requirements from a given academic year is six years.

For additional information on requirements on minors, click here (https://adminfinance.okstate.edu/site-files/documents/policies/requirements-for-undergraduate-and-graduate-minors.pdf).

Biochemistry and Molecular Biology, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p.)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
MATH 2144	Calculus I (A) [1]	4
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
CHEM 1314	Chemistry I (LN) [1]	4
Select 5 hours courses designated N		5
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1]	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		6
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
Agricultural Sciences and Natural Resources Core		
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
From two of the following groups, select one course:		6
Group 1:		
PLNT 1213	Introduction to Plant and Soil Systems (N)	
HORT 1013	Principles of Horticultural Science (LN)	
NREM 1113	Elements of Forestry	
Group 2:		
SOIL 1113	Land, Life and the Environment (N)	
SOIL 2124	Fundamentals of Soil Science (N)	
Group 3:		
ANSI 1023 & ANSI 1021	Introduction to the Animal Sciences and Introduction to the Animal Sciences Lab	
FDSC 1133	Fundamentals of Food Science	
ENTO 2993	Introduction to Entomology (LN)	
ENTO 3003	Livestock Entomology	
Group 4:		
NREM 1014	Introduction to Natural History (LN)	
NREM 3013	Applied Ecology and Conservation	
ENVR 1113	Elements of Environmental Science (N)	
BIOC 2344	Chemistry and Applications of Biomolecules	
BIOC 3713	Biochemistry I	
LA 1013	Introduction to Landscape Architecture	
Written and Oral Communications		
Select one of the following:		3
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources	
BCOM 3113	Written Communication	
ENGL 3323	Technical Writing [2]	
Select one of the following:		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [3]	
SPCH 2713	Introduction to Speech Communication (S) [3]	
SPCH 3733	Elements of Persuasion (S) [3]	
Hours Subtotal		**13**
Major Requirements		
Core Courses		
BIOC 1990	Freshman Research in Biochemistry and Molecular Biology	1
BIOC 3723	Biochemistry and Molecular Biology Laboratory	3
BIOC 3813	Biochemistry II	3
BIOC 3223	Physical Chemistry for Biologists	3
or CHEM 3433	Physical Chemistry I	
BIOC 4883	Senior Seminar in Biochemistry	3
BIOC 4990	Undergraduate Research (2 hrs) [4]	2
CHEM 1515	Chemistry II (LN)	5
CHEM 2113	Principles of Analytical Chemistry	3
CHEM 3053	Organic Chemistry I	3
CHEM 3112	Organic Chemistry Laboratory	2
CHEM 3153	Organic Chemistry II	3
Select one of the following:		3
MATH 2153	Calculus II (A)	
STAT 2013	Elementary Statistics (A)	
STAT 4013	Statistical Methods I (A)	
MICR 2123	Introduction to Microbiology	3
MICR 2132	Introduction to Microbiology Laboratory	2
PHYS 1114	College Physics I (LN)	4

or PHYS 2014	University Physics I (LN)	
PHYS 1214	College Physics II (LN)	4
or PHYS 2114	University Physics II (LN)	
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN)	4
or BIOL 1114	Introductory Biology (LN)	
BIOL 1604	Animal Biology	4
or PBIO 1404	Plant Biology (LN)	
Select one of the following:		3
ANSI 3423	Animal Genetics	
BIOL 3023	General Genetics	
PLNT 3554	Plant Genetics and Biotechnology	
Related Courses		
Select a minimum of 9 hours of BIOC or courses related to BIOC, subject to Advisor approval, of the following:		9
BIOC 2202	Medicine and Molecules	
BIOC 2352	Fundamental Biochemistry	
BIOC 3003	Hypothesis-Driven Undergraduate Research	
BIOC 3153	Synthetic Biology	
BIOC 4013	Biotechnology Development and Implementation	
BIOC 4023	Molecular Biology and Stress Response of Plants	
BIOC 4113	Molecular Biology	
BIOC 4213	Disease and Metabolism	
BIOC 3523	Biochemistry of Disease at the Cellular Level	
BIOC 4723	Introduction to Bioinformatics	
BIOC 4990	Undergraduate Research [4]	
Hours Subtotal		**67**
Electives		
Select 0 hours or hours to complete required total for degree		0
Total Hours		**120**

1

College & Departmental requirements that may be used to meet General Education requirements.

2

If ENGL 3323 Technical Writing is substituted for ENGL 1213 Composition II above; hours in this block are reduced by 3.

3

If used as (S) course above, hours in this block reduced by 3.

4

Total hours of BIOC 1990 Freshman Research in Biochemistry and Molecular Biology and BIOC 4990 Undergraduate Research may not exceed 10 hours.

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Biochemistry and Molecular Biology: Biotechnology, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p.)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
ENGL 1213	Composition II	3
or ENGL 1413	Critical Analysis and Writing II	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
MATH 1813	Preparation for Calculus (A)	3
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
CHEM 1314	Chemistry I (LN)	4
Select five hours of couses designated (N)		5
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S)	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		7
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
From two of the following groups, select one course:		6
Group 1		
PLNT 1213	Introduction to Plant and Soil Systems (N)	
HORT 1013	Principles of Horticultural Science (LN)	
NREM 1113	Elements of Forestry	
Group 2		
SOIL 1113	Land, Life and the Environment (N)	
SOIL 2124	Fundamentals of Soil Science (N)	
Group 3		
ANSI 1023 & ANSI 1021	Introduction to the Animal Sciences and Introduction to the Animal Sciences Lab	
or ANSI 1124	Introduction to the Animal Sciences	
FDSC 1133	Fundamentals of Food Science	
ENTO 2993	Introduction to Entomology (LN)	
ENTO 3003	Livestock Entomology	
Group 4		
NREM 1014	Introduction to Natural History (LN)	
NREM 3013	Applied Ecology and Conservation	
ENVR 1113	Elements of Environmental Science (N)	
BIOC 2344	Chemistry and Applications of Biomolecules	
BIOC 3713	Biochemistry I	
LA 1013	Introduction to Landscape Architecture	
Written and Oral Communication		
Select one of the following:		3
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources	
BCOM 3113	Written Communication	
ENGL 3323	Technical Writing [2]	
Select one of the following:		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [3]	
SPCH 2713	Introduction to Speech Communication (S) [3]	
SPCH 3733	Elements of Persuasion (S) [3]	
Hours Subtotal		**13**
Major Requirements		**0**
BIOC 1990	Freshman Research in Biochemistry and Molecular Biology [4]	1
BIOC 2352	Fundamental Biochemistry	2
BIOC 3723	Biochemistry and Molecular Biology Laboratory	3
BIOC 3813	Biochemistry II	3
BIOC 4990	Undergraduate Research [4]	2
BIOC 4113	Molecular Biology	3
BIOC 3153	Synthetic Biology	3
BIOC 4013	Biotechnology Development and Implementation	3
CHEM 1515	Chemistry II (LN) [1]	5
CHEM 2113	Principles of Analytical Chemistry	3
CHEM 3053	Organic Chemistry I	3
CHEM 3112	Organic Chemistry Laboratory	2
CHEM 3153	Organic Chemistry II	3
Select one of the following:		3
MATH 2123	Calculus for Technology Programs I (A)	
STAT 2013	Elementary Statistics (A)	
STAT 4013	Statistical Methods I (A)	
MICR 2123	Introduction to Microbiology	3
MICR 2132	Introduction to Microbiology Laboratory	2
PHYS 1114	College Physics I (LN)	4
or PHYS 2014	University Physics I (LN)	

BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN)	4
or BIOL 1114	Introductory Biology (LN)	
BIOL 1604	Animal Biology	4
or PBIO 1404	Plant Biology (LN)	
Select one of the following:		3
ANSI 3423	Animal Genetics	
BIOL 3023	General Genetics	
PLNT 3554	Plant Genetics and Biotechnology	
Related Courses		
Select a minimum of 8 hours of BIOC or courses related to BIOC, subject to Advisor approval, of the following:		8
BIOC 2202	Medicine and Molecules	
BIOC 3003	Hypothesis-Driven Undergraduate Research	
BIOC 4023	Molecular Biology and Stress Response of Plants	
BIOC 4213	Disease and Metabolism	
BIOC 3523	Biochemistry of Disease at the Cellular Level	
BIOC 4723	Introduction to Bioinformatics	
BIOC 3223	Physical Chemistry for Biologists	
or CHEM 3433	Physical Chemistry I	
BIOC 4883	Senior Seminar in Biochemistry	
BIOC 4990	Undergraduate Research [4]	
MICR 3033	Cell and Molecular Biology	
PHYS 1214	College Physics II (LN)	
or PHYS 2114	University Physics II (LN)	
PLNT 4933	Gene Editing and Genetically Modified Crops	
Hours Subtotal		**67**
Electives		
Select 0 hours to complete required total for degree		0
Hours Subtotal		**0**
Total Hours		**120**

1

College & Departmental requirements that may be used to meet General Education requirements.

2

If ENGL 3323 Technical Writing is substituted for ENGL 1213 Composition above; hours in this block are reduced by 3.

3

If used as (S) course above, hours in this block are reduced by 3.

4

Total hours of BIOC 1990 Freshman Research in Biochemistry and Molecular Biology and BIOC 4990 Undergraduate Research may not exceed 10 hours.

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Biochemistry and Molecular Biology: Pre-Medical or Pre-Veterinary Science, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p.)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
MATH 2144	Calculus I (A) [1]	4
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
CHEM 1314	Chemistry I (LN) [1]	4
5 hours courses designated N		5
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1]	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		6
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
Agricultural Sciences and Natural Resources Core		
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
From two of the following groups, select one course:		6
Group 1:		
PLNT 1213	Introduction to Plant and Soil Systems (N)	
HORT 1013	Principles of Horticultural Science (LN)	
NREM 1113	Elements of Forestry	
Group 2:		
SOIL 1113	Land, Life and the Environment (N)	
SOIL 2124	Fundamentals of Soil Science (N)	
Group 3:		
ANSI 1023 & ANSI 1021	Introduction to the Animal Sciences and Introduction to the Animal Sciences Lab	
FDSC 1133	Fundamentals of Food Science	
ENTO 2993	Introduction to Entomology (LN)	
ENTO 3003	Livestock Entomology	
Group 4:		
NREM 1014	Introduction to Natural History (LN)	
NREM 3013	Applied Ecology and Conservation	
ENVR 1113	Elements of Environmental Science (N)	
BIOC 2344	Chemistry and Applications of Biomolecules	
BIOC 3713	Biochemistry I	
LA 1013	Introduction to Landscape Architecture	
Written and Oral Communications		
Select one of the following:		3
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources	
BCOM 3113	Written Communication	
BCOM 3443	Business Communication for International Students	
ENGL 3323	Technical Writing [2]	
Select one of the following:		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [3]	
SPCH 2713	Introduction to Speech Communication (S) [3]	
SPCH 3733	Elements of Persuasion (S) [3]	
Hours Subtotal		**13**
Major Requirements		
Core Courses		
BIOC 3723	Biochemistry and Molecular Biology Laboratory	3
BIOC 3813	Biochemistry II	3
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN)	4
or BIOL 1114	Introductory Biology (LN)	
BIOL 1604	Animal Biology	4
or PBIO 1404	Plant Biology (LN)	
CHEM 1515	Chemistry II (LN)	5
CHEM 3053	Organic Chemistry I	3
CHEM 3112	Organic Chemistry Laboratory	2
CHEM 3153	Organic Chemistry II	3
Select one of the following:		3
MATH 2153	Calculus II (A)	
STAT 2013	Elementary Statistics (A)	
STAT 4013	Statistical Methods I (A)	
MICR 2123	Introduction to Microbiology	3
MICR 2132	Introduction to Microbiology Laboratory	2

PHYS 1114	College Physics I (LN)	4
or PHYS 2014	University Physics I (LN)	
PHYS 1214	College Physics II (LN)	4
or PHYS 2114	University Physics II (LN)	
Related Courses		
Option:		
Select an option (p. 2526)		20
Hours Subtotal		**63**
Electives		
Select 4 hours or hours to complete required total for degree.		4
Hours Subtotal		**4**
Total Hours		**120**

[1]

College & Departmental requirements that may be used to meet General Education requirements.

[2]

If ENGL 3323 Technical Writing is substituted for ENGL 1213 Composition II above; hours in this block are reduced by 3.

[3]

If used as (S) course above, hours in this block reduced by 3.

Options

Option 1

With the approval of the advisor, department head, and dean, hours of basic sciences from an accredited chiropractic, dental medial, optometry, osteopathic, pharmacy, podiatry, or veterinary medical school to total 57 hours.

Option 2

Code	Title	Hours
Select one of the following:		3
BIOL 3023	General Genetics	
ANSI 3423	Animal Genetics	
PLNT 3554	Plant Genetics and Biotechnology	
Select one of the following:		4
BIOL 3204	Physiology	
ENTO 3044	Insect Morphology and Physiology	
PBIO 4463	Plant Physiology	
Select a minimum of 13 hours of BIOC or courses related to BIOC, subject to Advisor approval, of the following:		13
ANSI 3543	Principles of Animal Nutrition	
BIOC 2202	Medicine and Molecules	
BIOC 2352	Fundamental Biochemistry	
BIOC 3003	Hypothesis-Driven Undergraduate Research	
BIOC 3153	Synthetic Biology	
BIOC 3223	Physical Chemistry for Biologists	
or CHEM 3433	Physical Chemistry I	
BIOC 3523	Biochemistry of Disease at the Cellular Level	
BIOC 4013	Biotechnology Development and Implementation	
BIOC 4023	Molecular Biology and Stress Response of Plants	
BIOC 4113	Molecular Biology	
BIOC 4213	Disease and Metabolism	
BIOC 4723	Introduction to Bioinformatics	
BIOC 4883	Senior Seminar in Biochemistry	
BIOC 4990	Undergraduate Research	
Total Hours		**20**

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Biosystems and Agricultural Engineering

The Department of Biosystems and Agricultural Engineering offers degrees within the Ferguson College of Agriculture and the College of Engineering, Architecture and Technology (CEAT). The department offers two undergraduate majors (Biosystems Engineering and Agricultural Systems Technology) and both masters and doctoral programs in biosystems engineering. The department's undergraduate and graduate biosystems engineering degrees are awarded through CEAT. The agricultural systems technology degree is awarded through the Ferguson College. The undergraduate biosystems engineering degree is accredited by the Engineering Accreditation Commission of ABET (see www.abet.org) under criteria for biological engineering and similarly named programs.

Biosystems engineers and agricultural systems technology professionals create and adapt engineering knowledge and technologies for the efficient and effective production, processing, storage, handling and distribution of food, feed, fiber, and other biological products, while at the same time providing for a quality environment and preserving and protecting natural resources. Our graduates directly address problems and opportunities related to food, water, energy, and the environment—all of which are critical to the quality of life in our society and align with the mission of the Division of Agricultural Sciences and Natural Resources.

Undergraduate Program

The Biosystems Engineering undergraduate degree program is a comprehensive engineering program that includes math, physical and biological sciences, basic engineering science and specialty areas. The first two years focus on the underlying biological, physical, chemical, and mathematical principles of engineering, supplemented by appropriate general education courses in English, social sciences, and humanities. The next two years build systematically upon the scientific knowledge acquired in the early courses and students can focus in specific option areas. The coursework is specifically sequenced and interrelated to provide design experience at each level, leading to progressively more complex, open-ended problems. The program culminates in senior year design courses in which students integrate the analysis, synthesis, and other abilities they have developed throughout the earlier portions of their study into a capstone experience. Subject-matter specialization is provided through the following five undergraduate option areas: general, bioprocessing and food processing, environment and natural resources, machine systems and pre-medical.

The biosystems engineering undergraduate program verifies that our students possess core engineering knowledge and capability by requiring students to take the Fundamentals of Engineering exam, which is an important step toward becoming a professional engineer. Candidates for the BS degree in Biosystems Engineering must take the Fundamentals of Engineering exam prior to receiving their degree.

A wide variety of employment opportunities are available for biosystems engineers in industry, public service, and education. Some of these opportunities include positions in government agencies, consulting engineering firms, biotechnology, and agricultural and food equipment industries.

The Agricultural Systems Technology degree program involves solving challenges faced in agricultural, food and natural systems using practical applications of available technologies and managerial skills. Those who work in this area link engineering design with end-users, developing and implementing solutions that will have positive impacts on agriculture and environmental sustainability, use of equipment and products and agribusiness. Flexibility of interests in agricultural and natural systems, business management and life-long learning in an ever-changing technological world are emphasized in the curriculum.

Agricultural systems technology graduates are prepared for a variety of careers and industries in which technology interfaces with agricultural, food and natural systems. Some of these potential career paths include agricultural and power equipment, manufacturing, equipment sales, food production and processing, government agencies, precision agriculture and environmental consulting, grain elevator management, production agriculture, petroleum industry, and water treatment operations.

In both undergraduate degree programs, an integral part of this education continuum—from basic science through comprehensive engineering design and technical problem solving—is learning experiences that facilitate the students' abilities to function effectively in both individual and team environments. Our programs provide every graduate with adequate learning experiences to develop effective written and oral communication skills. State-of-the-art computational tools are introduced and used as a part of their problem-solving experiences. Finally, the students' experience in solving ever-more-challenging problems enables them to continue to learn independently throughout their professional careers.

Courses

BAE 1011 Introduction to Biosystems Engineering
Description: Introduction to the Biosystems Engineering discipline; use of computers in solving engineering problems; and the application of computer software in engineering analysis and reporting. Previously offered as BAE 1012.
Credit hours: 1
Contact hours: Lab: 2 Contact: 2
Levels: Undergraduate
Schedule types: Lab
Department/School: Biosystems & Ag Eng

BAE 1022 Experimental Methods in Biosystems Engineering
Prerequisites: BAE 1012 or consent of instructor.
Description: An introduction to the basics of instrumentation, measurement techniques, and data analysis, with an emphasis on written communication skills. Lecture and laboratory exercises that address measurement principles, including accuracy, precision and error analysis.
Credit hours: 2
Contact hours: Lecture: 1 Lab: 2 Contact: 3
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Biosystems & Ag Eng

BAE 2013 Computational Methods in Biosystems Engineering
Description: Introduction to computer-based methods applied to biosystems and agricultural engineering problems. Application of spreadsheet tools and programming methods to solve engineering problems. Course previously offered as BAE 2012.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Biosystems & Ag Eng

BAE 3013 Heat and Mass Transfer in Biological Systems
Prerequisites: ENSC 3233, MATH 2233.
Description: Mechanisms of heat and mass transfer, with specific applications in transport processes of biological systems. Introduction to steady state and transient heat conduction and convection, radiation, diffusion, simultaneous heat and mass transfer.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Biosystems & Ag Eng

BAE 3023 Instruments and Controls
Prerequisites: ENSC 2613, MATH 2233.
Description: Design of control and instrumentation systems, including sensor and actuator principles, interface electronics, system identification, modeling, and performance specification. Applications in biological and agricultural systems. Design project required.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Biosystems & Ag Eng

BAE 3033 Advanced Biology and Material Science of Biomaterials
Prerequisites: BIOL 1114 or (BIOL 1113 and BIOL 1111) or PBIO 1404, PHYS 2014, MATH 2144.
Description: Building on basic biology and engineering fundamentals to characterize properties of biological materials such as moisture content and water movement, rheology, electromagnetic response, thermal properties, conveyance requirements, psychometric interactions and heating/cooling response. Course previously offered as BAE 2022 and BAE 2023.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Biosystems & Ag Eng

BAE 3113 Biological Applications in Engineering
Prerequisites: BAE 2012, BIOL 1114 or (BIOL 1113 and BIOL 1111), ENSC 2213, 3233, MATH 2233 or concurrent enrollment.
Description: Introduction to engineering applications of biological processes. Technologies covered include fermentation systems, enzyme kinetics, wastewater treatment and bioremediation.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Biosystems & Ag Eng

BAE 3213 Energy and Power in Biosystems Engineering
Prerequisites: Completion or concurrent enrollment in ENSC 2213, ENSC 2613, ENSC 3233.
Description: Analysis and design of energy generation, transmission, and utilization in the production and processing of biological materials.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Biosystems & Ag Eng

BAE 3223 Principles of Agriculture and Off-Road Machinery
Prerequisites: Completion or concurrent enrollment in ENSC 3233, ENSC 2613 and SOIL 2124.
Description: Principles of design, function, operation, testing and application of agricultural and off-road equipment and systems. Vehicle and implement system dynamics and hitching, and plant and soil interaction with machines. Machinery evaluation and standardized test procedures emphasizing safe and efficient performance of modern farm and off-road equipment.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Biosystems & Ag Eng

BAE 3313 Natural Resources Engineering
Prerequisites: BAE 2023, STAT 2013, and ENSC 3233 or concurrent enrollment.
Description: Principles and practices of engineering analysis and design applied to hydrology, water quality, erosion and sedimentation, air quality, irrigation and animal waste management. Course previously offered as BAE 3323.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 3 Contact: 5
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Biosystems & Ag Eng

BAE 4001 Professional Practice in Biosystems Engineering
Prerequisites: Concurrent enrollment in BAE 4012.
Description: Preparation for professional practice through case studies about ethics, legal liability, safety, and societal issues. Practical professional communications experience.
Credit hours: 1
Contact hours: Contact: 1 Other: 1
Levels: Undergraduate
Schedule types: Discussion
Department/School: Biosystems & Ag Eng

BAE 4010 Special Topics in Biosystems Engineering
Description: New and emerging areas of study in Biosystems Engineering. Offered for variable credit, 1-4 credit hours, maximum of 8 credit hours.
Credit hours: 1-4
Contact hours: Lecture: 1-4 Contact: 1-4
Levels: Undergraduate
Schedule types: Lecture
Department/School: Biosystems & Ag Eng

BAE 4012 Senior Engineering Design Project I
Prerequisites: Completion or concurrent enrollment in ENSC 2143, BAE 3013, BAE 3023, BAE 3213, BAE 4001.
Description: Team work on professional level design projects, using design procedures to develop specifications, propose alternative solutions, consider external constraints, develop drawings or plans, construct, test and evaluate designs.
Credit hours: 2
Contact hours: Lecture: 1 Lab: 2 Contact: 3
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Biosystems & Ag Eng

BAE 4023 Senior Engineering Design Project II
Prerequisites: BAE 4001, BAE 4012. BAE 4023 must be taken the immediate semester after completion of BAE 4012.
Description: Second of two-semester sequence of senior design courses. Course previously offered as BAE 4022.
Credit hours: 3
Contact hours: Lecture: 1 Lab: 4 Contact: 5
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Biosystems & Ag Eng

BAE 4043 In-Vehicle Networking for Off-Road and Heavy Duty Systems
Prerequisites: BAE 3023.
Description: Analysis of in-vehicle network systems and associated design issues. Introduction to CAN-based networking, serial and parallel communications, sensor interfacing, computer control of external devices, and comprehensive coverage of ISO 11783 and BAE J1939.
Credit hours: 3
Contact hours: Lecture: 1 Lab: 4 Contact: 5
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Biosystems & Ag Eng

BAE 4213 Precision Agriculture
Prerequisites: MATH 1513, senior standing.
Description: Introduction to the concepts of precision agriculture including analysis of spatial variability, relationships of fertility and crop response, geographical information systems, variable rate technology, optical sensing, global positioning systems, and yield monitoring. Case studies included for detailed analyses. Same course as SOIL 4213. May not be used for Degree Credit with BAE 5223.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Biosystems & Ag Eng

BAE 4224 Machinery for Production and Processing
Prerequisites: ENSC 2143.
Description: Analysis and design of machine components and machine systems for production and processing of biological materials. Component failure theory and analysis. Assembly and design of mechanical elements. Course previously offered as BAE 4223. May not be used for Degree Credit with BAE 5224.
Credit hours: 4
Contact hours: Lecture: 4 Contact: 4
Levels: Undergraduate
Schedule types: Lecture
Department/School: Biosystems & Ag Eng

BAE 4283 Bioprocess Engineering
Prerequisites: BAE 3013, BAE 3113 or consent of instructor, ENSC 3233.
Description: Application of fundamental engineering principles to biochemical and biological processes. Introduction to cellular processes, fermentation technology, biological mass transfer and kinetics, bioreactor design and scale-up and downstream processing. Same course as CHE 4283. May not be used for Degree Credit with BAE 5283.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Biosystems & Ag Eng

BAE 4314 Design Hydrology
Prerequisites: BAE 3033, ENSC 3233, and STAT 4033 or STAT 4073, or concurrent.
Description: Basic principles of surface and groundwater hydrology and their application in engineering problems. The hydrologic cycle, weather and hydrology, precipitation, evaporation, transpiration, subsurface waters, stream flow hydrographs, hydrologic and hydraulic stream routing, probability of hydrologic events and application of hydrologic models. Laboratory component will emphasize the application of hydrologic and hydraulic models and the quantification of hydrologic and hydraulic parameters. Course previously offered as BAE 4313. May not be used for degree credit with BAE 5314.
Credit hours: 4
Contact hours: Lecture: 3 Lab: 2 Contact: 5
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Biosystems & Ag Eng

BAE 4323 GIS for Water Resources
Prerequisites: ENSC 2113 or GEOG 4203 or LA 4453 or NREM 2083.
Description: Various aspects of GIS applications in water resources, including spatial coordinate systems, acquisitioning water resources GIS data, water resources data management and processing, physiographic terrain analysis and mapping, river and watershed networks, National Hydrography Dataset (NHD), and Arc Hydro. May not be used for degree credit with BAE 5323.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Biosystems & Ag Eng

BAE 4324 Water Quality Engineering
Prerequisites: MATH 2233; BAE 2013; CHEM 1414 or CHEM 1515; or consent of instructor.
Description: Assessment of water quality, water and wastewater treatment, as well as point and nonpoint source pollution processes. Additional topics include principles of environmental chemistry, water body assessment, and integrated watershed management. May not be used for Degree Credit with BAE 5374.
Credit hours: 4
Contact hours: Lecture: 3 Lab: 3 Contact: 6
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Biosystems & Ag Eng

BAE 4343 Environmental Contaminant Fate and Transport
Prerequisites: BAE 4324 or consent of instructor.
Description: Physical, chemical, and biological processes that govern the environmental fate and transport of contaminants in natural systems including soil, water, and air. Topics include conceptual and mathematical models describing transport processes, mass balance, chemical equilibria and kinetics, and modelling. May not be used for degree credit with BAE 5343.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Biosystems & Ag Eng

BAE 4400 Special Problems
Description: Investigations in specialized areas of biosystems engineering. Offered for variable credit, 1-4 credit hours, maximum of 8 credit hours.
Credit hours: 1-4
Contact hours: Contact: 1-4 Other: 1-4
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Biosystems & Ag Eng

BAE 4413 Food Engineering
Prerequisites: BAE 3013 and ENSC 3233, ENSC 2213.
Description: Analysis and design of various unit operations in food processing including thermal processing, drying, evaporation, freezing, processing non-Newtonian fluids and quality changes during processing. Course previously offered as BAE 4423. May not be used for Degree Credit with BAE 5443.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Biosystems & Ag Eng

BAE 5000 Master's Research and Thesis
Prerequisites: Consent of major professor.
Description: Research and thesis writing. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Graduate
Schedule types: Independent Study
Department/School: Biosystems & Ag Eng

BAE 5010 Advanced Topics in Biosystems Engineering
Prerequisites: Graduate standing or consent of instructor.
Description: New and emerging areas of study in Biosystems Engineering. Offered for variable credit, 1-4 credit hours, maximum of 8 credit hours.
Credit hours: 1-4
Contact hours: Lecture: 1-4 Contact: 1-4
Levels: Graduate
Schedule types: Lecture
Department/School: Biosystems & Ag Eng

BAE 5030 Problems in Biosystems Engineering and Agricultural Technology
Prerequisites: Consent of instructor.
Description: Problems associated with biosystems engineering and agricultural technology. Offered for variable credit, 1-6 credit hours, maximum of 9 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Graduate
Schedule types: Independent Study
Department/School: Biosystems & Ag Eng

BAE 5213 Renewable Energy Engineering
Prerequisites: ENSC 2213, ENSC 3233 or consent of instructor.
Description: Renewable technologies such as solar, wind, geothermal, hydroelectric, and biomass to generate energy for electricity, heating, transportation, and other uses.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Biosystems & Ag Eng

BAE 5223 Precision Agriculture
Prerequisites: MATH 1513.
Description: Introduction to the concepts of precision agriculture including analysis of spatial variability, relationships of fertility and crop response, geographical information systems, variable rate technology, optical sensing, global positioning systems, and yield monitoring. Case studies included for detailed analyses. May not be used for degree credit with BAE 4213.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Biosystems & Ag Eng

BAE 5224 Machinery for Production and Processing
Prerequisites: ENSC 2143.
Description: Analysis and design of machine components and machine systems for production and processing of biological materials. Component failure theory and analysis. Assembly and design of mechanical elements. May not be used for degree credit with BAE 4224.
Credit hours: 4
Contact hours: Lecture: 4 Contact: 4
Levels: Graduate
Schedule types: Lecture
Department/School: Biosystems & Ag Eng

BAE 5243 Biological Conversion for Advanced Biofuels
Prerequisites: ENSC 2213.
Description: Fundamental principles and applications of converting biomass to advanced biofuels. Focus will be on biological processes, fermentor design and operation, product recovery and emerging fuels.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Biosystems & Ag Eng

BAE 5283 Advanced Bioprocess Engineering
Prerequisites: Consent of instructor.
Description: Application of fundamental engineering principles to biochemical and biological processes. Introduction to cellular processes, fermentation technology, biological mass transfer and kinetics, bioreactor design and scale-up and downstream processing. Same course as CHE 5283.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Biosystems & Ag Eng

BAE 5313 Watershed Modeling
Prerequisites: BAE 4313 or equivalent.
Description: A computer modeling course with an emphasis on chemical and physical processes governing nonpoint source pollution (nitrogen, phosphorus, sediment) at the basin scale. The laboratory use of state-of-the-art models applied to a variety of agricultural systems. "Hands on" use of comprehensive hydrologic water quality models that utilize spatial data in a geographic information system. Models and parameter uncertainty, digital data sources, parameter estimation and model testing, calibration and validation. For students with advanced personal computer skills.
Credit hours: 3
Contact hours: Lecture: 1 Lab: 6 Contact: 7
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Biosystems & Ag Eng

BAE 5314 Design Hydrology
Prerequisites: BAE 2023 and ENSC 3233, and STAT 4033 or STAT 4073, or concurrent.
Description: Basic principles of surface and groundwater hydrology and their application in engineering problems. The hydrologic cycle, weather and hydrology, precipitation, evaporation, transpiration, subsurface waters, stream flow hydrographs, hydrologic and hydraulic stream routing, probability of hydrologic events and application of hydrologic models. Laboratory component will emphasize the application of hydrologic and hydraulic models and the quantification of hydrologic and hydraulic parameters. Course previously offered as BAE 4313. May not be used for degree credit with BAE 4314.
Credit hours: 4
Contact hours: Lecture: 3 Lab: 2 Contact: 5
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Biosystems & Ag Eng

BAE 5323 GIS for Water Resources
Prerequisites: ENSC 2113 or GEOG 4203 or LA 4453 or NREM 2083.
Description: Various aspects of GIS applications in water resources, including spatial coordinate systems, acquisitioning water resources GIS data, water resources data management and processing, physiographic terrain analysis and mapping, river and watershed networks, National Hydrography Dataset (NHD), and Arc Hydro. May not be used for degree credit with BAE 4323.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Biosystems & Ag Eng

BAE 5324 Modeling and Design in Storm Water and Sediment Control
Prerequisites: BAE 4313 or equivalent.
Description: Analysis and design of storm water, sediment and water quality systems with a focus on application to urban areas and developments in the urban-rural fringe. Advanced concepts in hydrologic modeling with kinematics, diffusion and dynamic modeling of flow; soil erosion, sediment transport and sediment control; storm water quality modeling and the impact of best management practices. In laboratories, use of hydrologic, sediment, and water quality models in analysis and design for real-world problems.
Credit hours: 4
Contact hours: Lecture: 3 Lab: 3 Contact: 6
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Biosystems & Ag Eng

BAE 5333 Applied Water Resources Statistics
Prerequisites: STAT 5013 or equivalent.
Description: Applied statistical methods for hydrologists, engineers, and environmental scientists for analysis of environmental data. Parametric and nonparametric methods and exploratory data analysis applied to observed environmental data sets. Laboratory exercises emphasize hands-on application of statistical problems to reinforce concepts.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 3 Contact: 5
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Biosystems & Ag Eng

BAE 5343 Environmental Contaminant Fate and Transport
Prerequisites: BAE 4324 or consent of instructor.
Description: Physical, chemical, and biological processes that govern the environmental fate and transport of contaminants in natural systems including soil, water, and air. Topics include conceptual and mathematical models describing transport processes, mass balance, chemical equilibria and kinetics, and modeling. May not be used for degree credit with BAE 4343.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Biosystems & Ag Eng

BAE 5353 Environmental and Ecological Risk Assessment
Prerequisites: Graduate standing.
Description: Process and methodologies associated with human, environmental and ecological risks. Will quantify uncertainty in human perturbation, management, and restoration of environmental and ecological processes. Course available online only through AG*IDEA consortium.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Biosystems & Ag Eng

BAE 5374 Water Quality Engineering
Prerequisites: Graduate standing.
Description: Assessment of water quality, water and wastewater treatment, as well as point and nonpoint source pollution processes. Additional topics include principles of environmental chemistry, water body assessment and integrated watershed management. May not be used for degree credit with BAE 4324.
Credit hours: 4
Contact hours: Lecture: 3 Lab: 3 Contact: 6
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Biosystems & Ag Eng

BAE 5413 Advanced Data Acquisition and Control
Prerequisites: BAE 3023 or equivalent.
Description: Principles and operation of commercial instruments and data acquisition systems used in biological, environmental, and agricultural applications. Hands-on projects that will improve system design, development and programming skills. Introduction of advanced topics including machine vision, spectroscopy, and data communication networks.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Biosystems & Ag Eng

BAE 5423 Food Rheology
Prerequisites: ENSC 3233.
Description: Characterization and analysis of the rheological properties of food products. Focus on measurement techniques and equipment, including tube and rotational type instruments, with specific applications in food processing.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Biosystems & Ag Eng

BAE 5433 Biosensors
Prerequisites: PHYS 2114 and CHEM 3053 or equivalent.
Description: Principles and applications of biosensors in food analysis, disease diagnostics, and environmental monitoring. Emphasis on conceptual design and characterization of biosensors. Introduction to recent advances in biodetection using nanotechnology.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Biosystems & Ag Eng

BAE 5443 Food Engineering
Prerequisites: BAE 3013 and ENSC 3233, ENSC 2213.
Description: Analysis and design of various unit operations in food processing including thermal processing, drying, evaporation, freezing, processing non-Newtonian fluids and quality changes during processing. May not be used for degree credit with BAE 4413.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Biosystems & Ag Eng

BAE 5501 Seminar
Description: Discussion of current literature with special emphasis on research and experimental techniques. Graded on a pass-fail basis.
Credit hours: 1
Contact hours: Contact: 1 Other: 1
Levels: Graduate
Schedule types: Discussion
Department/School: Biosystems & Ag Eng

BAE 6000 Doctoral Research and Dissertation
Prerequisites: Approval by the student's advisory committee.
Description: Research and doctoral dissertation preparation. Offered for variable credit, 1-10 credit hours, maximum of 42 credit hours.
Credit hours: 1-10
Contact hours: Contact: 1-10 Other: 1-10
Levels: Graduate
Schedule types: Independent Study
Department/School: Biosystems & Ag Eng

BAE 6101 Teaching Practicum in Biosystems Engineering
Prerequisites: One semester of doctoral study in Biosystems Engineering, or consent of instructor; International students must pass the ITA exam.
Description: Philosophies and techniques of resident and non-resident teaching, including experiences in preparation, presentation, and evaluation of lectures, laboratories, extension or continuing education programs. Course previously offered as BAE 6100.
Credit hours: 1
Contact hours: Contact: 1 Other: 1
Levels: Graduate
Schedule types: Independent Study
Department/School: Biosystems & Ag Eng

BAE 6213 Advanced Biomass Thermochemical Conversion
Prerequisites: ENSC 2213.
Description: Advanced study, evaluation, and application of thermochemical conversion pathways in biofuel production. Specific topics include biomass gasification, pyrolysis, liquefaction, and heterogeneous catalysis. Course available online only through AG*IDEA consortium. Course previously offered as BAE 6100.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Biosystems & Ag Eng

BAE 6313 Stochastic Methods in Hydrology
Prerequisites: CIVE 5843, STAT 4033.
Description: Stochastic and statistical hydrologic analyses of surface water and groundwater systems. Analysis of urban and rural drainage and detention systems. Same course as CIVE 6843.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Biosystems & Ag Eng

BAE 6333 Fluvial Hydraulics
Prerequisites: BAE 3013 or equivalent.
Description: Principles of sediment detachment and transport in fluvial systems. Design of stable channels and flow resistance relationships for sediment-laden flows.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Biosystems & Ag Eng

BAE 6343 Ground Water Contaminant Transport
Prerequisites: SOIL 5583 or CIVE 5913 or GEOL 5453.
Description: Principles of solute and multiphase transport in soils and ground water. Effects of advection, diffusion, dispersion, degradation, volatilization and adsorption. Relationships between laboratory and field scale transport. Contamination by nonaqueous phase liquids.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Biosystems & Ag Eng

BAE 6503 Similitude in Research
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Biosystems & Ag Eng

BAE 6520 Problems in Soil and Water Engineering
Prerequisites: Consent of instructor.
Description: Consent of instructor. Problems associated with erosion control, drainage, flood protection and irrigation. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 2-6
Contact hours: Contact: 2-6 Other: 2-6
Levels: Graduate
Schedule types: Independent Study
Department/School: Biosystems & Ag Eng

BAE 6540 Prob Farm Power & Mach
Prerequisites: Consent of instructor.
Description: Literature review and analytical studies of selected farm power and machinery problems. Written report required. Offered for variable credit, 2-6 credit hours, maximum of 6 credit hours.
Credit hours: 2-6
Contact hours: Contact: 2-6 Other: 2-6
Levels: Graduate
Schedule types: Independent Study
Department/School: Biosystems & Ag Eng

BAE 6580 Problems in Transport Processes
Prerequisites: Consent of instructor.
Description: Literature review and analysis of heat and mass transport and interval diffusion in biological materials. Transport phenomena at interfaces, thermal and cryogenic processing, drying, packed and fluidized bed systems. Thermal and moisture control processing affecting quality of food products. Written report required. Offered for variable credit, 2-6 credit hours, maximum of 6 credit hours.
Credit hours: 2-6
Contact hours: Contact: 2-6 Other: 2-6
Levels: Graduate
Schedule types: Independent Study
Department/School: Biosystems & Ag Eng

BAE 6610 Adv Research & Study
Prerequisites: Approval by the student's advisory committee.
Description: Research and study at the doctoral level on the topic related to the student's doctoral program and field of interest. Offered for variable credit, 1-10 credit hours, maximum of 20 credit hours.
Credit hours: 1-10
Contact hours: Contact: 1-10 Other: 1-10
Levels: Graduate
Schedule types: Independent Study
Department/School: Biosystems & Ag Eng

Undergraduate Programs

- Agricultural Systems Technology, BSAG (p. 2535)
- Biosystems Engineering: Bioprocessing & Food Processing, BSBE (p. 2537)
- Biosystems Engineering: Bioprocessing & Food Processing, BSBE (p. 2537)
- Biosystems Engineering: Environmental and Natural Resources, BSBE (p. 2541)
- Biosystems Engineering: Machine Systems & Agricultural Engineering, BSBE (p. 2543)
- Biosystems Engineering: Pre-Medical, BSBE (p. 2545)

Graduate Programs

The Department of Biosystems and Agricultural Engineering offers Master of Science and Doctor of Philosophy degrees in Biosystems Engineering. Specific research areas include Machine System Engineering, Bioprocessing and Biotechnology, Food Engineering, and Environment & Natural Resources.

Program Information

Excellent laboratory and computer facilities are available for students to explore research and design in such areas as bioprocessing and food engineering, machine vision, sensor and control technology, waste management and utilization, hydrology, water quality, porous media flow, and intelligent systems for agricultural machine design and production.

Research projects are supported by the Oklahoma Agricultural Experiment Station and by state, federal and private grants, and contracts. Well-trained faculty members, many of whom are registered professional engineers with research, consulting, and design experience, guide the graduate students' activities and plan programs to meet students' needs. Graduate students design experiments and special equipment to conduct their work. They are expected to demonstrate, by supporting research or by designs, the ability to identify a problem, define alternatives, propose a solution, organize a design or an experimental investigation, manage the project to completion and report the results through peer-reviewed papers and professional presentations.

Graduate Admission Requirements

Minimum BAE Program Requirements:

- Previous Degree:
  - An undergraduate degree in Biosystems Engineering or other Engineering from an ABET accredited or equivalent program (ABET Accredited Programs (https://main.abet.org/aps/accreditedprogramsearch.aspx)).
  - Students with undergraduate degrees in other disciplines or closely related fields, such as chemistry, physics, mathematics,

biological sciences, agricultural sciences, and environmental sciences are also invited to apply to the BAE graduate program. Such applications are evaluated on an individual basis. Completion of additional credit hours of undergraduate courses (such as engineering sciences and advanced biology) may be required before a BAE graduate Plan of Study is developed.

- Grade Point Average (GPA): GPA > 3.0 (on a 4.0 scale). Equivalent grades are required from an international university.
- Prior research and publication experience for a Ph.D. application are preferred.

Degree Requirements

Master of Sciences (MS)

Thesis Option – MS Students with a Thesis Option will complete a thesis reporting original research. Thirty (30) credit hours are required for the degree, which consists of 23 credits of coursework (including 9 credits of BAE courses), one (1) credit of BAE 5501 BAE Graduate Seminar, and six (6) credits of satisfactory research hours (BAE 5000).

Non-Thesis with a Formal Report – MS Students with a Non-Thesis Option and a Formal Report should complete a total of 32 credit hours, which consist of at least 28 credits of coursework (including 6 credits of BAE courses), one (1) credit of BAE 5501 BAE Graduate Seminar, and 1-3 credits of BAE 5010 Advanced Topics in Biosystems Engineering.

Non-Thesis Option – MS Students with a Non-Thesis Option are required to complete a total of thirty- two (32) credit hours of coursework (including six credits of BAE courses and one-credit of BAE 5501 BAE Graduate Seminar).

Doctor of Philosophy (Ph.D.)

Ph.D. Degree After MS Option – Ph.D. students are required to take a minimum total of 44 credit hours beyond an MS degree. This includes a minimum of 30 credits of BAE 6000 Thesis Research and 14 credits of coursework. The coursework is required to include at least 6 credits of BAE courses, including one (1) credit of BAE 6101 Teaching Practicum and one (1) credit of BAE 5501 BAE Graduate Seminar.

Ph.D. Degree After BS Option – Ph.D. students are required to take a minimum 74 credits beyond a BS degree. This includes a minimum of 36 credits of BAE 6000 Thesis Research and 38 credits of coursework. The coursework should include at least six (6) credit hours of BAE courses, including one (1) credit hour of BAE 6101 Teaching Practicum and two (2) credit hours of BAE 5501 BAE Graduate Seminar.

Faculty

Mari S. Chinn, PhD—Professor and Department Head, AT&T Professorship in Engineering

Professor, Orville L. and Helen Buchanan Endowed Chair: Danielle Bellmer, PhD

Director, Capital Projects for CASNR/Assistant Director, Oklahoma Agricultural Experiment Station: Randy L. Raper, PhD, PE

Professors:#Hasan Atiyeh, PhD, PE; Danielle D. Bellmer, PhD; Timothy J. Bowser, PhD, PE; Nurhan Dunford, PhD, PE; Ajay Kumar, PhD, PE;#Yu Mao, PhD; Ning Wang, PhD, PE

Associate Professors: Robert Scott Frazier, PhD, PE; Douglas W. Hamilton, PhD, PE; John Long, PhD, PE; Ali Mirchi, PhD

Assistant Professors: Sumon Datta, PhD; Keighobad Jafarzadegan, PhD; Kiranmayi Mangalgiri, PhD; Kevin Moore, PhD, MBA, CSP; Jeffrey Sadler, PhD

Research Associate Professor: J.D. Carlson, PhD

Assistant Extension Specialist: Wesley Lee, MS

Teaching Assistant Professor: Sara Alian, PhD

Adjunct Professor: Jason Vogel, PhD, PE

Adjunct Associate Professors:#Krushna Patil, PhD; Derek Whitelock, PhD

Adjunct Assistant Professor:#Sherry L. Hunt, PhD

Agricultural Systems Technology, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p. 977)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
MATH 2123	Calculus for Technology Programs I (A)	3
or MATH 2103	Business Calculus (A)	
STAT 2013	Elementary Statistics (A)	3
or STAT 2023	Elementary Statistics for Business and Economics (A)	
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
PHYS 1114	College Physics I (LN)	4
Course designated (N)		2
Social & Behavioral Sciences (S)		
SPCH 2713	Introduction to Speech Communication (S)	3
or AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S)	
Additional General Education		
Courses designated (A), (H), (N), or (S)		7
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
Agricultural Sciences and Natural Resources		
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
SOIL 2124	Fundamentals of Soil Science (N)	4
Select one of the following:		3
PLNT 1213	Introduction to Plant and Soil Systems (N)	
ENVR 1113	Elements of Environmental Science (N)	
FDSC 1133	Fundamentals of Food Science	
AGEC 1113	Introduction to Agricultural Economics (S)	3
or ECON 2103	Introduction to Microeconomics (S)	
Written and Oral Communications		
Select one of the following:		3
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources	
BCOM 3113	Written Communication	
ENGL 3323	Technical Writing	
CHEM 1314	Chemistry I (LN)	4
Hours Subtotal		**18**
Major Requirements		
Core Courses		
AST 1413	Introduction to Engineering in Agriculture	3
AST 2313	Surveying	3
AST 3102	Principles of Agricultural Electrification	2
AST 4101	Ag Electrification	1
AST 4213	Safety and Health in Agriculture	3
AST 4203	Agricultural Water Management	3
AST 4303	Automation, Sensors and Controls for Agricultural Systems	3
AST 4013	Capstone for Agricultural Systems Technology	3
AGEC 3213	Quantitative Methods in Agricultural Economics	3
AGEC 3423	Farm and Agribusiness Management	3
or MGMT 3013	Fundamentals of Management (S)	
Select from one of the following pairs of courses:		6
ACCT 2103	Financial Accounting	
ACCT 2203	Managerial Accounting	
OR		
ACCT 2003	Survey of Accounting	
ACCT 3004	Foundational Accounting and Data Skills	
Technical Agriculture Electives		
Select 21 hours from the following:		21
ANSI 1124	Introduction to the Animal Sciences	
ANSI 2112	Live Animal Evaluation	
ANSI 2123	Livestock Feeding	
ANSI 2253	Meat Animal and Carcass Evaluation	
ANSI 3333	Meat Science	
ANSI 3423	Animal Genetics	
ENTO 2003	Insects and Society (N)	
ENTO 2143	Global Agricultural Biosecurity and Forensics	
ENTO 2223	Insects in Global Public Health (N)	
ENTO 2993	Introduction to Entomology (LN)	
ENTO 3003	Livestock Entomology	
ENTO 3021	Postharvest, Structural, and Urban Arthropod Pests	

ENTO 3331	Insect Pests of Agronomic Crops	
ENTO 3421	Horticultural Insects	
ENTO 3461	Insects in Forest Ecosystems	
FDSC 3113	Quality Control	
FDSC 3123	HACCP in the Food Industry	
FDSC 3154	Food Microbiology	
FDSC 3133	Plant Sanitation for Food Processing Operations	
FDSC 3373	Food Chemistry I	
FDSC 4123	Principles of Food Engineering	
FDSC 4143	Food Safety Modernization Act	
FDSC 4233	Food Safety Audit Schemes	
HORT 1013	Principles of Horticultural Science (LN)	
HORT 2513	Herbaceous Plant Materials	
HORT 2613	Woody Plant Materials	
HORT 3084	Plant Propagation	
HORT 3113	Greenhouse Management	
HORT 3153	Turf Management	
HORT 3213	Fruit and Nut Production	
HORT 3433	Commercial Vegetable Production	
NREM 2083	Geospatial Technologies for Natural Resources	
NREM 3613	Principles of Rangeland Management	
NREM 3063	Natural Resource Biometrics	
PLNT 2013	Applied Plant Science	
PLNT 3554	Plant Genetics and Biotechnology	
PLNT 4013	Principles of Weed Science	
SOIL 4234	Soil Nutrient Management	
SOIL 4213	Precision Agriculture	
SOIL 4363	Environmental Soil Science	
SOIL 4463	Soil and Water Conservation	
SOIL 4483	Soil Microbiology	
Hours Subtotal		**54**
Electives		
Select 8 hours or hours to complete required total for degree		8
Hours Subtotal		**8**
Total Hours		**120**

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Biosystems Engineering: Bioprocessing & Food Processing, BSBE

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 122

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p. 977)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
MATH 2144	Calculus I (A)	4
MATH 2153	Calculus II (A)	3
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
CHEM 1414	General Chemistry for Engineers (LN)	4
PHYS 2014	University Physics I (LN)	4
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN)	4
or BIOL 1114	Introductory Biology (LN)	
Social & Behavioral Sciences (S)		
Course designated (S)		3
Additional General Education		
Courses designated (A), (H), (N), or (S)		3
Hours Subtotal		**43**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
Mathematics		
MATH 2163	Calculus III	3
MATH 2233	Differential Equations	3
Engineering & Engineering Science		
ENGR 1322	Engineering Design with CAD	2
or ENGR 1332	Engineering Design with CAD for MAE	
ENSC 2113	Statics	3
ENSC 2143	Strength of Materials	3
ENSC 2213	Thermodynamics	3
ENSC 2613	Introduction to Electrical Science	3
ENSC 3233	Fluid Mechanics	3
ENSC 3231	Fluids and Hydraulics Lab	1
ENSC 3431	Thermodynamics and Heat Transfer Lab	1
(Select One of the Following:)		
Select one of the following:		1
ENSC 2141	Strength of Materials Lab	
ENSC 2411	Electrical Science Lab	
ENSC 2611	Electrical Fabrication Lab	
ENSC 3311	Material Science Lab	
ENGR 2421	Engineering Data Acquisition Controls Lab	
Biosystems Engineering		
BAE 1011	Introduction to Biosystems Engineering	1
BAE 1022	Experimental Methods in Biosystems Engineering	2
BAE 2013	Computational Methods in Biosystems Engineering	3
BAE 3033	Advanced Biology and Material Science of Biomaterials	3
Hours Subtotal		**36**
Major Requirements		
Common Professional School		
STAT 4033	Engineering Statistics	3
or STAT 4073	Engineering Statistics with Design of Experiments	
IEM 3503	Engineering Economic Analysis	3
BAE 3013	Heat and Mass Transfer in Biological Systems	3
BAE 3023	Instruments and Controls	3
BAE 3213	Energy and Power in Biosystems Engineering	3
BAE 4001	Professional Practice in Biosystems Engineering	1
BAE 4012	Senior Engineering Design Project I	2
BAE 4023	Senior Engineering Design Project II	3
Specific Professional School		
BAE 4283	Bioprocess Engineering	3
BAE 4413	Food Engineering	3
MICR 2123	Introduction to Microbiology	3
MICR 2132	Introduction to Microbiology Laboratory	2
BIOC 2344	Chemistry and Applications of Biomolecules	4
Hours Subtotal		**36**
Electives		
Select 7 hours of engineering and/or science electives to be selected from an approved list upon consultation with an advisor		7

Hours Subtotal	**7**
Total Hours	**122**

Other Requirements

- A minimum 2.0 Technical GPA. The Technical GPA is calculated from all BAE prefixes or substitutions to BAE courses.
- A grade of "C" or better is required in following courses: BAE 2013, BAE 3013, BAE 3023, BAE 3033, BAE 3213, ENSC 2113, ENSC 2143, ENSC 2213, ENSC 2613, ENSC 3233.
- Students are required to complete the Fundamentals of Engineering (FE) exam prior to graduation.
- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Biosystems Engineering: Biosystems Engineering, BSBE

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p. 977)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
MATH 2144	Calculus I (A)	4
MATH 2153	Calculus II (A)	3
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
CHEM 1414	General Chemistry for Engineers (LN)	4
PHYS 2014	University Physics I (LN)	4
Select four hours from the following:		4
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN)	
BIOL 1114	Introductory Biology (LN)	
PBIO 1404	Plant Biology (LN)	
Social & Behavioral Sciences (S)		
Any course designated (S)		3
Additional General Education		
Courses designated (A), (H), (N), or (S)		3
Hours Subtotal		**43**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
Mathematics		
MATH 2163	Calculus III	3
MATH 2233	Differential Equations	3
Engineering & Engineering Science		
ENGR 1332	Engineering Design with CAD for MAE	2
ENSC 2113	Statics	3
ENSC 2143	Strength of Materials	3
ENSC 2213	Thermodynamics	3
ENSC 2613	Introduction to Electrical Science	3
ENSC 3233	Fluid Mechanics	3
Biosystems Engineering		
BAE 1011	Introduction to Biosystems Engineering	1
BAE 1022	Experimental Methods in Biosystems Engineering	2
BAE 2013	Computational Methods in Biosystems Engineering	3
BAE 3033	Advanced Biology and Material Science of Biomaterials	3
Hours Subtotal		**33**
Major Requirements		
Common Professional School		
STAT 4033	Engineering Statistics	3
or STAT 4073	Engineering Statistics with Design of Experiments	
IEM 3503	Engineering Economic Analysis	3
BAE 3013	Heat and Mass Transfer in Biological Systems	3
BAE 3023	Instruments and Controls	3
BAE 3213	Energy and Power in Biosystems Engineering	3
BAE 4001	Professional Practice in Biosystems Engineering	1
BAE 4012	Senior Engineering Design Project I	2
BAE 4023	Senior Engineering Design Project II	3
Specific Professional School		
ENSC 2123	Elementary Dynamics	3
BAE 4224	Machinery for Production and Processing	4
BAE 4314	Design Hydrology	4
BAE 4283	Bioprocess Engineering (or)	3
BAE 4413	Food Engineering	
Select one of the following:		3
PLNT 4123	Plant-Environment Interactions	
PLNT 4443	Cropping Systems	
HORT 4963	Horticulture Physiology	
ENVR 4033	Ecology of Invasive Species	
NREM 3013	Applied Ecology and Conservation	
MICR 2123	Introduction to Microbiology	
BIOL 3204	Physiology	
Select 6 hours from upper level BAE or AST courses.		6
Hours Subtotal		**44**
Total Hours		**120**

Other Requirements

- A minimum 2.0 Technical GPA. The Technical GPA is calculated from all BAE prefixes or substitutions to BAE courses.

- A grade of "C" or better is required in following courses: BAE 2013, BAE 3013, BAE 3023, BAE 3033, BAE 3213, ENSC 2113, ENSC 2143, ENSC 2213, ENSC 2613, ENSC 3233.
- Students are required to complete the Fundamentals of Engineering (FE) exam prior to graduation.
- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Biosystems Engineering: Environmental and Natural Resources, BSBE

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 125

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p. 977)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
MATH 2144	Calculus I (A)	4
MATH 2153	Calculus II (A)	3
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
CHEM 1414	General Chemistry for Engineers (LN)	4
PHYS 2014	University Physics I (LN)	4
Select four hours from the following:		4
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN)	
BIOL 1114	Introductory Biology (LN)	
PBIO 1404	Plant Biology (LN)	
Social & Behavioral Sciences (S)		
Any course designated (S)		3
Additional General Education		
Courses designated (A), (H), (N), or (S)		3
Hours Subtotal		**43**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
Mathematics		
MATH 2163	Calculus III	3
MATH 2233	Differential Equations	3
Engineering & Engineering Science		
ENGR 1322	Engineering Design with CAD	2
or ENGR 1332	Engineering Design with CAD for MAE	
ENSC 2113	Statics	3
ENSC 2143	Strength of Materials	3
ENSC 2213	Thermodynamics	3
ENSC 2613	Introduction to Electrical Science	3
ENSC 3233	Fluid Mechanics	3
Biosystems Engineering		
BAE 1011	Introduction to Biosystems Engineering	1
BAE 1022	Experimental Methods in Biosystems Engineering	2
BAE 2013	Computational Methods in Biosystems Engineering	3
BAE 3033	Advanced Biology and Material Science of Biomaterials	3
Hours Subtotal		**33**
Major Requirements		
Common Professional School		
STAT 4033	Engineering Statistics	3
or STAT 4073	Engineering Statistics with Design of Experiments	
IEM 3503	Engineering Economic Analysis	3
BAE 3013	Heat and Mass Transfer in Biological Systems	3
BAE 3023	Instruments and Controls	3
BAE 3213	Energy and Power in Biosystems Engineering	3
BAE 4001	Professional Practice in Biosystems Engineering	1
BAE 4012	Senior Engineering Design Project I	2
BAE 4023	Senior Engineering Design Project II	3
Specific Professional School		
BAE 4314	Design Hydrology	4
BAE 4324	Water Quality Engineering	4
BAE 4323	GIS for Water Resources	3
CIVE 3833	Applied Hydraulics	3
NREM 3013	Applied Ecology and Conservation	3
or NREM 4033	Ecology Of Invasive Species	
SOIL 2124	Fundamentals of Soil Science (N)	4
CIVE 2081	Environmental Chemistry for Engineers	1
Select two of the following:		6
AST 2313	Surveying	
AST 4203	Agricultural Water Management	
BAE 4343	Environmental Contaminant Fate and Transport	
CIVE 3714	Introduction to Geotechnical Engineering	
CIVE 3813	Environmental Engineering Science	
CIVE 4013	Aquatic Chemistry	
CIVE 4833	Unit Operations in Environmental Engineering	

PLNT 4033	Applied Agricultural Meteorology	
GEOL 4453	Hydrogeology	
SOIL 4463	Soil and Water Conservation	
Hours Subtotal		**49**
Total Hours		**125**

Other Requirements

- A minimum 2.0 Technical GPA. The Technical GPA is calculated from all BAE prefixes or substitutions to BAE courses.
- A grade of "C" or better is required in following courses: BAE 2013, BAE 3013, BAE 3023, BAE 3033, BAE 3213, ENSC 2113, ENSC 2143, ENSC 2213, ENSC 2613, ENSC 3233.
- Students are required to complete the Fundamentals of Engineering (FE) exam prior to graduation.
- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Biosystems Engineering: Machine Systems & Agricultural Engineering, BSBE

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 124

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p. 977)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
MATH 2144	Calculus I (A)	4
MATH 2153	Calculus II (A)	3
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
CHEM 1414	General Chemistry for Engineers (LN)	4
PHYS 2014	University Physics I (LN)	4
Select four hours from the following:		4
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN)	
BIOL 1114	Introductory Biology (LN)	
PBIO 1404	Plant Biology (LN)	
Social & Behavioral Sciences (S)		
Any course designated (S)		3
Additional General Education		
Courses designated (A), (H), (N), or (S)		3
Hours Subtotal		**43**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
Mathematics		
MATH 2163	Calculus III	3
MATH 2233	Differential Equations	3
Engineering & Engineering Science		
ENGR 1332	Engineering Design with CAD for MAE	2
ENSC 2113	Statics	3
ENSC 2143	Strength of Materials	3
ENSC 2213	Thermodynamics	3
ENSC 2613	Introduction to Electrical Science	3
ENSC 3233	Fluid Mechanics	3
ENSC 2141	Strength of Materials Lab	1
ENSC 3311	Material Science Lab	1
Select One of the Following:		1
ENSC 2411	Electrical Science Lab	
ENSC 2611	Electrical Fabrication Lab	
ENSC 3231	Fluids and Hydraulics Lab	
ENSC 3431	Thermodynamics and Heat Transfer Lab	
ENGR 2421	Engineering Data Acquisition Controls Lab	
Biosystems Engineering		
BAE 1011	Introduction to Biosystems Engineering	1
BAE 1022	Experimental Methods in Biosystems Engineering	2
BAE 2013	Computational Methods in Biosystems Engineering	3
BAE 3033	Advanced Biology and Material Science of Biomaterials	3
Hours Subtotal		**36**
Major Requirements		
Common Professional School		
STAT 4033	Engineering Statistics	3
or STAT 4073	Engineering Statistics with Design of Experiments	
IEM 3503	Engineering Economic Analysis	3
BAE 3013	Heat and Mass Transfer in Biological Systems	3
BAE 3023	Instruments and Controls	3
BAE 3213	Energy and Power in Biosystems Engineering	3
BAE 4001	Professional Practice in Biosystems Engineering	1
BAE 4012	Senior Engineering Design Project I	2
BAE 4023	Senior Engineering Design Project II	3
Specific Professional School		
BAE 3223	Principles of Agriculture and Off-Road Machinery	3
BAE 4224	Machinery for Production and Processing	4
ENSC 2123	Elementary Dynamics	3
ENSC 3313	Materials Science	3
SOIL 2124	Fundamentals of Soil Science (N)	4
Select One of the Following:		3
PLNT 4123	Plant-Environment Interactions	
PLNT 4543	Cropping Systems	
HORT 4963	Horticulture Physiology	
ENVR 4033	Ecology of Invasive Species	

MICR 2123	Introduction to Microbiology	
BIOL 3204	Physiology	
Hours Subtotal		**41**
Electives		
Select 4 hours of engineering and/or science electives to be selected from an approved list upon consultation with an advisor		4
Hours Subtotal		**4**
Total Hours		**124**

Other Requirements

- A minimum 2.0 Technical GPA. The Technical GPA is calculated from all BAE prefixes or substitutions to BAE courses.
- A grade of "C" or better is required in the following courses: BAE 2013, BAE 3013, BAE 3023, BAE 3033, BAE 3213, ENSC 2113, ENSC 2143, ENSC 2213, ENSC 2613, ENSC 3233.
- Students are required to complete the Fundamentals of Engineering (FE) exam prior to graduation.
- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Biosystems Engineering: Pre-Medical, BSBE

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 125

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p. 977)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
MATH 2144	Calculus I (A)	4
MATH 2153	Calculus II (A)	3
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
CHEM 1314	Chemistry I (LN)	4
PHYS 2014	University Physics I (LN)	4
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN)	4
or BIOL 1114	Introductory Biology (LN)	
Social & Behavioral Sciences (S)		
Any course designated (S)		3
Additional General Education		
Courses designated (A), (H), (N), or (S)		3
Hours Subtotal		**43**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
Basic Science		
CHEM 1515	Chemistry II (LN)	5
Mathematics		
MATH 2163	Calculus III	3
MATH 2233	Differential Equations	3
Engineering & Engineering Science		
ENGR 1322	Engineering Design with CAD	2
or ENGR 1332	Engineering Design with CAD for MAE	
ENSC 2113	Statics	3
ENSC 2143	Strength of Materials	3
ENSC 2213	Thermodynamics	3
ENSC 2613	Introduction to Electrical Science	3
ENSC 3233	Fluid Mechanics	3
Biosystems Engineering		
BAE 1011	Introduction to Biosystems Engineering	1
BAE 1022	Experimental Methods in Biosystems Engineering	2
BAE 2013	Computational Methods in Biosystems Engineering	3
BAE 3033	Advanced Biology and Material Science of Biomaterials	3
Hours Subtotal		**38**
Major Requirements		
Common Professional School		
STAT 4033	Engineering Statistics	3
or STAT 4073	Engineering Statistics with Design of Experiments	
IEM 3503	Engineering Economic Analysis	3
BAE 3013	Heat and Mass Transfer in Biological Systems	3
BAE 3023	Instruments and Controls	3
BAE 3213	Energy and Power in Biosystems Engineering	3
BAE 4001	Professional Practice in Biosystems Engineering	1
BAE 4012	Senior Engineering Design Project I	2
BAE 4023	Senior Engineering Design Project II	3
Specific Professional School		
Select BAE 4000-level (Any Upper Level BAE Classes, at least 5 hours total)		5
CHEM 3053	Organic Chemistry I	3
CHEM 3153	Organic Chemistry II	3
CHEM 3112	Organic Chemistry Laboratory	2
MICR 2123	Introduction to Microbiology	3
BIOL 1604	Animal Biology	4
BIOC 3653	Survey of Biochemistry	3
or MICR 3033	Cell and Molecular Biology	
Hours Subtotal		**44**
Total Hours		**125**

Other Requirements

- A minimum 2.0 Technical GPA. The Technical GPA is calculated from all BAE prefixes or substitutions to BAE courses.
- A grade of "C" or better is required in following courses: BAE 2013, BAE 3013, BAE 3023, BAE 3033, BAE 3213, ENSC 2113, ENSC 2143, ENSC 2213, ENSC 2613, ENSC 3233.

- Students are required to complete the Fundamentals of Engineering (FE) exam prior to graduation.
- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Entomology and Plant Pathology

The mission for the Department of Entomology and Plant Pathology is to discover, develop and disseminate science-based knowledge concerning arthropods and plant pathogens. Entomology is the science and study of insects and related arthropods. Plant Pathology is the science and study of bacteria, viruses, fungi, and nematodes that cause diseases in plants. A strong academic background in the physical and biological sciences is essential for success in both disciplines. Research and education programs range from basic studies of cellular, physiological, and genetic aspects to broad ecological and population studies and focus on the development of practical pest management strategies.

The undergraduate program in entomology leads to the BS in Entomology and offers students opportunities to explore the diversity of nature through the study of arthropods and their interactions with plants, animals, and human culture. Specialized course work in entomology includes insect identification, biology, ecology, physiology, biochemistry, population dynamics, medical and veterinary entomology, and insect pest management.

Plant pathology as a discipline encompasses the science required to understand the causes of plant diseases as well as prevention and controlling diseases. Undergraduate level courses are available in Plant Pathology and are valuable additions to programs in entomology, horticulture, agronomy, ecology, and botany. Specialized course work in plant pathology includes pathogen identification, genetics, host pathogen physiology, biotechnology, molecular genetics, and disease management.

There are many, and diverse, career opportunities for graduates of these programs, including positions involved with pest management in crops and livestock production, stored products such as grains and processed foods and protecting structural systems such as houses from termites and agricultural biotechnology. Undergraduate options in entomology include insect biology and ecology, bioforensics, and pre-medical/pre-veterinary sciences. Undergraduates of the entomology program are prepared to enter graduate programs in several disciplines, including entomology and plant pathology and have been successful in seeking and receiving professional degrees in medical and veterinary science programs. Others gain employment with private industry, research laboratories or county, state, or federal agencies. Some develop their own businesses as consultants and/or entrepreneurs.

Minor in Entomology

This minor is designed to provide students with a basic understanding of insect biology, ecology, and classification. Students are also instructed on applications of Entomology related to ecosystem function, conservation, and agricultural impacts. Directed electives in this major also allow students to explore aspects of insect behavior, aquatic entomology, specific applications of entomology in horticulture, forestry, agronomy, structural, urban, and stored product scenarios. Requirements of the minor include 15 hours of core courses.

Minor in Pest Management

This minor is designed to introduce students to pests including insects, plant pathogens and weeds that damage, reduce the quality, or increase production costs of agricultural crops or livestock, turf or ornamental plants, and trees. Integrated management methods for these pests are presented including cultural, biological, and chemical control strategies. The minor is intended for students majoring in horticulture, plant and soil science, natural resource ecology and management, animal science, environmental science, entomology, or other majors in biological sciences. Requirements of the minor include 18 hours with 9-12 hours from core courses.

Courses

ENTO 2001 Introduction to Entomological Research
Description: Familiarize entomology majors with the department, faculty, and other students. Experience a broad overview of the field of entomology and how a degree in entomology can prepare you for many different opportunities and career paths.
Credit hours: 1
Contact hours: Lecture: 1 Contact: 1
Levels: Undergraduate
Schedule types: Lecture
Department/School: Entomology & Plant Pathology

ENTO 2003 Insects and Society (N)
Description: Influence of insects and related arthropods on human society. Current issues involving insects, society and the environment. View of insects in folklore and mythology. Basic biology and behavior of insects and use of insects as model systems for biological studies. A course for both majors and non-majors.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Entomology & Plant Pathology
General Education and other Course Attributes: Natural Sciences

ENTO 2223 Insects in Global Public Health (N)
Description: Biology of diseases carried by arthropods, including their historical and societal impacts focusing on the intersection of arthropod and human biology.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Entomology & Plant Pathology
General Education and other Course Attributes: Natural Sciences

ENTO 2993 Introduction to Entomology (LN)
Description: Basic biology and classification of insects and closely related animals. Overview of the ecological roles of insects in both natural and managed ecosystems. Previously offered as ENTO 2992 and ENTO 2023.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Entomology & Plant Pathology
General Education and other Course Attributes: Scientific Investigation, Natural Sciences

ENTO 3001 Research Skills in Entomology
Description: Introduction to research opportunities in field and laboratory entomology. Focus on literature review, hypothesis formation, and development of a grant proposal.
Credit hours: 1
Contact hours: Lecture: 1 Contact: 1
Levels: Undergraduate
Schedule types: Lecture
Department/School: Entomology & Plant Pathology

ENTO 3003 Livestock Entomology
Description: Economic importance, biology and control of pests affecting domestic animals. Biology of diseases carried by arthropods, including their impacts focusing on the intersection of arthropod and animal biology. Previously offered as ENTO 2091.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Entomology & Plant Pathology

ENTO 3044 Insect Morphology and Physiology
Prerequisites: ENTO 2993 Introduction to Entomology.
Description: Morphology and function of insects and their organ systems and use of selected techniques for the study of insect physiology. May not be used for degree credit with ENTO 5044.
Credit hours: 4
Contact hours: Lecture: 3 Lab: 3 Contact: 6
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Entomology & Plant Pathology

ENTO 3421 Horticultural Insects
Prerequisites: ENTO 2993 or concurrent enrollment.
Description: Identification, biology and control of pests attacking horticultural crops. Emphasis on pests injurious to vegetables, fruits, pecans, greenhouse plants, turf and ornamental trees and shrubs.
Credit hours: 1
Contact hours: Lab: 2 Contact: 2
Levels: Undergraduate
Schedule types: Lab
Department/School: Entomology & Plant Pathology

ENTO 3461 Insects in Forest Ecosystems
Prerequisites: ENTO 2993 or concurrent enrollment.
Description: Identification and seasonal life history of insect pests and beneficial insects on shade trees in urban settings, in commercial forests, and in forest products.
Credit hours: 1
Contact hours: Lab: 2 Contact: 2
Levels: Undergraduate
Schedule types: Lab
Department/School: Entomology & Plant Pathology

ENTO 3501 Entomology for Educators
Description: Hands-on laboratory course designed to provide high school science teachers, FFA or 4H leaders with all of the resources and background information needed to use insects as a model to teach scientific concepts. Curriculum and resources are provided at the level of 7-12th grade and may be adapted to other levels as needed.
Credit hours: 1
Contact hours: Lab: 2 Contact: 2
Levels: Undergraduate
Schedule types: Lab
Department/School: Entomology & Plant Pathology

ENTO 4223 Ecological Methodology
Prerequisites: One course in either ecology or general biology.
Description: Use of insects and other invertebrates for describing and evaluating interactions of individuals and populations with their environments. Coverage of behavioral and physiological ecology on consequences to individuals; population and community ecology considered in dynamics of groups of organisms in ecosystems. May not be used for Degree Credit with ENTO 5223.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Entomology & Plant Pathology

ENTO 4400 Special Topics
Prerequisites: Consent of instructor.
Description: Special topics in plant pathology, entomology or related fields. Same course as PLP 4400. Offered for variable credit, 1-3 credit hours, maximum of 3 credit hours.
Credit hours: 1-3
Contact hours: Contact: 1-3 Other: 1-3
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Entomology & Plant Pathology

ENTO 4464 Insect Biology and Classification
Prerequisites: ENTO 2993 or equivalent or consent of instructor.
Description: Insect phylogeny, taxonomy, behavior, morphology and physiology in the context of ecosystem function. Major roles of insects in shaping ecosystem diversity, as indicators of environmental integrity, and as vectors of plant and animal pathogens and parasites.
Credit hours: 4
Contact hours: Lecture: 2 Lab: 4 Contact: 6
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Entomology & Plant Pathology

ENTO 4484 Aquatic Entomology
Prerequisites: ENTO 2993 or instructor permission.
Description: Biology, taxonomy and ecology of insects and other invertebrates, inhabiting freshwater environments. Identification and biology of individual taxa. Roles of insects in aquatic ecology, as a forage base. May not be used for degree credit with ENTO 5484 or ZOOL 5484. Same course as ZOOL 4484. Previously offered as ENTO 4483.
Credit hours: 4
Contact hours: Lecture: 3 Lab: 2 Contact: 5
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Entomology & Plant Pathology

ENTO 4513 Biological Control
Prerequisites: ENTO 2993 or equivalent or consent of instructor.
Description: The ecological principles and applied practices of biological control of insects and weeds. Principles include the scientific basis of biological control; natural enemies and their biology; biological control methods; and biological control in invasive species and pest management programs. May not be used for degree credit with ENTO 5513.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Entomology & Plant Pathology

ENTO 4573 Introduction to Forensic Entomology
Description: The role of arthropods in decomposition, the use of forensic entomology in criminal and civil investigations and the increasing importance of forensic science on society; material includes content that some students may find disturbing. May not be used for degree credit with ENTO 5573.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Entomology & Plant Pathology

ENTO 4733 Insect Behavior and Chemical Ecology
Prerequisites: ENTO 2993 and CHEM 3015 or equivalent.
Description: Behavioral biology of insects. Ecological interactions among organisms mediated by naturally produced chemicals. An interface of ecology, behavior, physiology and chemistry with examples from animals, plants and microorganisms. Origin, function, significance and utilization of semiochemicals such as pheromones and allelochemicals. No credit for students with credit in ENTO 5733.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Entomology & Plant Pathology

ENTO 4800 Entomology Practicum
Prerequisites: Consent of instructor.
Description: Supervised research or extension experience with faculty in the Entomology/Plant Pathology Dept. or with approved governmental agencies or private employers. Written report required at close of practicum. Offered for variable credit, 1-4 credit hours, maximum of 4 credit hours.
Credit hours: 1-4
Contact hours: Contact: 1-4 Other: 1-4
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Entomology & Plant Pathology

ENTO 4854 Medical and Veterinary Entomology
Prerequisites: ENTO 2993 or consent of instructor.
Description: Biology and control of arthropod vectors of disease and the diseases carried by arthropods. Course includes emphasis on scientific writing skills. No credit for students with credit in ENTO 5854.
Credit hours: 4
Contact hours: Lecture: 3 Lab: 4 Contact: 7
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Entomology & Plant Pathology

ENTO 5003 Insect Biochemistry
Prerequisites: BIOC 3653 or equivalent or consent of instructor.
Description: Biochemical processes in insects and closely related arthropods with emphasis on pathways unique to this group. Biochemical aspects of arthropod-microbe and arthropod-host interactions.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Entomology & Plant Pathology

ENTO 5523 Integrated Management of Insect Pests and Pathogens
Prerequisites: ENTO 2993 and PLP 3344.
Description: Modern theory and practices for management of insect pests and pathogens in plant production systems, emphasizing an ecologically-based, integrated approach. Basic concepts of pest management, decision-making, cost/benefit analysis and risk/benefit analytics. Previously offered as ENTO 5524.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Entomol & Plant Path

ENTO 5573 Introduction to Forensic Entomology
Description: The role of arthropods in decomposition, the use of forensic entomology in criminal and civil investigations and the increasing importance of forensic science on society; material includes content that some students may find disturbing. May not be used for degree credit with ENTO 4573.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Entomology & Plant Pathology

ENTO 5613 Host Plant Resistance
Prerequisites: ENTO 2993 and PLP 3343 or equivalent and a general genetics course; or consent of instructor.
Description: Interactions of plants and the herbivorous insects and pathogenic micro-organisms that attack them. Development and deployment of multiple-pest resistant cultivars in crop management systems. Same course as PLP 5613. Previously offered as ENTO 5612.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Entomology & Plant Pathology

ENTO 5733 Insect Behavior and Chemical Ecology
Prerequisites: ENTO 2993 and CHEM 3015 or equivalent.
Description: Behavioral biology of insects. Ecological interactions among organisms mediated by naturally produced chemicals. An interface of ecology, behavior, physiology and chemistry with examples from animals, plants and microorganisms. Origin, function, significance and utilization of semiochemicals such as pheromones and allelochemicals. No credit for students with credit in ENTO 4733.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Entomology & Plant Pathology

PLP 3343 Principles of Plant Pathology
Prerequisites: PBIO 1404 or MICR 2123 or HORT 1113 or PLNT 2013.
Description: Introduction to basic principles and concepts of plant pathology, including the nature, cause and control of biotic and environmentally induced plant diseases, with emphasis on principles and methods of disease management. Offered in combination with PLP 5343. No credit for both PLP 3343 and PLP 5343. Previously offered as PLP 3344.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Entomology & Plant Pathology

PLP 3553 Fungi: Myths and More
Prerequisites: BIOL 1114 or (BIOL 1113 and BIOL 1111) or equivalent.
Description: Fungal biology covering environmental roles and impacts on the health and nutrition of plants, animals and humans. Ethnomycological and industrial uses of fungi in foods, medicines, and intoxicants, and associated folklore and myths. Microscopy, microbiological methods, mushroom cultivation, and identification of microfungi and wild mushrooms. Same course as BOT 3553 or PBIO 3553.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Entomology & Plant Pathology

PLP 4400 Special Topics
Prerequisites: Consent of instructor.
Description: Special topics in Plant Pathology, Entomology or related fields. Same course as ENTO 4400. Offered for variable credit, 1-3 credit hours, maximum of 3 credit hours.
Credit hours: 1-3
Contact hours: Contact: 1-3 Other: 1-3
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Entomology & Plant Pathology

PLP 4923 Applications of Biotechnology in Pest Management
Prerequisites: BIOL 1114 or (BIOL 1113 and BIOL 1111) and CHEM 1215 or equivalent.
Description: Applications of biotechnology in controlling arthropod pests of plants and animals, plant pathogens, and weeds. Introduction to underlying technology, products being developed and deployed, their effectiveness and associated problems or concerns resulting from their use. Same course as ENTO 4923 and PLNT 4923. Previously offered as PLP 4922. May not be used for Degree Credit with PLP 5923.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Entomology & Plant Pathology

PLP 5003 Plant Nematology
Prerequisites: PLP 3343 or concurrent enrollment.
Description: General morphology, taxonomy and bionomics of nonparasitic and plant parasitic nematodes. Plant parasitic nematode assay techniques, subfamily identification, symptomology, pathogenicity and control. Previously offered as PLP 5004.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Entomology & Plant Pathology

PLP 5613 Host Plant Resistance
Prerequisites: ENTO 3343 and ENTO 2993 or equivalent and a general genetics course; or consent of instructor.
Description: Interactions of plants and the herbivorous insects and pathogenic micro-organisms that attack them. Development and deployment of multiple-pest resistant cultivars in crop management systems. Same course as ENTO 5613.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Entomology & Plant Pathology

PLP 5860 Colloquium
Prerequisites: PLP 3343.
Description: Concepts and principles of plant pathology through discussions of pertinent literature. Offered for fixed credit, 2 credits, maximum of 2 credit hours.
Credit hours: 2
Contact hours: Contact: 3 Other: 3
Levels: Graduate
Schedule types: Independent Study
Department/School: Entomology & Plant Pathology

PLP 6303 Soilborne Diseases of Plants
Prerequisites: PLP 3343.
Description: Soilborne diseases, their reception and importance, the pathogens involved, rhizoplane and rhizosphere influences, inoculum potential, specialization of pathogens, suppressive soil effects, and disease management. Lecture and discussion sessions will emphasize in-depth understanding of problems and complexities associated with studies of soilborne pathogens.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Entomology & Plant Pathology

Undergraduate Programs

- Entomology: Bio-Forensics, BSAG (p. 2553)
- Entomology: Insect Biology and Ecology, BSAG (p. 2555)
- Entomology: Pre-Veterinary and Pre-Medical, BSAG (p. 2557)

Graduate Programs

Advanced Degree Programs

The Department of Entomology and Plant Pathology offers programs of study that lead to the MS of Entomology and Plant Pathology, the PhD in Entomology, or the PhD in Plant Pathology. These programs offer students opportunities to specialize in a wide range of basic or applied

research fields. To qualify for graduate study in entomology and/or plant pathology an applicant should obtain a solid background in the basic sciences, especially biology, chemistry, mathematics, English, and communications skills. All requirements of the Graduate College must be satisfied for entry to the graduate programs. In addition, applicants for graduate programs should take the Graduate Record Examination and submit their scores. Students applying to the graduate program must be accepted into a research program by a major professor. The applicant must secure appropriate financial support in the form of a scholarship, fellowship, or graduate assistantship to be negotiated with the major professor and department and be approved by the departmental screening committee and department head before being admitted to the Department. Each graduate student is under the direction of the major professor as advisor and a selected faculty advisory committee. The program of study is adapted to the individual's needs within departmental and Graduate College guidelines. Graduate students are required to meet with their advisory committees every six months for program reports. Each student will follow a program of study and research approved by the student's committee and must submit an approved thesis or dissertation and present a public defense. Students supported as half-time research assistants are expected to be active participants in the research projects of their major professors. Additional information regarding the graduate programs in Entomology and Plant Pathology may be obtained from the department's website at: https://agriculture.okstate.edu/departments-programs/entomol-plant-path/.

Minors

- Entomology (ENTO), Minor (p. 2552)
- Pest Management (PEST), Minor (p. 2559)

Faculty

Justin Talley, PhD—Professor and Head; Interim Director, Institute of Biosecurity and Microbial Forensics
Regents Professors: Kristopher L. Giles, PhD; Haobo Jiang, PhD
Regents Professor Emerita: Jacqueline Fletcher, PhD
Endowed Professor Structural and Urban Entomology: Bradford M. Kard, PhD
Professors: Kitty Cardwell, PhD; Francisco Ochoa Corona, PhD; Li Maria Ma, PhD; George Opit, PhD; Wyatt Hoback, PhD; Nathan Walker, PhD
Professors Emeriti: Robert W. Barker, PhD; Carol Bender, PhD; Richard C. Berberet, PhD; Jim T. Criswell, PhD; Kenneth Conway, PhD; John P. Damicone, PhD; Jonathon Edelson, PhD; Robert M. Hunger, PhD; Phillip G. Mulder, Jr, PhD; Tom Royer, PhD; John R. Sauer, PhD; Astri Wayadande, PhD; Russell E. Wright, PhD; Ali Zarrabi, PhD
Adjunct Professors: Charles Abramson, PhD; Akhtar Ali, PhD; Norman C. Elliott, PhD; John Foster, PhD; Carla Garzon, PhD; Brian McCornack, PhD; Hassan A. Melouk, PhD; J.P. Michaud, PhD; Richard Nelson, PhD; Eric Rebek, PhD; Hal Reed, PhD; Kiran Mysore, PhD; Carolyn Young, PhD
Associate Professors: Stephen Marek, PhD; Bruce Noden, PhD
Adjunct Associate Professors: Carmen Greenwood, PhD; Jen White, PhD
Assistant Professors: Meriem Aoun, PhD; Andres Espindola Camacho, PhD; Maira Duffeck, PhD; Mustafa Jibrin,PhD; Ashleigh Faris, PhD; Jonathan Cammack, PhD
Adjunct Assistant Professors: Francisco Flores, PhD; Deborah Jaworski, PhD; Michael Reiskind, PhD; Kay Scheets, PhD; Michael Cavallaro, PhD
Associate Extension Specialist & Pesticide Coordinator: Kevin Shelton, MS
Associate Extension Specialists: Steven Kelly Seuhs, MS; Andrine Shufran, PhD
Assistant Extension Specialist–Integrated Pest Management Specialist for Cotton: Maxwell Smith, MS
Director, Associate Extension Specialist-Plant Disease Diagnostics: Jen Olson, MS
Director, Oklahoma Agricultural Leadership Program and Associate Extension Specialist (Stored Products): Edmond Bonjour, MS

Entomology (ENTO), Minor

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Total Hours: 15

Code	Title	Hours
Minor Requirements		
ENTO 2993	Introduction to Entomology (LN)	3
Select 12 credit hours from any other ENTO courses to achieve the 15 minimum credits. Students must have a minimum of 2.0 GPA in ENTO courses.		12
Total Hours		**15**

Additional OSU Requirements

Undergraduate Minors

- An undergraduate minor must include between fifteen and thirty hours, inclusive of undergraduate coursework.
- A minimum of six credit hours for the minor must be earned in residence at OSU.
- The courses required for a minor may be included in the course requirements for any undergraduate degree or they may be in addition to degree requirements, depending on the overlap between the minor and degree requirements. However, an undergraduate minor must be earned in an academic field other than the student's declared degree option. The minor may not duplicate the degree major or option (for example, a student who earns a BA in Art with an Art History option may earn a minor in Studio Art but not Art History).
- A student generally follows the minor requirements associated with his or her matriculation year or newer requirements that have been established since matriculation. The time limit for following requirements from a given academic year is six years.

For additional information on requirements on minors, click here (https://adminfinance.okstate.edu/site-files/documents/policies/requirements-for-undergraduate-and-graduate-minors.pdf).

Entomology: Bio-Forensics, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p.)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
Select one of the following:		3
MATH 1513	College Algebra (A) [1]	
MATH 1613	Trigonometry (A) [1]	
MATH 2103	Business Calculus (A) [1]	
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
CHEM 1314	Chemistry I (LN) [1]	4
Select four hours from the following:		4
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN) [1]	
BIOL 1114	Introductory Biology (LN) [1]	
Social & Behavioral Sciences (S)		
Course designated (S)		3
Additional General Education		
Courses designated (A), (H), (N), or (S) [1]		8
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
Agricultural Sciences and Natural Resources		
Ferguson College of Agriculture course cannot be used here and as an (N)		
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
AGEC 1113	Introduction to Agricultural Economics (S)	3
ENTO 2993	Introduction to Entomology (LN)	3
STAT 2013	Elementary Statistics (A)	3
Select one of the following:		3
ANSI 1124	Introduction to the Animal Sciences	
BIOC 2344	Chemistry and Applications of Biomolecules	
ENVR 1113	Elements of Environmental Science (N)	
FDSC 1133	Fundamentals of Food Science	
HORT 1013	Principles of Horticultural Science (LN)	
LA 1013	Introduction to Landscape Architecture	
NREM 1014	Introduction to Natural History (LN)	
NREM 1113	Elements of Forestry	
NREM 2013	Ecology of Natural Resources	
PLNT 1213	Introduction to Plant and Soil Systems (N)	
SOIL 2124	Fundamentals of Soil Science (N)	
Written and Oral Communications		
Select one of the following:		3
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources	
BCOM 3113	Written Communication	
BCOM 3443	Business Communication for International Students	
ENGL 3323	Technical Writing [2]	
Select one of the following:		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S)	
SPCH 2713	Introduction to Speech Communication (S)	
SPCH 3733	Elements of Persuasion (S)	
Hours Subtotal		**19**
Major Requirements		
Core Courses		
Select two of the following:		8
ENTO 3044	Insect Morphology and Physiology	
ENTO 4464	Insect Biology and Classification	
ENTO 4854	Medical and Veterinary Entomology	
Additional Core Courses		
ENTO 4573	Introduction to Forensic Entomology	3
SOC 4333	Criminology (S)	3
SOC 4743	Criminalistics: Introduction to Forensic Sciences	3
Additional Entomology		
ENPP 2143	Global Agricultural Biosecurity and Forensics	3
ENTO 4800	Entomology Practicum	3
Related Courses		
Genetics:		
Select one of the following:		3
BIOL 3023	General Genetics	
PLNT 3554	Plant Genetics and Biotechnology	
ANSI 3423	Animal Genetics	
Chemistry:		
CHEM 1515	Chemistry II (LN)	5

Organic Chemistry (5 upper division hours)		5
BIOC 3653	Survey of Biochemistry	3
Lab Courses:		
CHEM 2113	Principles of Analytical Chemistry	3
CHEM 2122	Quantitative Analysis Laboratory	2
BIOC 3723	Biochemistry and Molecular Biology Laboratory	3
Additional Biological Courses		
Select 7 hours of the following:		7
MICR 2123 & MICR 2132	Introduction to Microbiology and Introduction to Microbiology Laboratory	
MICR 3033	Cell and Molecular Biology	
MICR 4123	Virology	
MICR 4203	Bioinformatics	
MICR 4233	Advanced Cell and Molecular Biology	
MICR 4253	Concepts in Medical Genetics	
MICR 4263	Microbial Genetics: from Genes to Genomes	
MICR 4323	Cellular Energy Metabolism	
BIOL 3204	Physiology	
BIOL 4215	Mammalian Physiology	
BIOL 4283	Endocrinology	
BIOL 4293	Behavioral Neuroendocrinology	
BIOL 4303	Organismal Ecotoxicology (OR)	
Upper level entomology, plant pathology, biological sciences, forensic sciences courses not taken for credit in other categories.		
Additional Math and Science		
Select 7 hours of the following:		7
MATH 2144	Calculus I (A)	
MATH 2153	Calculus II (A)	
PBIO 1404	Plant Biology (LN)	
CHEM 3153	Organic Chemistry II	
PHYS 1114	College Physics I (LN)	
PHYS 1214	College Physics II (LN)	
STAT 2331	SAS Programming	
STAT 4013	Statistical Methods I (A)	
STAT 4023	Statistical Methods II	
BIOL 1604	Animal Biology	
BIOL 4133	Evolution (OR)	
Other math and science courses not taken for credit in other categories		
Foreign Language		
Up to 10 credit hours of upper division foreign language may be substituted for Additional Natural Resources or Biological Sciences		
Hours Subtotal		**61**
Electives		
Select 0 hours or hours to complete required total for degree		0
Total Hours		**120**

1

College & Departmental requirements that may be used to meet General Education requirements.

2

If ENGL 3323 Technical Writing is substituted for ENGL 1213 Composition II above; hours in this block are reduced by 3.

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Entomology: Insect Biology and Ecology, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p.)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
Select one of the following:		3
MATH 1483	Mathematical Functions and Their Uses (A)	
MATH 1513	College Algebra (A) [1]	
MATH 1613	Trigonometry (A) [1]	
MATH 2103	Business Calculus (A) [1]	
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
CHEM 1314	Chemistry I (LN) [1]	4
or CHEM 1215	Chemical Principles I (LN)	
Select four hours from the following:		4
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN) [1]	
BIOL 1114	Introductory Biology (LN) [1]	
Social & Behavioral Sciences (S)		
Course designated (S)		3
Additional General Education		
Courses designated (A), (H), (N), or (S)		8
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
Agricultural Sciences and Natural Resources		
Ferguson College of Agriculture course cannot be used here and as an (N)		
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
AGEC 1113	Introduction to Agricultural Economics (S)	3
ENTO 2993	Introduction to Entomology (LN)	3
STAT 2013	Elementary Statistics (A)	3
Select one of the following:		3
ANSI 1124	Introduction to the Animal Sciences	
BIOC 2344	Chemistry and Applications of Biomolecules	
ENVR 1113	Elements of Environmental Science (N)	
FDSC 1133	Fundamentals of Food Science	
HORT 1013	Principles of Horticultural Science (LN)	
LA 1013	Introduction to Landscape Architecture	
NREM 1014	Introduction to Natural History (LN)	
NREM 1113	Elements of Forestry	
NREM 2013	Ecology of Natural Resources	
PLNT 1213	Introduction to Plant and Soil Systems (N)	
SOIL 2124	Fundamentals of Soil Science (N)	
Written and Oral Communications		
Select one of the following:		3
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources	
BCOM 3113	Written Communication	
BCOM 3443	Business Communication for International Students	
ENGL 3323	Technical Writing [2]	
Select one of the following: [3]		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S)	
SPCH 2713	Introduction to Speech Communication (S)	
SPCH 3733	Elements of Persuasion (S)	
Hours Subtotal		**19**
Major Requirements		
With approval from the advisor and the department head, a maximum of 30 hours of science courses from an accredited doctoral health program may be substituted for major requirements other than the ENTO core courses .		
Core Courses		
ENTO 3044	Insect Morphology and Physiology	4
ENTO 4464	Insect Biology and Classification	4
ENTO 2001	Introduction to Entomological Research	1
ENTO 3001	Research Skills in Entomology	1
ENTO 4800	Entomology Practicum	1
Entomology or plant pathology course not taken as a core course		12
Related Courses		
Genetics:		
Select one of the following:		3
BIOL 3023	General Genetics	
PLNT 3554	Plant Genetics and Biotechnology	
ANSI 3423	Animal Genetics	
Ecology:		

Select one of the following:		3
BIOL 3034	General Ecology	
NREM 4033	Ecology Of Invasive Species	
Chemistry:		
CHEM 1225	Chemical Principles II (LN) [1]	5
or CHEM 1515	Chemistry II (LN)	
Select one of the following:		3
BIOC 3653	Survey of Biochemistry	
CHEM 3053	Organic Chemistry I	
Select 24 hours of the following:		24
ENPP 2143	Global Agricultural Biosecurity and Forensics	
ENTO 2003	Insects and Society (N)	
ENTO 2223	Insects in Global Public Health (N)	
ENTO 3003	Livestock Entomology	
ENTO 3501	Entomology for Educators	
ENPP 3663	Turfgrass Integrated Pest Management	
ENTO 4223	Ecological Methodology	
ENTO 4400	Special Topics	
ENTO 4484	Aquatic Entomology	
ENTO 4573	Introduction to Forensic Entomology	
ENTO 4733	Insect Behavior and Chemical Ecology	
ENTO 4854	Medical and Veterinary Entomology	
Foreign Language: Up to 10 credit hours of upper division foreign language may be substituted		
Hours Subtotal		**61**
Electives		
Select 0 hours or hours to complete required total for degree		0
Total Hours		**120**

1

College & Departmental requirements that may be used to meet General Education requirements.

2

If ENGL 3323 Technical Writing is substituted for ENGL 1213 Composition II above; hours in this block are reduced by 3.

3

If used as (S) course above, hours in this block reduced by 3.

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Entomology: Pre-Veterinary and Pre-Medical, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p.)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
MATH 1513	College Algebra (A) [1]	3
or MATH 2103	Business Calculus (A)	
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
CHEM 1314	Chemistry I (LN) [1]	4
CHEM 1515	Chemistry II (LN) [1]	5
Select four hours from the following:		4
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN) [1]	
BIOL 1114	Introductory Biology (LN) [1]	
Social & Behavioral Sciences (S)		
SPCH 2713	Introduction to Speech Communication (S) [1]	3
or SPCH 3733	Elements of Persuasion (S)	
General Education		
Choose from course designated (A), (H), (N), or (S)		3
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed within the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
Agricultural Sciences and Natural Resources		
Ferguson College of Agriculture course cannot be used here and as an (N)		
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
AGEC 1113	Introduction to Agricultural Economics (S)	3
ENTO 2993	Introduction to Entomology (LN)	3
PHYS 1114 & PHYS 1214	College Physics I (LN) and College Physics II (LN)	8
STAT 2013	Elementary Statistics (A)	3
or STAT 2023	Elementary Statistics for Business and Economics (A)	
Select one of the following:		3
ANSI 1124	Introduction to the Animal Sciences	
BIOC 2344	Chemistry and Applications of Biomolecules	
ENVR 1113	Elements of Environmental Science (N)	
FDSC 1133	Fundamentals of Food Science	
HORT 1013	Principles of Horticultural Science (LN)	
LA 1013	Introduction to Landscape Architecture	
NREM 1014	Introduction to Natural History (LN)	
NREM 1113	Elements of Forestry	
NREM 2013	Ecology of Natural Resources	
PLNT 1213	Introduction to Plant and Soil Systems (N)	
SOIL 2124	Fundamentals of Soil Science (N)	
Written and Oral Communications		
Select one of the following:		3
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources	
BCOM 3113	Written Communication	
BCOM 3443	Business Communication for International Students	
ENGL 3323	Technical Writing [2]	
Hours Subtotal		**24**
Major Requirements		
Core ENTO Courses		
ENTO 3003	Livestock Entomology	3
ENTO 3044	Insect Morphology and Physiology	4
ENTO 4464	Insect Biology and Classification	4
ENTO 4854	Medical and Veterinary Entomology	4
ENTO 2001	Introduction to Entomological Research	1
ENTO 3001	Research Skills in Entomology	1
ENTO 4800	Entomology Practicum (1-3 hours)	1
Additional Core Courses		
MICR 2123 & MICR 2132	Introduction to Microbiology and Introduction to Microbiology Laboratory	5
BIOL 1604	Animal Biology	4
or BIOL 3204	Physiology	
Select one of the following:		5
CHEM 3013 & CHEM 3012	Survey of Organic Chemistry and Survey of Organic Chemistry Laboratory	
or		

CHEM 3053 & CHEM 3153 & CHEM 3112	Organic Chemistry I and Organic Chemistry II and Organic Chemistry Laboratory	
BIOC 3653	Survey of Biochemistry	3
Select one of the following:		3
ANSI 3423	Animal Genetics (Vet)	
ANSI 3543	Principles of Animal Nutrition	
BIOL 3023	General Genetics (Med)	
Related Courses		
Select Alternative 1 or Alternative 2 (p. 2558)		18
Hours Subtotal		**56**
Electives		
Select 0 hours to complete required total for degree		0
Total Hours		**120**

1

College & Departmental requirements that may be used to meet General Education requirements.

2

If ENGL 3323 Technical Writing is substituted for ENGL 1213 Composition II above; hours in this block are reduced by 3.

Alternatives

Alternative 1

Complete the first 2 semesters in a College of Veterinary Medicine or Medical School.

Alternative 2

Code	Title	Hours
Select 18 hours of the following:		18
ANSI 3543	Principles of Animal Nutrition	
ANSI 4843	Applications of Biotechnology in Animal Science	
BIOL 3023	General Genetics	
ENTO 3421	Horticultural Insects	
ENTO 3461	Insects in Forest Ecosystems	
ENTO 4733	Insect Behavior and Chemical Ecology	
ENTO 4800	Entomology Practicum (3 hours)	
MICR 3033	Cell and Molecular Biology	
MICR 3253	Immunology	
MATH 2144	Calculus I (A)	
MATH 2153	Calculus II (A)	
MATH 2163	Calculus III	
PSYC 1113	Introductory Psychology (S)	
SOC 1113	Introductory Sociology (S)	
BIOL 3114	Vertebrate Zoology	
BIOL 3204	Physiology	
BIOL 3214	Human Anatomy	
BIOL 4104	General Parasitology	
BIOL 4113	Conservation Genetics	
BIOL 4134	Embryology	
BIOL 4215	Mammalian Physiology	
BIOL 4273	Environmental Physiology	
BIOL 4283	Endocrinology	
BIOL 4293	Behavioral Neuroendocrinology	

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Pest Management (PEST), Minor

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Total Hours: 18

Code	Title	Hours
Minor Requirements		
Select one or both of the following:		3-6
ENTO 2993	Introduction to Entomology (LN)	
PLP 3343	Principles of Plant Pathology	
Select 6-10 hours of the following:		6-10
ENTO 2223	Insects in Global Public Health (N)	
ENTO 3421	Horticultural Insects	
ENTO 3461	Insects in Forest Ecosystems	
HORT 1013	Principles of Horticultural Science (LN)	
MICR 2123	Introduction to Microbiology	
NREM 1014	Introduction to Natural History (LN)	
NREM 2013	Ecology of Natural Resources	
PBIO 1404	Plant Biology (LN)	
PLNT 2013	Applied Plant Science	
PLNT 4013	Principles of Weed Science	
PLNT 4123	Plant-Environment Interactions	
SOIL 2124	Fundamentals of Soil Science (N)	
Additional hours to total 18 hours, from any of the following, or other upper-level course approved by the minor's departmental advisor:		
ENTO 3044	Insect Morphology and Physiology	
ENTO 3421	Horticultural Insects	
ENTO 3461	Insects in Forest Ecosystems	
ENTO 4223	Ecological Methodology	
ENTO 4464	Insect Biology and Classification	
ENTO 4484	Aquatic Entomology	
GEOG 3023	Climatology (N)	
HORT 3113	Greenhouse Management	
NREM 3613	Principles of Rangeland Management	
NREM 4033	Ecology Of Invasive Species	
PBIO 4233	Plant Anatomy	
PBIO 4463	Plant Physiology	
PLNT 4113	Advanced Weed Science	
PLNT 4123	Plant-Environment Interactions	
PLP 3343	Principles of Plant Pathology	
PLP 3553	Fungi: Myths and More	
SOIL 4363	Environmental Soil Science	
SOIL 4483	Soil Microbiology	
Total Hours		**18**

- A grade average of 2.0 for courses that count for the minor.

Additional OSU Requirements

Undergraduate Minors

- An undergraduate minor must include between fifteen and thirty hours, inclusive of undergraduate coursework.
- A minimum of six credit hours for the minor must be earned in residence at OSU.
- The courses required for a minor may be included in the course requirements for any undergraduate degree or they may be in addition to degree requirements, depending on the overlap between the minor and degree requirements. However, an undergraduate minor must be earned in an academic field other than the student's declared degree option. The minor may not duplicate the degree major or option (for example, a student who earns a BA in Art with an Art History option may earn a minor in Studio Art but not Art History).
- A student generally follows the minor requirements associated with his or her matriculation year or newer requirements that have been established since matriculation. The time limit for following requirements from a given academic year is six years.

For additional information on requirements on minors, click here (https://adminfinance.okstate.edu/site-files/documents/policies/requirements-for-undergraduate-and-graduate-minors.pdf).

Environmental Sciences

The Ferguson College of Agriculture offers an undergraduate major in Environmental Sciences. This interdisciplinary program provides a comprehensive and quality education that prepares students to analyze complex environmental challenges and formulate sustainable, science-based solutions.

As an interdisciplinary, science-oriented major, Environmental Sciences include courses in biology, chemistry, math, physics, statistics, and social sciences. Students may choose one of three areas of emphasis (options):Environmental Policy, Natural Resources, or Water Resources. Depending on the option, upper-division coursework will require interdisciplinary problem-solving in water and soil quality, economic and social policy, political science, resource management, restoration and/or invasive species. Students will also be exposed to general educational subjects, including communications, philosophy, ethics, and sociology.

A primary goal is to enable graduates to solve environmental problems based on scientific principles and in accordance with society's needs.

The environmental sciences undergraduate major is directly supported by faculty from multiple departments in the Ferguson College of Agriculture, including Agricultural Economics (AGEC), Agricultural Education, Communication and Leadership (AECL), Animal and Food Sciences (AFS), Biosystems and Agricultural Engineering (BAE), Entomology and Plant Pathology (EPP), Horticulture and Landscape Architecture (HLA), Natural Resource Ecology and Management (NREM), and Plant and Soil Sciences (PASS). Students in Environmental Sciences also benefit from working in classroom, field, and laboratory settings with faculty who are conducting cutting-edge research related to environmental problems. Undergraduate student research is supported through a variety of programs, including the Freshman Research Scholars Program, Oklahoma Agricultural Experiment Station and Ferguson College of Agriculture Undergraduate Research Scholars Program, Honors Thesis Projects, Niblack and Wentz Research Scholars Programs, Oklahoma Louis Stokes Alliance for Minority Participation Program, Goldwater, and Udall Scholars.

Graduates from the program are well-prepared for working in areas such as land-use planning, environmental management, natural resources management, waste disposal, water and soil quality, environmental restoration, environmental remediation, and policy analysis.

Our graduates work with federal, state, or local government agencies involved in resource management and policy development. Graduates also find employment with consulting firms that are involved with solving environmental problems. Many graduates go on to graduate school or pursue a professional degree in law or medicine.

Courses

ENVR 1113 Elements of Environmental Science (N)
Description: Application of biology, chemistry, ecology, economics, geology, hydrology, mathematics, physics, and other agricultural sciences to environmental issues. Addressing environmental problems from the standpoint of ethics, risk, and scientific and social feasibility. Emphasis on agricultural systems and natural resources.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Dean of Agriculture
General Education and other Course Attributes: Natural Sciences

ENVR 3101 Career Development in Environmental Sciences
Description: Develop career readiness skills in the environmental science field through resume building. Identify necessary skills to meet job requirements. Learn about career development resources and networking with environmental professionals. Understand the steps of the job/graduate school search, application and interview process.
Credit hours: 1
Contact hours: Lecture: 1 Contact: 1
Levels: Undergraduate
Schedule types: Lecture
Department/School: Dean of Agriculture

ENVR 3113 Environmental Sampling and Analysis
Prerequisites: ENVR 1113 and CHEM 1215 or CHEM 1314 and BIOL 1114 or (BIOL 1111 and BIOL 1113) and STAT 2013; SOIL 2124 (or concurrently)
Description: Sampling and analysis for environmental characterization. Introduction of methods to analyze air, soil, water, vegetation, and biological samples. Applying state and federal criteria to evaluate environment.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 3 Contact: 5
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Dean of Agriculture

ENVR 4010 Internships in Environmental Science
Description: Supervised internships with business, industry, or governmental agencies in environmental policy, natural resources, and water resources. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Dean of Agriculture

ENVR 4033 Ecology of Invasive Species
Prerequisites: BIOL 1114 or (BIOL 1113 and BIOL 1111); and PBIO 1404 and BIOL 1604 recommended.
Description: Ecological principles and their application to invasive species. Population level characteristics, community and ecosystem level effects of a wide variety of taxa including microbial, fungal, plant invertebrate and vertebrate examples. Global consequences and governmental policies/programs designed to limit the spread of invasives. Same course as NREM 4033. May not be used for degree credit with NREM 5033.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Dean of Agriculture

ENVR 4112 Land Measurement and Site Analysis
Prerequisites: MATH 1513 or equivalent.
Description: Methods and techniques used to locate sites and evaluate physical conditions. Includes map interpretation and land description, use of Global Positioning Systems, Rectangular System of Land Description and determination of land elevations, areas and slopes. Same course as AST 4112. Previously offered as MCAG 3311 and MCAG 4112.
Credit hours: 2
Contact hours: Lecture: 1 Lab: 2 Contact: 3
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Dean of Agriculture

ENVR 4363 Environmental Soil Science
Prerequisites: BIOL 1114 or (BIOL 1113 and BIOL 1111) and SOIL 2124.
Description: Re-emphasis of soil science concepts vital in the understanding of processes that are within the realms of the ecological regulator function of the soil; discussions on the role of soil as the foundation of forest, rangeland/pastureland, agricultural, urban and suburban, as well as wetland ecosystems; impact of soil processes on global environmental concerns; soil as the ultimate recipient of waste; impact of soil processes on groundwater and surface water quality Same course as SOIL 4363.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Dean of Agriculture

ENVR 4500 Environmental Science Problems
Prerequisites: Upper-division standing, GPA of 2.50 or better, and consent of instructor.
Description: Individual or small group study of selected problems in environmental science. Course may be used twice for up to six credit hours to meet degree requirements. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Dean of Agriculture

ENVR 4512 Introduction to National Environmental Policy Act
Description: Outline of the National Environmental Policy Act (NEPA) documentation of potential environmental impacts for decision makers. Development of environmental assessment, environmental impact statements, and categorical exclusion documents that result from the NEPA processes.
Credit hours: 2
Contact hours: Lecture: 2 Contact: 2
Levels: Undergraduate
Schedule types: Lecture
Department/School: Dean of Agriculture

ENVR 4573 Ethical Issues in Agriculture and the Environment
Description: Application of ethical concepts and economics theory to real-world agricultural and environmental issues. Recognition of the moral, ethical, and economic dimensions of value that aid in understanding and resolving the controversial aspects of these private and public issues.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Dean of Agriculture

ENVR 4811 Capstone Project Planning
Prerequisites: Senior standing. ENVR 1113 and ENVR 3113 (with a grade of "C" or better) or ENVR 3113 concurrent.
Description: Collaborate in a team setting to develop a comprehensive proposal and strategic timeline addressing a real-world environmental science problem. Apply essential teamwork skills, integrate knowledge from prior coursework, and engage with environmental stakeholders, advisors, and experts. Develop a written proposal aimed at resolving the issue or implementing an innovative solution.
Credit hours: 1
Contact hours: Lecture: 1 Contact: 1
Levels: Undergraduate
Schedule types: Lecture
Department/School: Dean of Agriculture

ENVR 4813 Environmental Science Capstone
Prerequisites: ENVR 4811 with a grade of "C" or better. Must be taken the immediate semester after completion of ENVR 4811.
Description: Team-based project to develop and recommend solutions and communicate recommendations to stakeholders as part of a senior capstone project. Research results are presented by oral and written reports directly to stakeholders.
Credit hours: 3
Contact hours: Lecture: 1 Lab: 4 Contact: 5
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Dean of Agriculture

ENVR 4893 Environmental Soil Chemistry
Prerequisites: SOIL 2124 and CHEM 1225 or CHEM 1515.
Description: Chemistry of soil systems with an emphasis on environmental health and quality. Topics include organic matter dynamics, the role of plant and microbial inputs, ion exchange processes, sorption phenomena, properties of clay minerals, and soil acidity. Same course as SOIL 4893.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Dean of Agriculture

ENVR 4913 Animal Waste Management
Prerequisites: SOIL 2124.
Description: Aspects of animal waste management related to animal nutrition, system design, land application, socioeconomic issues and environmental impacts. Same course as ANSI 4913 and SOIL 4913.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Dean of Agriculture

ENVR 5000 Master's Thesis
Prerequisites: Approval of advisory committee and departmental steering committee.
Description: Research leading to master's thesis or report. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Graduate
Schedule types: Independent Study
Department/School: Graduate College

ENVR 5033 GIS Applications for Water Resources
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

ENVR 5050 Readings in Environmental Science
Prerequisites: Consent of the instructor.
Description: This course provides an avenue for masters students to extend their knowledge of Environmental Science topics not covered in other courses. This course is not available for doctoral students. Offered for variable credit, 1-3 credit hours, maximum of 9 credit hours.
Credit hours: 1-3
Contact hours: Contact: 1-3 Other: 1-3
Levels: Graduate
Schedule types: Independent Study
Department/School: Graduate College

ENVR 5123 Environmental Problem Analysis
Description: This course reviews the process of environmental problem analysis using current practical examples. This course draws on theories from various disciplines and applies appropriate techniques of analysis.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

ENVR 5200 Special Topics in Environmental Science
Prerequisites: Graduate standing.
Description: Topics and issues in the broad field of environmental science. Group discussions and projects not covered by existing courses such as ecological risk assessment, water chemistry and environmental law. Offered for variable credit, 1-4 credit hours, maximum of 10 credit hours.
Credit hours: 1-4
Contact hours: Contact: 1-4 Other: 1-4
Levels: Graduate
Schedule types: Independent Study
Department/School: Graduate College

ENVR 5210 Seminar in Environmental Science
Prerequisites: Consent of the instructor.
Description: This seminar is offered as a special topics course for masters students. The theme of the seminar will vary in accordance with recent advances in environmental science and the interests of the faculty instructor. Offered for variable credit, 1-3 credit hours, maximum of 6 credit hours.
Credit hours: 1-3
Contact hours: Contact: 1-3 Other: 1-3
Levels: Graduate
Schedule types: Independent Study
Department/School: Graduate College

ENVR 5303 Issues in Environmental Sustainability
Description: The course reviews human-nature relationships and how they affect the ability of future generations to sustainably improve their quality of life. The course also considers methods of environmental stewardship that can contribute to sustainability. In-class and/ or online discussions of issues, guest presentations by outside experts, and reports on selected topics are included.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

ENVR 5313 Clean Air Act: Regulation, Compliance and Reporting
Description: This course will present an overview of the Federal Clean Air Act including regulatory history and framework, key concepts such as technology forcing, enforceability and adequate margin of safety. This course addresses the preparation of emissions calculations for reporting and permitting, discussion of emissions monitoring and control technologies, and review of reporting requirements and legal standards for compliance. Course will focus on U.S. Federal and State application.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

ENVR 5353 Environmental Outreach and Education
Description: Techniques for environmental education and outreach programs for adults and children in the classroom and in the public arena.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

ENVR 5403 Water Resource Management, Law, and Policy
Description: This course explores ways to secure the right to obtain and use water, as well as the law relating to water pollution permitting. Surface and groundwater resources will be the focus. The course covers doctrines of water allocation, groundwater management regimes, the public rights to water, federal and tribal water management and regulation of water resources, and the permitting regime under the Clean Water Act.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

ENVR 5413 Legal Framework for Resource Decision - Making and Public Land Management
Description: This course focuses on the federal, state, and local agencies, policies, strategies, and public law that influence public lands management of the United States, and, to a lesser extent, other countries. Focus is on the historical and contemporary land management approaches used to protect, exploit, manage, and/or use public lands, with specific emphasis on the application of the National Environmental Policy Act (NEPA), jurisdiction, and contemporary issues.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

ENVR 5433 Environmental Law for Management Professionals
Description: This course blends fundamental environmental policy with legal and practical information for the management professional with emphasis on case and statutory histories. The course will explore why environmental laws and policies developed, how they are implemented, and how compliance is achieved. Students will gain the ability to evaluate the need for permits and know how to work practically and cooperatively with relevant state and federal agencies.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

ENVR 5443 Hazardous Waste Regulations for Environmental Managers
Description: Covers air, water and waste permitting and plans as well as DOT transportation of hazardous materials and several OSHA standards.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

ENVR 5453 Bioremediation for Environmental Managers
Description: Teaches the fundamental biological mechanisms that allow microorganisms and plants to degrade and/or remove contaminants from the environment.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

ENVR 5503 Environmental Management Practicum
Prerequisites: 18 graduate credit hours.
Description: This course explores methods of analyzing sustainable solutions to complex environmental, safety and health problems using an integrated team approach. This approach combines technical, legal, economic, and sociopolitical information into a coherent analytical framework.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

ENVR 5510 Environmental Management Internship
Prerequisites: ENVR 5503 and consent of program director.
Description: The student must identify and solve an environmental problem under the supervision of a competent professional environmental manager, and submit and defend a formal report presenting the problem, solution analysis methodologies, and recommended solution. The internship must involve at least 240 contact hours with the manager. The course is required of all masters students pursuing a plan of study in environmental management. Course previously offered as ENVR 5600. Offered for fixed credit, 3 credit hours.
Credit hours: 3
Contact hours: Contact: 3 Other: 3
Levels: Graduate
Schedule types: Independent Study
Department/School: Graduate College

ENVR 5513 Advanced Environmental Impact Analysis
Description: National Environmental Policy Act (NEPA) outlines documentation of potential environmental impacts for decision makers. Development of environmental assessment, environmental impact statements, and categorical exclusion documents that result from the NEPA processes. Development of environmental assessment projects graded on a pass/fail basis.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Graduate College

ENVR 5523 Industrial Ecology
Prerequisites: General biology.
Description: Provides students with an overview and broad understanding of ecology principles as applied to an industrial setting. The course begins with an overview of general ecological principles such as ecosystem components and structures, biogeochemical cycles, energy flows, and properties of populations. The course concludes with a consideration of industrial ecology principles such as sustainability, pollution prevention, life cycle assessment and waste minimization.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

ENVR 5533 Genres of Environmental Writing
Description: This course focuses on three written genres: proposals, reports and academic articles. Students will learn the basic Introduction, Methods, Results, and Discussion (IMRD) structure. This structure is the basis of workplace reports and research articles in a wide variety of academic disciplines. Students will examine how the language features and organizational structure of these documents are influenced by their audience and context.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

ENVR 5543 Environmental Management Systems
Description: This course introduces strategies for the design and operation of environmental management systems that reduce environmental impacts in conformance with ISO 14000 standards. Topics include aspect identification, impact assessment, impact reduction strategies, and management oversight. Other topics such as training, internal and external auditing, and integration with other management programs will also be addressed.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

ENVR 5563 Transportation of Hazardous Materials
Description: This course will fulfill the Federal Department of Transportation (DOT) training requirements for General Awareness and Security Awareness in accordance with 49 CFR, Part 172, Subpart H. The course covers shippers' responsibilities associated with the many hazardous materials regulated by the DOT. Students will learn how to use the hazmat table and complete shipping papers; when to use specific hazard placards, markings and labels; and how to appropriately package specific hazardous materials.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

ENVR 5573 Applied Standards for Environmental Managers
Description: Foundational understanding of the complex regulatory framework related to waste management.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

ENVR 5583 Safety Aspects for Environmental Managers
Description: This course fulfills OSHA's 30-hour General Industry training requirements as per 29 CFR 1910. The course provides environmental managers with specialized training to recognize, avoid, and prevent potential jobsite hazards. Students will gain a practical understanding of hazard analysis calculations and their application within the rules and regulations of OSHA.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

ENVR 5593 Hazardous Waste Operations and Emergency Response: HAZWOPER
Description: This course fulfills the off-site requirements of OSHA 40-hour Hazardous Waste Operations and Emergency Responses Standard (HAZWOPER) requirements for General Site Workers as per 29 CFR 1910.120. The course uses discussion, demonstration, simulations, and hands-on experiences to address personal protective equipment use, decontamination procedures, and tactics for establishing safe work areas at hazardous waste sites or in emergency response work.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

ENVR 5613 Introduction to Environmental Toxicology & Industrial Hygiene
Description: An introduction to the basic principles, concepts, and issues associated with environmental toxicology and industrial hygiene. Environmental toxicology addresses biological, chemical and physical contaminants in the environment, their fate and transport, and their potential adverse effects. Also covers environmental factors that contribute to worker illness and injury resulting from exposure to chemical, physical and biological contaminants.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

ENVR 5633 Physical Geology for Environmental Managers
Description: Overview of the physical and chemical nature of the solid and fluid earth. Focuses on how these physical attributes and processes influence interactions between humans and the earth's environment.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

ENVR 5673 Applied Hydrology & Hydrogeology for Environmental Managers
Description: Aspects of surface and groundwater of direct interest to environmental managers. Hydrology is considered from the perspective of irrigation and stormwater management. Hydrogeology is addressed as it applies to industrial and commercial sites. Emphasis on use of monitoring equipment and preparation of stormwater manager plans, groundwater investigation reports, and groundwater management plans.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

ENVR 5703 Chemical Aspects of Environmental Science I
Prerequisites: CHEM 1225, MATH 2155.
Description: For non-chemists with a basic understanding of industrial environmental chemistry. For the environmental professional student in the calculations required for permitting, such as the Clean Air Act, the Clean Water Act, release reporting (CERCLA), RCRA and Industrial Hygiene. The chemical interpretation of MSDS sheets and review of basic chemistry for individuals sitting for professional examinations. Fundamental scientific basis required for dealing with any environmental area.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

ENVR 5713 Chemical Aspects of Environmental Science II
Prerequisites: ENVR 5703.
Description: A continuation of 5703. Applications of statistical methods for environmental monitoring, environmental sampling, chemical wastewater treatment, fugacity (air emission calculations) and environmental chemical analysis.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

ENVR 5723 Field Investigation for Environmental Managers
Description: This course focuses on practical environmental investigations of soil, surface water, and groundwater contamination within an industrial setting. Students will research study sites to design, estimate cost, and implement actual field investigations. Samples will be analyzed and results used to make recommendations for operational improvement and/or remediation.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

ENVR 5733 Environmental Site Assessment
Description: This course introduces concepts associated with conducting environmental site assessments (ESAs) and contaminant remediation. Topics include review of federal regulations regarding site assessments, an overview of Phase I and Phase II ESA methodologies, proper soil/water sampling techniques, soil/geology/hydrogeology principles relating to environmental assessments, and various remediation strategies. The course includes field exercises simulating Phase I and Phase II ESA investigations, interpretation of historical aerial photos, and wetland identification.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

ENVR 5743 Environmental Impact Assessment
Description: The course teaches students how to understand and apply the National Environmental Policy Act to evaluate and document potential environmental impacts for decision makers. The course reviews the development of environmental assessment, environmental impact statement and categorical exclusion documents that result from the NEPA process. Emphasis is placed on the development of an environmental assessment program.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

ENVR 5753 Environmental Site Remediation
Description: Introduction to concepts associated with environmental site remediation. Emphasis will be placed on the application and assessment of site clean-up.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

ENVR 5823 Watershed Management
Description: This course provides an overview of watershed management that integrates law, politics, economics, watershed science, engineering, education, social marketing, and conflict resolution. Students will also learn how to critically evaluate watershed management programs. Field trips to watersheds are included.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

ENVR 5853 Field Stream Assessment
Description: Techniques for evaluating the health of streams. Laboratory techniques for fish and aquatic insect collection, habitat assessments, chemical water quality analysis, and stream discharge measurement.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

ENVR 6000 Doctoral Research for Dissertation
Prerequisites: Approval of advisory committee.
Description: Research leading to the PhD dissertation. Offered for variable credit, 1-12 credit hours, maximum of 24 credit hours.
Credit hours: 1-12
Contact hours: Contact: 1-12 Other: 1-12
Levels: Graduate
Schedule types: Independent Study
Department/School: Graduate College

ENVR 6011 Survey of Environmental Science
Description: This course introduces newly admitted environmental science students to environmental research conducted by faculty at OSU. The course also helps students prepare interdisciplinary plans of study that support their professional and research goals. It is required of all ES doctoral students during their first year of enrollment. The course may also be taken by ES masters students, but is not required.
Credit hours: 1
Contact hours: Lecture: 1 Contact: 1
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

ENVR 6023 Research Methodologies in Environmental Science
Prerequisites: Permission of student's research adviser.
Description: Introduction to research techniques and literature in environmental science for doctoral students.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

ENVR 6031 Interdisciplinary Research Report Preparation
Prerequisites: ENVR 6023 or AGED 5983 and permission of the student's research adviser.
Description: This course teaches students how to prepare and defend interdisciplinary dissertations. Students will learn how to interpret results, articulate findings, justify conclusions, and identify implications. They will also learn how to deliver professional conference presentations and write professional papers. The course requires permission of the student's research adviser. The course is required of all ES doctoral students just before they intend to prepare and defend their dissertations. ES master's students who want to learn more about preparing and defending a thesis may also enroll.
Credit hours: 1
Contact hours: Lecture: 1 Contact: 1
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

ENVR 6050 Advanced Readings in Environmental Science
Prerequisites: Consent of the instructor.
Description: This course provides an avenue for doctoral students to extend their knowledge of environmental science topics not covered in other courses. Offered for variable credit, 1-3 credit hours, maximum of 9 credit hours.
Credit hours: 1-3
Contact hours: Contact: 1-3 Other: 1-3
Levels: Graduate
Schedule types: Independent Study
Department/School: Graduate College

ENVR 6210 Advanced Seminar in Environmental Science
Prerequisites: Consent of the instructor.
Description: This course is offered as a special topics course for doctoral students. The theme of the course will vary in accordance with recent advances in environmental science and the interests of the faculty instructor. No masters student may enroll in this course. Offered for variable credit, 1-3 credit hours, maximum of 9 credit hours.
Credit hours: 1-3
Contact hours: Lecture: 1-3 Contact: 1-3
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

ENVR 6310 Advanced Topics in Environmental Science
Prerequisites: 24 credit hours of graduate credit and permission of instructor.
Description: This course covers current topics and issues in environmental science. Though the topics will vary, each course will typically include environmental assessment, environmental sustainability and environmental policy. Group discussions and team projects may be required. Offered for variable credit, 1-3 credit hours, maximum of 6 credit hours.
Credit hours: 1-3
Contact hours: Contact: 1-3 Other: 1-3
Levels: Graduate
Schedule types: Independent Study
Department/School: Graduate College

ENVR 6503 Advanced Environmental Management Practicum
Prerequisites: 30 graduate credit hours.
Description: This course discusses and compares advanced methods of analyzing sustainable solutions to complex environmental, safety and health problems. A framework for integrating technical, legal, economic, and sociopolitical analysis into a risk-based model will be developed and applied to a real-world case study. Required for doctoral students pursuing a plan of study in environmental management.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

ENVR 6516 Advanced Environmental Management Internship
Prerequisites: ENVR 6503 and consent of program director.
Description: The student must identify and solve an environmental problem in collaboration with a competent professional environmental manager, and submit and defend a formal report presenting the problem, problem and solution analysis methodologies, and recommended solution. The internship must involve at least 480 contact hours with the manager. The course is an experience for all ES doctoral students pursuing a plan of study in environmental management.
Credit hours: 6
Contact hours: Lecture: 6 Contact: 6
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

ENVR 6623 Social Aspects of Environmental Planning
Description: This course develops students' theoretical and practical understanding of social aspects of environmental planning. The course addresses topics such as social impact assessment, the role of public involvement, environmental justice, and other social considerations in the implementation of environmental programs. It will also demonstrate the application of social science techniques in environmental planning and prepare students for the application of social perspectives in environmental decision-making - in both the public and private sectors.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Graduate College

Undergraduate Programs

- Environmental Science: Environmental Policy, BSAG (p. 2569)
- Environmental Science: Natural Resources, BSAG (p. 2571)
- Environmental Science: Water Resources, BSAG (p. 2573)

Minors

- Environmental Science (ENVR), Minor (p. 2568)

Faculty

Karen Hickman, PhD—Professor and Director
Professors: Sergio M. Abit, Jr., PhD (PASS; environmental soil science); Tyson E. Ochsner, PhD (PASS; soil and water resources); Ryan Reuter, PhD (AFS; animal science); Karl Rich, PhD (MIAP; international agriculture); Kevin Wagner, PhD (OK Water Resource Center; water resources); Gail W.T. Wilson, PhD (NREM; restoration ecology); Chris B. Zou, PhD (NREM; hydrology and water quality)
Associate Professors: Qing Lana Luo, MLA (HLA; landscape architecture); Quisto Settle, PhD (AECL; agricultural communications)
Assistant Professors: Julie LaBar, PhD (PASS; environmental science); Lixia H. Lambert, PhD (AGEC; natural resource and environmental economics)
Graduate Program: Scott Stoodley, PhD (Environmental Science Graduate Program; environmental science, water quality, remote sensing)

Environmental Science (ENVR), Minor

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Total Hours: 19

Code	Title	Hours
Minor Requirements		
ENVR 1113	Elements of Environmental Science (N)	3
SOIL 2124	Fundamentals of Soil Science (N)	4
ENVR 3113	Environmental Sampling and Analysis	3
Select 9 hours from the following:		9
AGCM 3503	Issues Management and Crisis Communications in Agriculture and Natural Resources	
AGEC 3503	Natural Resource Economics	
AGEC 4503	Environmental Economics and Resource Development	
ENVR 4033	Ecology of Invasive Species	
ENVR 4363	Environmental Soil Science	
ENVR 4512	Introduction to National Environmental Policy Act	
ENVR 4811	Capstone Project Planning	
ENVR 4813	Environmental Science Capstone	
ENVR 4893	Environmental Soil Chemistry	
NREM 4023	Restoration Ecology	
NREM 4443	Watershed Hydrology and Water Quality	
SOIL 4463	Soil and Water Conservation	
SOIL 4483	Soil Microbiology	
SOIL 4683	Soil, Water, and Weather	
Total Hours		**19**

Other Requirements

- At least nine upper-division hours must be taken at OSU.
- A grade-point average of 2.0 for courses that count for the minor.

Additional OSU Requirements

Undergraduate Minors

- An undergraduate minor must include between fifteen and thirty hours, inclusive of undergraduate coursework.
- A minimum of six credit hours for the minor must be earned in residence at OSU.
- The courses required for a minor may be included in the course requirements for any undergraduate degree or they may be in addition to degree requirements, depending on the overlap between the minor and degree requirements. However, an undergraduate minor must be earned in an academic field other than the student's declared degree option. The minor may not duplicate the degree major or option (for example, a student who earns a BA in Art with an Art History option may earn a minor in Studio Art but not Art History).
- A student generally follows the minor requirements associated with his or her matriculation year or newer requirements that have been established since matriculation. The time limit for following requirements from a given academic year is six years.

For additional information on requirements on minors, click here (https://adminfinance.okstate.edu/site-files/documents/policies/requirements-for-undergraduate-and-graduate-minors.pdf).

Environmental Science: Environmental Policy, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 124

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p.)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
STAT 2013	Elementary Statistics (A) [1]	3
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
Select four hours from the following:		4
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN) [1]	
BIOL 1114	Introductory Biology (LN) [1]	
Course designated (N)		3
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1]	3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [1]	3
or SPCH 2713	Introduction to Speech Communication (S)	
Additional General Education		
Courses designated (A), (H), (N), or (S)		6
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
Agricultural Sciences and Natural Resources		
UNIV 1111	First Year Seminar (or other approved first year seminar course) [3]	1
ENVR 1113	Elements of Environmental Science (N) [3]	3
SOIL 2124	Fundamentals of Soil Science (N) [3]	4
Select one of the following:		3
BCOM 3113	Written Communication [3]	
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources [3]	
ENGL 3323	Technical Writing [2, 3]	
MATH 1513	College Algebra (A)	3
CHEM 1314	Chemistry I (LN) [1, 3]	4
or CHEM 1215	Chemical Principles I (LN)	
CHEM 1515	Chemistry II (LN) [1,3]	5
or CHEM 1225	Chemical Principles II (LN)	
Hours Subtotal		**23**
Major Requirements		
AGEC 3503	Natural Resource Economics [3]	3
ENVR 3101	Career Development in Environmental Sciences	1
ENVR 3113	Environmental Sampling and Analysis [3]	3
ENVR 4113	Advanced Environmental Sampling and Analysis	3
ENVR 4512	Introduction to National Environmental Policy Act	2
Select one of the following:		3
GEOG 2344	Digital Tools for Environmental Problem-Solving (LN) [3]	
NREM 2083	Geospatial Technologies for Natural Resources [3]	
GEOG 4203	Fundamentals of Geographic Information Systems [3]	
ENVR 4010	Internships in Environmental Science [3]	1
ENVR 4033	Ecology of Invasive Species	3
ENVR 4811	Capstone Project Planning [3]	1
ENVR 4813	Environmental Science Capstone [3]	3
Select one of the following:		3
AGEC 3723	Environmental Law for Agriculture and Natural Resources [3]	
NREM 4043	Natural Resource Administration and Policy [3]	
POLS 4363	Environmental Law And Policy [3]	
CHEM 3013	Survey of Organic Chemistry [3]	3
or BIOC 2344	Chemistry and Applications of Biomolecules	
BIOL 3034	General Ecology [3]	4
PBIO 1404	Plant Biology (LN)	4
or BIOL 1604	Animal Biology	
GEOL 1114	Physical Geology (LN)	4
or PHYS 1114	College Physics I (LN)	
AGEC 4503	Environmental Economics and Resource Development	3
Select one of the following:		3
STAT 4013	Statistical Methods I (A)	
MATH 2103	Business Calculus (A)	
MATH 2144	Calculus I (A)	

AGCM 3503	Issues Management and Crisis Communications in Agriculture and Natural Resources	3
SOC 4433	Environmental Sociology (S) [3]	3
Related Courses		
Select 8 hours of the following:		8
AGLE 3403	Facilitating Social Change in Agriculture	
BIOL 3053	Freshwater: Concepts, Threats and Management (N)	
ECON 3903	Economics of the Environment	
ENTO 2003	Insects and Society (N)	
ENTO 2223	Insects in Global Public Health (N)	
ENVR 4500	Environmental Science Problems	
ENVR 4893	Environmental Soil Chemistry	
ENVR 4363	Environmental Soil Science	
ENVR 4913	Animal Waste Management	
GEOG 4073	Climate Change: Past, Present, and Future	
GEOG 4113	Environment and Development	
GEOG 4163	Resource Management in the National Parks	
GEOG 4233	Human Dimensions of Global Environmental Change	
GEOL 3503	Environmental Geology (N)	
GLST 2002	Global Sustainability (N)	
GLST 2103	Global Perspectives (IS)	
GLST 4443	Sustainable Tourism and Geography	
LA 4423	Planning and Design for Sustainable Landscapes	
LA 4433	Land Use and City Planning	
NREM 3613	Principles of Rangeland Management	
NREM 4001	Issues In Global Change	
NREM 4023	Restoration Ecology	
PBIO 3253	Environment and Society (N)	
PBIO 3263	Plants and People (N)	
PHIL 3733	Environmental Ethics (H)	
POLS 3493	Public Policy	
POLS 4363	Environmental Law And Policy	
POLS 4593	Natural Resources and Environmental Policy	
RM 4453	Outdoor Education and Interpretation	
RM 4473	Recreation in the Natural Environment	
SOC 1113	Introductory Sociology (S)	
SOC 4453	Environmental Inequality (S)	
SOC 4473	Oklahoma Environmental Sociology	
SOC 4533	World Population Problems	
Hours Subtotal		**61**
Electives		
Select 0 hours or hours to complete required total for degree		0
Total Hours		**124**

1

College & Departmental or Major requirements that may be used to meet General Education requirements.

2

If ENGL 3323 Technical Writing is used to satisfy ENGL 1213 Composition II above then hours in this block are 0.

3

Hours meeting the major common core.

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Environmental Science: Natural Resources, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 124

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p.)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
STAT 2013	Elementary Statistics (A) [1]	3
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
Select four hours from the following:		4
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN) [1]	
BIOL 1114	Introductory Biology (LN) [1]	
Course designated (N)		3
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1]	3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [1]	3
or SPCH 2713	Introduction to Speech Communication (S)	
Additional General Education		
Courses designated (A), (H), (N), or (S)		6
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
UNIV 1111	First Year Seminar (or other approved first year seminar course) [3]	1
ENVR 1113	Elements of Environmental Science (N) [3]	3
SOIL 2124	Fundamentals of Soil Science (N) [3]	4
Select one of the following:		3
BCOM 3113	Written Communication [3]	
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources [3]	
ENGL 3323	Technical Writing [2,3]	
CHEM 1314	Chemistry I (LN) [1,3]	4
or CHEM 1215	Chemical Principles I (LN)	
MATH 1513	College Algebra (A)	3
CHEM 1515	Chemistry II (LN) [1,3]	5
or CHEM 1225	Chemical Principles II (LN)	
Hours Subtotal		**23**
Major Requirements		
AGEC 3503	Natural Resource Economics [3]	3
ENVR 3101	Career Development in Environmental Sciences	1
ENVR 3113	Environmental Sampling and Analysis [3]	3
ENVR 4113	Advanced Environmental Sampling and Analysis	3
ENVR 4512	Introduction to National Environmental Policy Act	2
Select one of the following:		3
GEOG 2344	Digital Tools for Environmental Problem-Solving (LN) [3]	
NREM 2083	Geospatial Technologies for Natural Resources [3]	
GEOG 4203	Fundamentals of Geographic Information Systems [3]	
ENVR 4010	Internships in Environmental Science [3]	1
ENVR 4811	Capstone Project Planning [3]	1
ENVR 4813	Environmental Science Capstone [3]	3
ENVR 4363	Environmental Soil Science [3]	3
Select one of the following:		3
AGEC 3723	Environmental Law for Agriculture and Natural Resources [3]	
NREM 4043	Natural Resource Administration and Policy [3]	
POLS 4363	Environmental Law And Policy [3]	
SOC 4433	Environmental Sociology (S) [3]	
CHEM 3013	Survey of Organic Chemistry [3]	3
or BIOC 2344	Chemistry and Applications of Biomolecules	
BIOL 3034	General Ecology [3]	4
PBIO 1404	Plant Biology (LN)	4
BIOL 1604	Animal Biology	4
GEOL 1114	Physical Geology (LN)	4
PHYS 1114	College Physics I (LN)	4
MATH 2144	Calculus I (A)	3
or STAT 4013	Statistical Methods I (A)	
Related Courses		
Select 9 hours of the following:		9
AGCM 3503	Issues Management and Crisis Communications in Agriculture and Natural Resources	
BIOL 3163	Environmental Biology	

BIOL 4363	Principles of Toxicology
ENTO 2993	Introduction to Entomology (LN)
ENVR 4033	Ecology of Invasive Species
ENVR 4500	Environmental Science Problems
ENVR 4893	Environmental Soil Chemistry
GEOG 4073	Climate Change: Past, Present, and Future
GEOL 3503	Environmental Geology (N)
MICR 2123	Introduction to Microbiology
MICR 2132	Introduction to Microbiology Laboratory
NREM 3143	Forest Biology
NREM 4443	Watershed Hydrology and Water Quality
PBIO 3253	Environment and Society (N)
PBIO 4005	Field Botany
PLNT 4123	Plant-Environment Interactions
POLS 4593	Natural Resources and Environmental Policy
SOC 4453	Environmental Inequality (S)
SOIL 3433	Soil Genesis, Morphology, and Classification
SOIL 4463	Soil and Water Conservation
SOIL 4483	Soil Microbiology
SOIL 4683	Soil, Water, and Weather
Hours Subtotal	**61**
Electives	
Select 0 hours or hours to complete required total for degree	0
Total Hours	**124**

1

College & Departmental or Major requirements that may be used to meet General Education requirements.

2

If ENGL 3323 Technical Writing is used to satisfy ENGL 1213 Composition II above then hours in this block are 0.

3

Hours meeting the Major common core.

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Environmental Science: Water Resources, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 124

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p.)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
STAT 2013	Elementary Statistics (A) [1]	3
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
Select four hours from the following:		4
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN) [1]	
BIOL 1114	Introductory Biology (LN) [1]	
Course designated (N)		3
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1]	3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [1]	3
or SPCH 2713	Introduction to Speech Communication (S)	
Additional General Education		
Courses designated (A), (H), (N), or (S)		6
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
Agricultural Sciences and Natural Resources		
UNIV 1111	First Year Seminar (or other approved first year seminar course) [3]	1
ENVR 1113	Elements of Environmental Science (N) [3]	3
SOIL 2124	Fundamentals of Soil Science (N) [3]	4
Select one of the following:		3
BCOM 3113	Written Communication [3]	
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources [3]	
ENGL 3323	Technical Writing [2, 3]	
MATH 1813	Preparation for Calculus (A) [1, 3]	3
CHEM 1314	Chemistry I (LN) [1,3]	4
or CHEM 1215	Chemical Principles I (LN)	
CHEM 1515	Chemistry II (LN) [1,3]	5
or CHEM 1225	Chemical Principles II (LN)	
Hours Subtotal		**23**
Major Requirements		
AGEC 3503	Natural Resource Economics [3]	3
ENVR 3101	Career Development in Environmental Sciences	1
Select one of the following:		3
GEOG 2344	Digital Tools for Environmental Problem-Solving (LN) [3]	
NREM 2083	Geospatial Technologies for Natural Resources [3]	
GEOG 4203	Fundamentals of Geographic Information Systems [3]	
ENVR 3113	Environmental Sampling and Analysis [3]	3
ENVR 4010	Internships in Environmental Science [3]	1
ENVR 4811	Capstone Project Planning [3]	1
ENVR 4113	Advanced Environmental Sampling and Analysis	3
ENVR 4813	Environmental Science Capstone [3]	3
Select one of the following:		3
AGEC 3723	Environmental Law for Agriculture and Natural Resources [3]	
NREM 4043	Natural Resource Administration and Policy [3]	
POLS 4363	Environmental Law And Policy [3]	
SOC 4433	Environmental Sociology (S) [3]	
CHEM 3013	Survey of Organic Chemistry [3]	3
or BIOC 2344	Chemistry and Applications of Biomolecules	
BIOL 3034	General Ecology [3]	4
PBIO 1404	Plant Biology (LN)	4
or BIOL 1604	Animal Biology	
GEOL 1114	Physical Geology (LN)	4
PHYS 1114	College Physics I (LN)	4
PHYS 1214	College Physics II (LN)	4
MATH 2144	Calculus I (A)	4
NREM 4443	Watershed Hydrology and Water Quality	3
Select one of the following:		3
BIOL 4434	Limnology	
GEOL 4453	Hydrogeology	
Select one of the following:		3
ENVR 4893	Environmental Soil Chemistry	
SOIL 4683	Soil, Water, and Weather	

ENVR 4363	Environmental Soil Science [3]	
Related Courses		
Select 4 hours of the following:		4
BIOL 3053	Freshwater: Concepts, Threats and Management (N)	
BIOL 4363	Principles of Toxicology	
ENTO 4484	Aquatic Entomology	
ENVR 4033	Ecology of Invasive Species	
ENVR 4500	Environmental Science Problems	
ENVR 4512	Introduction to National Environmental Policy Act	
GEOG 4073	Climate Change: Past, Present, and Future	
GEOL 4403	Environmental Geochemistry	
MICR 2123	Introduction to Microbiology	
MICR 2132	Introduction to Microbiology Laboratory	
NREM 4023	Restoration Ecology	
NREM 4403	Wetland Ecology and Management	
SOIL 3433	Soil Genesis, Morphology, and Classification	
SOIL 4463	Soil and Water Conservation	
SOIL 4483	Soil Microbiology	
Hours Subtotal		**61**
Electives		
Select 0 hours or hours to complete required total for degree		0
Total Hours		**124**

1

College & Departmental or Major requirements that may be used to meet GE requirements.

2

If ENGL 3323 Technical Writing is used to satisfy ENGL 1213 Composition II above then hours in this block are 0.

3

Hours meeting the Major common core.

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Horticulture and Landscape Architecture

Horticulture is the science, business and art associated with the culture, production, preservation and processing of flowers, trees, shrubs, turfgrass, vegetables, fruits, and nuts. It also includes the proper environmental use and maintenance of plants in the landscape. Horticulture is involved with the production and processing of a significant part of the world's food supply. It provides a major source of beauty in and around homes, cities, parks, highways, golf courses and other public areas. Educational opportunities for study in horticulture cover a wide variety of plants and subjects and range from the cellular to the whole plant level. Factors such as plant nutrition, irrigation, genetics, propagation, control of flowering, and fruit and seed production are considered in their relationship to culture, production, conservation of resources, harvesting, processing and storage. Students can prepare themselves for careers in public garden management (arboreta, parks, and zoos), turf (sports and golf course management), horticulture business, small farm production, controlled environment production (ornamentals or vegetables), environment and sustainability practices, sales, and marketing, along with teaching, extension, and research experience.

Landscape Architecture is the study of artistic, scientific, and technical principles as they are applied to landscape planning, design, and management services. It applies artistic and scientific principles to the design, planning, and management of both natural and built environments. Landscape architects work on a wide variety of projects including garden design, residential design, community planning, urban design, parks and recreation, commercial/campus design, and sustainable site design. The design process involves creative expression that comes from an understanding of the context of site (or landscape), natural systems, cultural systems, and social dynamics. It requires one to interpret, imagine, draw, conceptualize, synthesize, and construct project ideas that transform both the landscapes and the users of those landscapes. As issues of sustainability are becoming more critical, Landscape Architects are poised to address them, as they design the interface between humankind and the urban, suburban, and natural environment.

The Department of Horticulture and Landscape Architecture offers undergraduate programs leading to the following degrees:

- BS in Horticulture
- BLA in Landscape Architecture

The BS in Horticulture

For the BS degree in Horticulture, students can choose from seven options.

Horticulture Business features the opportunity to combine horticulture with the principles of running a business. A built-in requirement for a formal academic minor in a business area is included in this option.

Horticulture Food Safety offers classes that train students in the principles and practices of minimizing potential food safety risks in growing, handling, and processing fruits and vegetables. This option allows students to become certified in Good Agricultural Practices (GAPs), Good Handling Practices (GHPs) and Preventive Controls for Human Foods. It also features the opportunity to become trained in Global Food Safety Initiative (GFSI) recognized food safety programs.

Horticulture Science emphasizes preparing students for science-based careers, including laboratory science or graduate study. This option provides training and expertise for production, maintenance and preservation of fruits, nuts, vegetables, nursery crops, flower crops, etc. Training can be general or be chosen to emphasize a particular commodity area of horticulture. Students learn plant care techniques and the role plants and landscape applications play in sustaining the environment.

Landscape Management emphasizes the construction and management phases of landscape development, including plants, environmental applications, and structures. Courses include basic landscape architectural design, construction technology, business, and horticulture. Students may emphasize either landscape design or business management. Students emphasizing business management may complete a minor in Management through the OSU Spears School of Business. Graduates are employed by landscape contracting companies, design-build firms, landscape maintenance companies, landscape nurseries and governmental agencies.

Public Horticulture focuses on the people-plant interface, particularly in urban settings. Students may choose to specialize in either garden management or urban horticulture. The program is appropriate for those interested in careers in arboreta, botanic gardens, zoos, horticultural societies, park systems, museums, habitat creation and restoration (especially disturbed areas and/or wetlands) civic garden centers, and specialty crop production in developed areas. This option can also lead to graduate study. Students have the opportunity to be involved in The Botanic Garden at OSU and the department's television show, Oklahoma Gardening.

Turf Management provides training for turfgrass production and for management of turfgrass in golf courses, parks, athletic fields, home landscapes, airports and along highways.

Urban Horticulture focuses on the production, processing and marketing of horticultural food and ornamental crops in the urban environment. It provides training for broad practices including small scale crop production, vertical farming, hydroponics, container production, greenhouse production, roof-top, and organic production. Students have the opportunity to be involved in vegetable production at the OSU Student Farm.

The BLA in Landscape Architecture

The Bachelor of Landscape Architecture (BLA) degree focuses on professional practice. This degree is nationally accredited by the Landscape Architectural Accreditation Board (LAAB). Students will experience a strong landscape design curriculum that is supported with courses in art, construction, horticulture, ecology, environmental science, and social science. Students will gain professional practice experience through short-term or long-term internships with Landscape Architecture firms. Typical employers of landscape architects include landscape architecture firms, architectural/engineering firms and government agencies dealing with land planning, environmental and conservation applications, urban planning, and parks/recreation.

Minor in Horticulture

Additional formal training in horticulture can benefit students in career areas as diverse as education, interior design, or entrepreneurship. The Horticulture minor includes 15 hours of core courses in soil science, plant biology and horticultural science, along with advanced cross-commodity applications in plant propagation. The core provides the basic prerequisites for further study. Students then select at least eight hours of controlled electives in horticulture according to their areas of interest. A total of 23 hours is required for the minor.

Courses

HORT 1013 Principles of Horticultural Science (LN)
Description: Basic physical and physiological processes responsible for plant dormancy, growth, flowering, fruiting, and senescence with respect to the science and art of production, cultivation, utilization, and/or storage of horticultural plants. Current research associated with various horticultural commodity groups.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Hort & Landscape Arch
General Education and other Course Attributes: Scientific Investigation, Natural Sciences
Additional Fees: HORT/LA Facil, Equip, Lab fee of $12 per credit hour applies.

HORT 2010 Internship in Horticulture or Landscape Management
Prerequisites: 24 credit hours and consent of adviser.
Description: Supervised work experience with approved public and private employers in horticulture, landscape management, or related fields. Credit will not substitute for required courses. Graded on a pass-fail basis. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Hort & Landscape Arch
Additional Fees: HORT/LA Facil, Equip, Lab fee of $12 per credit hour and HORT/LA Facil, Equip, Lab fee of $12 per credit hour apply.

HORT 2513 Herbaceous Plant Materials
Description: Identification, cultural requirements, and use of ornamental garden and indoor herbaceous plants.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Hort & Landscape Arch

HORT 2613 Woody Plant Materials
Description: Identification, cultural requirements, and use of ornamental woody plants including deciduous and evergreen trees, shrubs and vines.00 per credit hour applies
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Hort & Landscape Arch
Additional Fees: HORT/LA Facil, Equip, Lab fee of $12 per credit hour applies.

HORT 3013 Arboriculture
Prerequisites: HORT 2613 or NREM 2134 and SOIL 2124.
Description: Theory and practice of selecting, planting and maintaining trees, shrubs and vines in the landscape. Previously offered as HORT 3014.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Hort & Landscape Arch

HORT 3084 Plant Propagation
Prerequisites: HORT 1013 or PLNT 1213
Description: Principles and practices involved in propagation of plants. Anatomical, morphological and physiological aspects of sexual and asexual methods of regeneration and their importance.
Credit hours: 4
Contact hours: Lecture: 3 Lab: 2 Contact: 5
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Hort & Landscape Arch
Additional Fees: HORT/LA Facil, Equip, Lab fee of $12 per credit hour applies.

HORT 3113 Greenhouse Management
Prerequisites: HORT 1013 or PLNT 1213
Description: Commercial greenhouse operation with emphasis on floricultural plant production aspects; environment, growing media, fertilizers and application methods, watering, pest and disease control, chemical growth regulators, production costs.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Hort & Landscape Arch
Additional Fees: HORT or LA Course Field Trip fee of $20 and HORT/LA Facil, Equip, Lab fee of $12 per credit hour apply.

HORT 3153 Turf Management
Description: Selection, establishment and maintenance of grass species and other plant materials for special use areas.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Hort & Landscape Arch

HORT 3213 Fruit and Nut Production
Prerequisites: BIOL 1113 and BIOL 1111 or PBIO 1404.
Description: Commercial production of fruits and nuts, with emphasis on pecan, apple, peach, strawberry, blackberry and blueberry. A two-day field trip is required.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Hort & Landscape Arch

HORT 3253 Personnel and Financial Management for Horticulture
Prerequisites: HORT 1013 or LA 1013 and one upper division HORT or LA course.
Description: Preparing and executing an operational budget in a horticultural service industry and methods for maintaining an effective work force.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch

HORT 3433 Commercial Vegetable Production
Description: Commercial production and marketing of vegetable crops. May not be used for degree credit with HORT 5433.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Hort & Landscape Arch
Additional Fees: HORT/LA Facil, Equip, Lab fee of $12 per credit hour applies.

HORT 3513 Landscape Irrigation
Description: Basics of landscape irrigation with an emphasis on residential irrigation design, maintenance and installation.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Hort & Landscape Arch
Additional Fees: HORT/LA Facil, Equip, Lab fee of $12 per credit hour applies.

HORT 3613 Bidding and Estimating
Prerequisites: ACCT 2003 or ACCT 2103.
Description: Budgeting, bid preparation and job cost estimation for landscape related industries including golf course budgeting, overhead and labor budgeting, and profitable pricing. Previously offered as HORT 3612.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch

HORT 3713 Urban Horticulture Production
Prerequisites: HORT 1013 or PLNT 1213.
Description: Principles and production of crops for public or community practices with emphasis on production associated with hydroponics, raised beds, containers, controlled environments, roof tops, high tunnels, and farmers markets.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Hort & Landscape Arch
Additional Fees: HORT/LA Facil, Equip, Lab fee of $12 per credit hour applies.

HORT 3833 Hydroponics and Soilless Crop Production
Description: Basics of soilless production with emphasis on hydroponics and aquaponic production of vegetables and cut flowers.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Hort & Landscape Arch

HORT 4010 Special Topics in Horticulture
Description: New and emerging areas of study in Horticulture. Offered for variable credit, 1-4 credit hours, maximum of 9 credit hours.
Credit hours: 1-4
Contact hours: Lecture: 1-4 Contact: 1-4
Levels: Undergraduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch
Additional Fees: HORT/LA Facil, Equip, Lab fee of $12 per credit hour applies.

HORT 4053 International Experience in Horticulture (I)
Description: Participation in international travel to develop an understanding of different horticultural systems and technologies used outside the U.S.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch
General Education and other Course Attributes: International Dimension

HORT 4133 Temperature Stress Physiology
Prerequisites: CHEM 1215, and BIOL 1114 or (BIOL 1113 and BIOL 1111) or PBIO 1404
Description: Effects of heat, chilling and freezing stress on plants. Responses to temperature extremes at the molecular to whole plant levels with emphasis on mechanisms of injury and resistance. Same course as PLNT 4133. May not be used for degree credit with HORT 5133 and PLNT 5133.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch

HORT 4453 Turfgrass Physiology and Ecology
Prerequisites: HORT 3153, and BIOL 1113 and BIOL 1111 or PBIO 1404.
Description: A study of the relationship between turf physiology and modern turf management practices. Concepts of stand ecology with emphasis on species dominance in stressful environments. May not be used for Degree Credit with HORT 5453.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch

HORT 4493 Athletic Field Management
Prerequisites: HORT 3153.
Description: Principles, practices and challenges associated with natural turf- covered athletic field management; field construction, maintenance and evaluation of playing surface quality; soil physical properties influencing management and field use, construction and maintenance materials specification, and traction, hardness and ball response factors. Offered in combination with HORT 5493. No credit for both HORT 4493 and HORT 5493.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch

HORT 4543 Sustainable Nursery Production
Prerequisites: HORT 1013
Description: Sustainable commercial production of field- and container-grown woody ornamental crops. Previously offered as HORT 3544. May not be used for degree credit with HORT 5543.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Hort & Landscape Arch

HORT 4713 Public Garden Management
Description: Issues and methods in public garden management, including database management of collections, conservation of native species, grant writing, volunteer coordination, computerized mapping systems, master planning, and other topics pertaining to a career in public horticulture. Field trips required. May not be used for degree credit with HORT 5713.
Credit hours: 3
Contact hours: Lecture: 1 Lab: 4 Contact: 5
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Hort & Landscape Arch
Additional Fees: HORT/LA Facil, Equip, Lab fee of $12 per credit hour applies.

HORT 4773 Applied Landscape Planning
Description: Concepts of landscape management, design and construction including hand graphics and AutoCad with an emphasis on residential landscape. No credit for students in the landscape architecture or landscape management programs. Previously offered as HORT 4774.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Hort & Landscape Arch

HORT 4901 Horticulture in Controlled Environments Laboratory
Prerequisites: HORT 4903 or concurrent enrollment.
Description: Hands-on experiences and virtual field trips designed to reinforce principles discussed in HORT 4903, and to develop skill sets important to successful implementation of horticultural practices in controlled environments. May not be used for Degree Credit with HORT 5901.
Credit hours: 1
Contact hours: Lab: 2 Contact: 2
Levels: Undergraduate
Schedule types: Lab
Department/School: Hort & Landscape Arch

HORT 4903 Horticulture in Controlled Environments
Prerequisites: CHEM 1215 and HORT 3113.
Description: Designing, constructing, monitoring, and manipulating controlled environments for efficient horticultural production. May not be used for degree credit with HORT 5903.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch

HORT 4933 Principles of Sustainable and Organic Horticulture
Prerequisites: HORT 1013.
Description: Principles and practices of sustainable, organic, and alternative horticultural management systems.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch

HORT 4943 International Horticulture
Prerequisites: HORT 1013.
Description: Overview of the horticulture industry worldwide. Export, marketing, and international trade issues in a global horticulture context. Individual country analyses of specific fruit, vegetable and ornamental crops. May not be used for Degree Credit with HORT 5943.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch

HORT 4953 Plant Growth and Development
Prerequisites: HORT 1013 and PBIO 1404.
Description: Plant embryogenesis and organogenesis; growth and development of shoots and reproductive structures; plant developmental processes including shoot expansion and dormancy as influenced by temperature, light, and other environmental factors. May not be used for Degree Credit with HORT 5953.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch

HORT 4963 Horticulture Physiology
Prerequisites: CHEM 1215, and BIOL 1114 or (BIOL 1113 and BIOL 1111) or PBIO 1404.
Description: Physiology of horticultural plants, including water relations, respiration, photosynthesis, and growth and development. May not be used for degree credit with HORT 5963.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch
Additional Fees: HORT/LA Facil, Equip, Lab fee of $12 per credit hour applies.

HORT 4973 Sustainable Landscape Management
Prerequisites: HORT 1013 or LA 1013.
Description: The ecological principles and landscape resources supporting decision-making for sustainable landscape management. Retrofits of existing development for enhanced sustainability, including equipment selection, stormwater management, use of successional landscapes, permaculture, and organic methods. May not be used for Degree Credit with HORT 5973.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch

HORT 4990 Horticultural Problems
Prerequisites: Consent of instructor.
Description: Study of horticultural problems under the supervision of a faculty member. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Hort & Landscape Arch
Additional Fees: HORT/LA Facil, Equip, Lab fee of $12 per credit hour applies.

HORT 5000 Master's Research and Thesis
Description: Research on thesis problems required of master's degree candidates. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Graduate
Schedule types: Independent Study
Department/School: Hort & Landscape Arch
Additional Fees: HORT/LA Facil, Equip, Lab fee of $12 per credit hour applies.

HORT 5020 Graduate Seminar
Prerequisites: Graduate standing.
Description: Proposal and results seminars for graduate programs. Offered for fixed credit, 1 credit hour, maximum of 2 credit hours.
Credit hours: 1
Contact hours: Contact: 1 Other: 1
Levels: Graduate
Schedule types: Independent Study
Department/School: Hort & Landscape Arch
Additional Fees: HORT/LA Facil, Equip, Lab fee of $12 per credit hour applies.

HORT 5110 Advanced Horticultural Problems
Description: Selected research problems in horticulture, floriculture, landscape design; nursery production, olericulture and pomology. Offered for variable credit, 1-12 credit hours, maximum of 20 credit hours.
Credit hours: 1-12
Contact hours: Contact: 1-12 Other: 1-12
Levels: Graduate
Schedule types: Independent Study
Department/School: Hort & Landscape Arch
Additional Fees: HORT/LA Facil, Equip, Lab fee of $12 per credit hour applies.

HORT 5133 Temperature Stress Physiology
Description: Effects of heat, chilling and freezing stress on plants. Responses to temperature extremes at the molecular to whole plant levels with emphasis on mechanisms of injury and resistance. Same course as PLNT 5133. May not be used for degree credit with PLNT 4133 and HORT 4133.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch

HORT 5233 Experimental Horticulture
Description: Methods of conducting research with horticultural crops, including organization and plans, field plot techniques and analysis of data.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch

HORT 5293 Plant Response to Water Stress
Prerequisites: BIOC 3653 and PBIO 4463.
Description: Physiological ramifications of water deficit stress on cells, tissues, plants and canopies. Discussion of the soil/plant/atmosphere continuum, and avoidance and tolerance mechanisms leading to drought resistance. Photosynthesis, transpiration, and water-use efficiency and their relationship to biomass accumulation and crop yield. Same course as PLNT 5293.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch

HORT 5403 Commercial Vegetable Production
Prerequisites: HORT 1013, SOIL 2124 and PBIO 1404.
Description: Commercial production and marketing of vegetable crops. May not be used for degree credit with HORT 3433.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch

HORT 5423 Flowering and Fruiting in Horticultural Crops
Prerequisites: PBIO 3463.
Description: Environmental, chemical and cultural factors affecting the flowering and fruiting of horticultural crops. Previously offered as HORT 5422.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch

HORT 5433 Postharvest Physiology
Prerequisites: BOT 3463 and BOT 3460.
Description: Physiological causes for post-harvest changes in horticultural crops (ripening and senescence) and the basis for certain postharvest treatments (precooling at harvest, controlled atmosphere storage, refrigeration, and packaging techniques). Commodity-specific postharvest phenomena.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch

HORT 5443 Basic Laboratory Experimentation
Description: Principles and theory of safe laboratory practice and experimentation. Techniques for developing and optimizing plant sample acquisition, extraction and analysis protocols. Theory of operation and maintenance of common laboratory instrumentation (pH measurement, solid and liquid analytical measurement, temperature measurement, spectrophotometry, HPLC, GC). Laboratory provides hands-on experience for integrated protocol development and instrument use.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 3 Contact: 5
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Hort & Landscape Arch
Additional Fees: HORT/LA Facil, Equip, Lab fee of $12 per credit hour applies.

HORT 5453 Turfgrass Physiology and Ecology
Prerequisites: HORT 3153, PBIO 1404.
Description: A study of the relationship between turf physiology and modern turf management practices. Concepts of stand ecology with emphasis on species dominance in stressful environments. May not be used for degree credit with HORT 4453.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch

HORT 5493 Athletic Field Management
Prerequisites: HORT 3153.
Description: Principles, practices and challenges associated with natural turf- covered athletic field management; field construction, maintenance and evaluation of playing surface quality; soil physical properties influencing management and field use, construction and maintenance materials specification, and traction, hardness and ball response factors. Offered in combination with HORT 4493. No credit for both HORT 4493 and HORT 5493.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch

HORT 5543 Sustainable Nursery Production
Description: Sustainable commercial production of field and container grown woody ornamental crops. No credit for both HORT 4543 and HORT 5543.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch

HORT 5713 Public Garden Management
Prerequisites: HORT 1013.
Description: Issues and methods in public garden management, including database management of collections, conservation of native species, grant writing, volunteer coordination, computerized mapping systems, master planning, and other topics pertaining to a career in public horticulture. Field trips required. May not be used for degree credit with HORT 4713.
Credit hours: 3
Contact hours: Lecture: 1 Lab: 4 Contact: 5
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Hort & Landscape Arch
Additional Fees: HORT/LA Facil, Equip, Lab fee of $12 per credit hour applies.

HORT 5901 Horticulture in Controlled Environments Laboratory
Prerequisites: HORT 4903 or concurrent enrollment.
Description: Hands-on experiences and virtual field trips designed to reinforce principles discussed in HORT 4903, and to develop skill sets important to successful implementation of horticultural practices in controlled environments. May not be used for Degree Credit with HORT 4901.
Credit hours: 1
Contact hours: Lab: 2 Contact: 2
Levels: Graduate
Schedule types: Lab
Department/School: Hort & Landscape Arch

HORT 5903 Horticulture in Controlled Environments
Prerequisites: CHEM 1215 and HORT 3113.
Description: Designing, constructing, monitoring, and manipulating controlled environments for efficient horticultural production. May not be used for degree credit for HORT 4903.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch

HORT 5943 International Horticulture
Prerequisites: HORT 1013.
Description: Overview of the horticulture industry worldwide. Export, marketing, and international trade issues in a global horticulture context. Individual country analyses of specific fruit, vegetable and ornamental crops. May not be used for Degree Credit with HORT 4943.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch

HORT 5953 Plant Growth and Development
Description: Plant embryogenesis and organogenesis; growth and development of shoots and reproductive structures; plant development processes including shoot expansion and dormancy as influenced by temperature, light, and other environmental factors. May not be offered for degree credit with HORT 4953.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch

HORT 5963 Horticulture Physiology
Prerequisites: CHEM 1215 and BIOL 1114 or (BIOL 1113 or BIOL 1111).
Description: Physiology of horticultural plants, including water relations, respiration, photosynthesis, and growth and development. Offered in combination with HORT 4963. May not be used for degree credit with HORT 4963.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch
Additional Fees: HORT/LA Facil, Equip, Lab fee of $12 per credit hour applies.

HORT 5973 Sustainable Landscape Management
Description: The ecological principles and landscape resources supporting decision-making for sustainable landscape management. Retrofits of existing development for enhanced sustainability, including equipment selection, stormwater management, use of successional landscapes, permaculture, and organic methods. No credit for both HORT 4973 and HORT 5973.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch

HORT 6000 Doctoral Rsch & Dissertation
Description: Research on dissertation problems required of PhD candidates in multidisciplinary programs. Offered for variable credit, 1-12 credit hours, maximum of 30 credit hours.
Credit hours: 1-12
Contact hours: Contact: 1-12 Other: 1-12
Levels: Graduate
Schedule types: Independent Study
Department/School: Hort & Landscape Arch
Additional Fees: HORT/LA Facil, Equip, Lab fee of $12 per credit hour applies.

LA 1013 Introduction to Landscape Architecture
Description: An overview of the field of landscape architecture with an emphasis on the application of artistic and scientific principles of design, planning and management of natural and built environments.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch
Additional Fees: HORT/LA Facil, Equip, Lab fee of $12 per credit hour applies.

LA 1213 Visual Communication I for Landscape Architecture
Description: The practice and application of hand graphics, professional drafting, and freehand sketching skills to explore, communicate, and represent natural, designed, and built landscapes. Previously offered as LA 2002 and LA 2213.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 3 Contact: 5
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Hort & Landscape Arch
Additional Fees: HORT/LA Facil, Equip, Lab fee of $12 per credit hour applies.

LA 1223 Visual Communication II for Landscape Architecture
Description: The practice and application of digital visualization in the landscape architectural design process. Introduction to computer applications used in the industry for conceptualizing, drafting, modeling, and graphic communications. Previously offered as LA 3002 and LA 2223.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 3 Contact: 5
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Hort & Landscape Arch
Additional Fees: HORT/LA Facil, Equip, Lab fee of $12 per credit hour applies.

LA 1323 Computer-Aided Design for Landscape Architecture
Description: Principles and applications of computer-aided design (AutoCAD) in landscape architecture. Visual communication techniques related to technical and construction drawings. Introduction to portfolio design. Previously offered as LA 1122 and LA 2323.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Hort & Landscape Arch
Additional Fees: HORT/LA Facil, Equip, Lab fee of $12 per credit hour applies.

LA 1525 Studio 1: Principles and Theory of Design
Prerequisites: Concurrent enrollment in LA 1223.
Description: Introduction to basic elements, principles, and theory of design. Exploration of design process, both 2D and 3D form, spatial organization, and temporal nature of landscape. Applied projects in small scale landscape design. Previously offered as LA 3314, LA 3315, and LA 3773.
Credit hours: 5
Contact hours: Lecture: 2 Lab: 9 Contact: 11
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Hort & Landscape Arch
Additional Fees: HORT/LA Facil, Equip, Lab fee of $12 per credit hour applies.

LA 2413 Ecological Landscape Design
Description: Introduction to principles of ecological landscape design, natural systems, and landscape performance as applied in contemporary landscape architecture. Includes the natural, cultural, and aesthetic components involved with analyzing existing space for design and planning purposes. Exposure to historical and contemporary individuals that have inspired ecological landscape design and planning.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch

LA 2513 Native American Symbolism in Landscape Design (D)
Description: Study of cultural diversity through Native American symbolism and application of these symbols as design elements relating to functional and aesthetic qualities in landscape design.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 3 Contact: 5
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Hort & Landscape Arch
General Education and other Course Attributes: Diversity

LA 2515 Studio 2: Site Design
Prerequisites: LA 1223, LA 1525, and concurrent enrollment in LA 1213.
Description: Design process, site inventory and analysis as it relates to physical and social site design. Place making, experiential, behavioral, and environmental considerations among several issues to be examined. Applied projects will focus on residential design, site design and design development. Previously offered as LA 3324, LA 3325, and LA 4013.
Credit hours: 5
Contact hours: Lecture: 2 Lab: 9 Contact: 11
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Hort & Landscape Arch
Additional Fees: HORT/LA Facil, Equip, Lab fee of $12 per credit hour applies.

LA 2523 Garden Design in Harmony with Local Ecology
Description: History, theory, and practice of creating gardens in harmony with local ecology to express aesthetic and cultural values of individuals and societies. Environmental aspects of place related to design form and expression.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 3 Contact: 5
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Hort & Landscape Arch

LA 2525 Studio 3: Recreation and Open Space Design
Prerequisites: LA 2515.
Description: Recreation and play, the interface of nature, human-kind and land ethic. Applied projects will address structured and nature play, active and passive parks, open space planning, and natural landscapes. Previously offered as LA 4023, LA 4414 and LA 4415.
Credit hours: 5
Contact hours: Lecture: 2 Lab: 9 Contact: 11
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Hort & Landscape Arch
Additional Fees: HORT/LA Facil, Equip, Lab fee of $12 per credit hour applies.

LA 3010 Internship in Landscape Architecture
Prerequisites: 45 credit hours and consent of internship chairperson.
Description: Supervised work experience with approved public or private employers in landscape architecture or related fields. May not be substituted for other required courses. Graded on a pass-fail basis. Offered for variable credit, 1-7 credit hours, maximum of 10 credit hours.
Credit hours: 1-4
Contact hours: Contact: 1-4 Other: 1-4
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Hort & Landscape Arch
Additional Fees: HORT/LA Facil, Equip, Lab fee of $12 per credit hour applies.

LA 3020 Long-Term Internship in Landscape Architecture
Prerequisites: LA 3515 and approval of academic advisor and faculty internship coordinator.
Description: Supervised continuous work experience for 6 months or more with approved public or private employers in landscape architecture or related fields. Presentation required following the internship experience.
Credit hours: 1-8
Contact hours: Contact: 1-8 Other: 1-8
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Hort & Landscape Arch

LA 3112 Landscape Architecture National Survey
Prerequisites: LA 3315.
Description: Examination and exposure to the state of landscape architecture practice and issues critical to profession. Includes 4- to 6-day out-of-state field trip component to the city hosting the American Society of Landscape Architects National Convention, observation of nationally recognized built works, participation in the convention and networking with professionals from across the country. Includes pre-trip research and post-trip documentation. Required for third-year landscape architecture students.
Credit hours: 2
Contact hours: Lecture: 2 Contact: 2
Levels: Undergraduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch

LA 3515 Studio 4: Landscape Planting Design
Prerequisites: LA 2525, HORT 2613.
Description: Introduction and application of the techniques, methods, and concepts for exploring, expressing, and representing landscape planting designs. Medium to large scale landscape architectural planting design projects and the preparation of concept sketches, illustrative plans, construction documents, and specifications. Emphasis on plant selection and arrangement criteria based on ecology and horticultural practices, the principles of design, and the fundamentals of bioregionalism. Previously offered as LA 4033 and LA 4034.
Credit hours: 5
Contact hours: Lecture: 2 Lab: 9 Contact: 11
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Hort & Landscape Arch
Additional Fees: HORT/LA Facil, Equip, Lab fee of $12 per credit hour applies.

LA 3525 Studio 5: Sustainable Construction and Design
Prerequisites: LA 3515 and LA 3884 or LA 4894.
Description: Explore sustainable issues to improve the design and implementation of natural, cultural, and built environments in the practice of landscape architecture. Applied projects will focus on and apply sustainable construction and design solutions at various scales while considering impacts on human beings and the environments. Previously offered as LA 3893 and LA 3894.
Credit hours: 5
Contact hours: Lecture: 2 Lab: 9 Contact: 11
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Hort & Landscape Arch

LA 3673 History and Theory of Landscape Architecture (H)
Description: Introduction to the history of the built environment from ancient to contemporary time that has created the styles of historical significance in landscape architecture. Examination of the social, philosophical, cultural, economic, political, and environmental conditions of the built environment within design theory.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch
General Education and other Course Attributes: Humanities
Additional Fees: HORT/LA Facil, Equip, Lab fee of $12 per credit hour applies.

LA 3683 Professional Practice & Office Procedure
Description: Ethics, office practice and procedure. Contract documents and specifications relating to landscape architecture. Previously offered as LA 3682.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch

LA 3884 Landscape Construction: Site Grading
Prerequisites: LA 1323.
Description: Review mechanical drafting and lettering techniques, understanding contours, principles of stormwater runoff, site grading and earthwork calculations, methods of managing stormwater runoff, erosion control, introduction to paving and drainage construction materials, specifications, cost estimating. Computer applications and hand graphics used for projects. Previously offered as LA 3883.
Credit hours: 4
Contact hours: Lecture: 2 Lab: 4 Contact: 6
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Hort & Landscape Arch
Additional Fees: HORT/LA Facil, Equip, Lab fee of $12 per credit hour applies.

LA 4010 Special Topics in Landscape Architecture
Description: New and emerging areas of study in Landscape Architecture. Offered for variable credit, 1-4 credit hours, maximum of 9 credit hours.
Credit hours: 1-4
Contact hours: Lecture: 1-4 Contact: 1-4
Levels: Undergraduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch

LA 4053 International Experience in Landscape Architecture - Asia (I)
Prerequisites: Consent of appropriate faculty member.
Description: Participation in a formal or informal educational experience related with landscape architecture in Asia.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch
General Education and other Course Attributes: International Dimension

LA 4063 International Experience in Landscape Architecture - Peru (I)
Prerequisites: Consent of appropriate faculty member.
Description: Participation in a formal or informal educational experience related with landscape architecture in Peru.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch
General Education and other Course Attributes: International Dimension

LA 4112 Landscape Architecture Career Survey
Prerequisites: LA 2525.
Description: Examination and exposure to built works and landscape architecture professional offices with diverse practices and market niches. Targeted networking and career exploration opportunities for students. Includes a 4- to 6-day out-of-state regional field trip component, pre-trip research, and post-trip documentation. Required for fourth-year landscape architecture students.
Credit hours: 2
Contact hours: Contact: 2 Other: 2
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Hort & Landscape Arch

LA 4423 Planning and Design for Sustainable Landscapes
Prerequisites: For LA students, LA 3894. For all other students, NREM 3013 or NREM 2013 and SOIL 2124.
Description: Explore the origins of sustainability as a basis for understanding how to improve the planning and design of natural and cultural environments in the practice of landscape architecture.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch

LA 4433 Land Use and City Planning
Description: Land use and city planning within the framework of a municipality's comprehensive plan, zoning, and subdivision regulations that affect the development of city form. Origins of land use form as a basis for understanding how to improve the future of urban and suburban form through the practice of landscape architecture.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Hort & Landscape Arch

LA 4453 Principles of Landscape Analysis for Site Design
Prerequisites: LA 3515.
Description: Analysis of landscapes for design and management decision-making using real-world projects integrating computer-aided design (CAD) and geographic information systems (GIS), aerial photography, and global positioning system (GPS) technologies. Applications will be related to landscape architecture and site design.
Credit hours: 3
Contact hours: Lecture: 1 Lab: 4 Contact: 5
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Hort & Landscape Arch

LA 4515 Studio 6: Urban Design
Prerequisites: LA 3515.
Description: Contemporary urban issues affecting the design process, site master planning, and multi-disciplinary problem solving. Applied project will address influences on urban design, from regional influences to user behavior. Previously offered as LA 4514 and LA 5024.
Credit hours: 5
Contact hours: Lecture: 2 Lab: 9 Contact: 11
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Hort & Landscape Arch
Additional Fees: HORT/LA Facil, Equip, Lab fee of $12 per credit hour applies.

LA 4525 Studio 7: Community Development and Neighborhood Design
Prerequisites: LA 3525 or LA 4515.
Description: Exposure to contemporary issues of community development over a range of scales including landscape planning, schematic design, and design development. Projects will address issues at multiple forms and densities. Exploration of professional office dynamics, environments, and community involvement.
Credit hours: 5
Contact hours: Lecture: 2 Lab: 9 Contact: 11
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Hort & Landscape Arch
Additional Fees: HORT/LA Facil, Equip, Lab fee of $12 per credit hour applies.

LA 4573 Recreation Planning
Prerequisites: Consent of instructor.
Description: Theory and methods for small and large scale area planning with emphasis on natural and cultural resources.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Hort & Landscape Arch

LA 4894 Landscape Construction: Materials and Methods
Prerequisites: LA 1323 and LA 3884.
Description: A capstone course using design techniques, computer skills, construction materials, methods and applications for the landscape industry. Detailed computerized construction drawings of pavement, fences, walls, wood structures, and water features. Comprehensive construction documents using computer drafting, design and calculation applications. Previously offered as LA 4893.
Credit hours: 4
Contact hours: Lecture: 2 Lab: 4 Contact: 6
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Hort & Landscape Arch
Additional Fees: HORT/LA Facil, Equip, Lab fee of $12 per credit hour applies.

LA 4990 Landscape Architecture Special Problems
Prerequisites: Consent of appropriate faculty member.
Description: Landscape architectural related problems. Offered for variable credit, 1-6 credit hours, maximum of 12 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Hort & Landscape Arch
Additional Fees: HORT/LA Facil, Equip, Lab fee of $12 per credit hour applies.

LA 5110 Advanced Special Problems
Prerequisites: Consent of appropriate faculty member.
Description: Specific landscape architectural problems. Offered for variable credit, 1-12 credit hours, maximum of 20 credit hours.
Credit hours: 1-12
Contact hours: Contact: 1-12 Other: 1-12
Levels: Graduate, Undergraduate
Schedule types: Independent Study
Department/School: Hort & Landscape Arch
Additional Fees: HORT/LA Facil, Equip, Lab fee of $12 per credit hour applies.

Undergraduate Programs

- Horticulture: Horticultural Business, BSAG (p. 2587)
- Horticulture: Horticultural Food Safety, BSAG (p. 2589)
- Horticulture: Horticultural Science, BSAG (p. 2591)
- Horticulture: Landscape Management, BSAG (p. 2593)
- Horticulture: Public Horticulture, BSAG (p. 2595)
- Horticulture: Turf Management, BSAG (p. 2597)
- Horticulture: Urban Horticulture, BSAG (p. 2599)
- Landscape Architecture, BLA (p. 2601)

Graduate Programs

The department offers programs of study leading to the Master of Science degree in Horticulture (with areas of specialization including Horticultural Science, Phytochemistry and Turfgrass Science). Doctoral students can participate in multidisciplinary PhD programs in Crop Science, Environmental Science, or Food Science. Areas of study include floriculture crops, fruit and nut crops, vegetables, ornamental nursery crops, and turfgrass science. In addition to commodity-oriented specialties, students may emphasize food processing, environmental applications, water quantity and water quality, plant extraction applications, postharvest physiology, or stress physiology disciplines. Applicants should indicate their interest area(s). Research opportunities range from whole plant production/management studies to fundamental cellular studies. Additional information on programs, application procedures and financial assistance is available at: https://agriculture.okstate.edu/departments-programs/hla/.

Prerequisites

Admission requires a bachelor's degree in Horticulture, Landscape Architecture, or a related field with at least a 3.00 ("B") grade-point average. Students with coursework deficiencies in fundamental areas may be required to take remedial courses to attainproficiencyin accordance with the advisory committee's guidance. In addition to Graduate College requirements, applicants must submit official GRE scores, a statement of research and career interests, and three letters of reference.

Admission to the program requires approval by the graduate committee, a departmental advisor on the Graduate Faculty, the department head, and Graduate College. The program of study and research will be directed by the student's graduate advisor and advisory committee.

Minors

- Horticulture (HORT), Minor (p. 2586)

Faculty

Justin Quetone Moss, PhD—Professor and Head
Professors: Louis Anella, PhD; Bruce Dunn, PhD; Michael Holmes, MLA; William McGlynn, PhD; Niels Maness, PhD; Dennis Martin, PhD; Cheryl Mihalko, MLA; Michael A. Schnelle, PhD
Associate Professors: Charles Fontanier, PhD; Qing Luo, MLA; Bo Zhang, PhD
Assistant Professors: Shivani Kathi, PhD; Tyler Mason, PhD; Mingying Xiang, PhD; Lu Zhang, PhD
Senior Extension Specialists: Becky Carroll, BS; David Hillock, MS; Shelley Mitchell, PhD
Associate Extension Specialists: Casey Hentges, MS
Assistant Extension Specialists: Aaron Essary, MS
Assistant Research Professor: Shuhao Yu, PhD

Horticulture (HORT), Minor

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Total Hours: 15

Code	Title	Hours
Minor Requirements		
HORT 1013	Principles of Horticultural Science (LN)	3
Select a minimum of 12 hours of HORT prefix courses and/or LA 3515		12
Total Hours		**15**

Other Requirements

- A grade-point average of 2.0 for courses that count for the minor.

Additional OSU Requirements

Undergraduate Minors

- An undergraduate minor must include between fifteen and thirty hours, inclusive of undergraduate coursework.
- A minimum of six credit hours for the minor must be earned in residence at OSU.
- The courses required for a minor may be included in the course requirements for any undergraduate degree or they may be in addition to degree requirements, depending on the overlap between the minor and degree requirements. However, an undergraduate minor must be earned in an academic field other than the student's declared degree option. The minor may not duplicate the degree major or option (for example, a student who earns a BA in Art with an Art History option may earn a minor in Studio Art but not Art History).
- A student generally follows the minor requirements associated with his or her matriculation year or newer requirements that have been established since matriculation. The time limit for following requirements from a given academic year is six years.

For additional information on requirements on minors, click here (https://adminfinance.okstate.edu/site-files/documents/policies/requirements-for-undergraduate-and-graduate-minors.pdf).

Horticulture: Horticultural Business, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p.)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
ENGL 1213	Composition II	3
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
MATH 1483	Mathematical Functions and Their Uses (A)	3
or MATH 1513	College Algebra (A)	
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
Select from one of the following:		4
BIOL 1114	Introductory Biology (LN) [1]	
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN) [1]	
PBIO 1404	Plant Biology (LN) [1]	
HORT 1013	Principles of Horticultural Science (LN)	3
Social & Behavioral Sciences (S)		
Course designated (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1]	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		9
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
CHEM 1215	Chemical Principles I (LN)	5
SOIL 2124	Fundamentals of Soil Science (N)	4
Select one of the following:		3
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources	
BCOM 3113	Written Communication	
ENGL 3323	Technical Writing [3]	
Select one of the following:		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [2]	
SPCH 2713	Introduction to Speech Communication (S) [2]	
SPCH 3733	Elements of Persuasion (S) [2]	
ENTO 2993	Introduction to Entomology (LN)	3
HORT 2010	Internship in Horticulture or Landscape Management (1 hour)	1
HORT 2513	Herbaceous Plant Materials	3
or HORT 2613	Woody Plant Materials	
HORT 3153	Turf Management	3
or HORT 3833	Hydroponics and Soilless Crop Production	
HORT 3084	Plant Propagation	4
HORT 3513	Landscape Irrigation	3
PLP 3343	Principles of Plant Pathology	3
Hours Subtotal		**36**
Major Requirements		
ACCT 2003	Survey of Accounting	3
or ACCT 2103	Financial Accounting	
HORT 3113	Greenhouse Management	3
MGMT 3013	Fundamentals of Management (S)	3
SPAN (3 credits)		3
Select 12 hours (9 must be upper division) from HORT		12
Select 5 hours from HORT or Ferguson College of Agriculture		5
Select 15 hours (9 must be upper division) from AGEC or the Spears School of Business. Student should consult advisor about using these credits toward a Minor.		15
Hours Subtotal		**44**
Electives		
Select 0 or hours to complete required total for degree		0
Total Hours		**120**

1 College & Departmental requirements that may be used to meet General Education requirements.

2 If used as (S) course above, hours in this block are reduced by three.

3 If ENGL 3323 Technical Writing is substituted for ENGL 1213 Composition II above, then hours in this block reduced by three.

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.
- A 2.25 GPA or higher is required in courses listed in the Major Requirements column above.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Horticulture: Horticultural Food Safety, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p.)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
ENGL 1213	Composition II	3
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
MATH 1483	Mathematical Functions and Their Uses (A)	3
or MATH 1513	College Algebra (A)	
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
Select from one of the following:		4
BIOL 1114	Introductory Biology (LN) [1]	
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN) [1]	
PBIO 1404	Plant Biology (LN) [1]	
HORT 1013	Principles of Horticultural Science (LN)	3
Social and Behavioral Sciences (S)		
Course designated (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1]	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		9
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
CHEM 1215	Chemical Principles I (LN)	5
SOIL 2124	Fundamentals of Soil Science (N)	4
Select one of the following:		3
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources	
BCOM 3113	Written Communication	
ENGL 3323	Technical Writing [3]	
Select one of the following:		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [2]	
SPCH 2713	Introduction to Speech Communication (S) [2]	
SPCH 3733	Elements of Persuasion (S) [2]	
ENTO 2993	Introduction to Entomology (LN)	3
HORT 2010	Internship in Horticulture or Landscape Management	1
HORT 2513	Herbaceous Plant Materials	3
or HORT 2613	Woody Plant Materials	
HORT 3153	Turf Management	3
or HORT 3833	Hydroponics and Soilless Crop Production	
HORT 3084	Plant Propagation	4
HORT 3513	Landscape Irrigation	3
PLP 3343	Principles of Plant Pathology	3
Hours Subtotal		**36**
Major Requirements		
HORT 3113	Greenhouse Management	3
HORT 3713	Urban Horticulture Production	3
HORT 3213	Fruit and Nut Production	3
HORT 3433	Commercial Vegetable Production	3
CHEM 1225	Chemical Principles II (LN)	5
CHEM 3013	Survey of Organic Chemistry	3
MICR 2123	Introduction to Microbiology	3
FDSC 1133	Fundamentals of Food Science	3
FDSC 3123	HACCP in the Food Industry	3
FDSC 3133	Plant Sanitation for Food Processing Operations	3
FDSC 3154	Food Microbiology	4
FDSC 4143	Food Safety Modernization Act	3
FDSC 4233	Food Safety Audit Schemes	3
Select 2 hours from HORT		2
Elective		**0**
Select 0 or hours to complete required total for degree		0
Hours Subtotal		**44**
Total Hours		**120**

1 College & Departmental requirements that may be used to meet General Education requirements.

2 If used as (S) course above, hours in this block are reduced by three.

3 If ENGL 3323 Technical Writing is substituted for ENGL 1213 Composition II above, then hours in this block are reduced by 3.

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.
- A 2.25 GPA or higher is required in courses listed in the Major Requirements column above.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Horticulture: Horticultural Science, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p.)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
ENGL 1213	Composition II	3
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
MATH 1483	Mathematical Functions and Their Uses (A)	3
or MATH 1513	College Algebra (A)	
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
Select from one of the following:		4
BIOL 1114	Introductory Biology (LN) [1]	
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN) [1]	
PBIO 1404	Plant Biology (LN)	
HORT 1013	Principles of Horticultural Science (LN)	3
Social & Behavioral Sciences (S)		
Course designated (S)		
AGEC 1113	Introduction to Agricultural Economics (S)	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		9
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
CHEM 1215	Chemical Principles I (LN)	5
SOIL 2124	Fundamentals of Soil Science (N)	4
Select one of the following:		3
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources	
BCOM 3113	Written Communication	
ENGL 3323	Technical Writing [3]	
Select one of the following:		*3*
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [2]	
SPCH 2713	Introduction to Speech Communication (S) [2]	
SPCH 3733	Elements of Persuasion (S) [2]	
ENTO 2993	Introduction to Entomology (LN)	3
HORT 2010	Internship in Horticulture or Landscape Management	1
HORT 2513	Herbaceous Plant Materials	3
or HORT 2613	Woody Plant Materials	
HORT 3084	Plant Propagation	4
HORT 3153	Turf Management	3
or HORT 3833	Hydroponics and Soilless Crop Production	
HORT 3513	Landscape Irrigation	3
PLP 3343	Principles of Plant Pathology	3
Hours Subtotal		**36**
Major Requirements		
HORT 4963	Horticulture Physiology	3
CHEM 1225	Chemical Principles II (LN)	5
HORT 3113	Greenhouse Management	3
ANSI 3423	Animal Genetics	3
or BIOL 3023	General Genetics	
CHEM 3013	Survey of Organic Chemistry	3
or BIOC 2344	Chemistry and Applications of Biomolecules	
Related Courses		
Select 12 hours (6 must be upper-division) from Ferguson College of Agriculture		12
Select 15 hours (9 must be upper division) from HORT		15
Hours Subtotal		**44**
Electives		
Select 0 hours to complete required total for degree		0
Hours Subtotal		**0**
Total Hours		**120**

1

College & Departmental requirements that may be used to meet General Education requirements.

2

If used as (S) course above, hours in this block are reduced by three.

3

If ENGL 3323 Technical Writing is substituted for ENGL 1213 Composition II above, then hours in this block are reduced by three.

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

- A 2.25 GPA or higher is required in courses listed in the Major Requirements column above.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Horticulture: Landscape Management, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p.)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
ENGL 1213	Composition II	3
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
MATH 1483	Mathematical Functions and Their Uses (A)	3
or MATH 1513	College Algebra (A)	
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
Select from one of the following:		4
BIOL 1114	Introductory Biology (LN) [1]	
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN) [1]	
PBIO 1404	Plant Biology (LN) [1]	
HORT 1013	Principles of Horticultural Science (LN)	3
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1]	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		9
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
CHEM 1215	Chemical Principles I (LN)	5
SOIL 2124	Fundamentals of Soil Science (N)	4
Select one of the following:		3
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources	
BCOM 3113	Written Communication	
ENGL 3323	Technical Writing [3]	
Select one of the following:		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [2]	
SPCH 3733	Elements of Persuasion (S) [2]	
ENTO 2993	Introduction to Entomology (LN)	3
HORT 2010	Internship in Horticulture or Landscape Management	1
HORT 2613	Woody Plant Materials	3
HORT 3153	Turf Management	3
or HORT 3833	Hydroponics and Soilless Crop Production	
HORT 3084	Plant Propagation	4
HORT 3513	Landscape Irrigation	3
PLP 3343	Principles of Plant Pathology	3
Hours Subtotal		**36**
Major Requirements		
ACCT 2003	Survey of Accounting	3
or ACCT 2103	Financial Accounting	
AST 2313	Surveying	3
HORT 2513	Herbaceous Plant Materials	3
HORT 3613	Bidding and Estimating	3
LA 1213	Visual Communication I for Landscape Architecture	3
LA 1223	Visual Communication II for Landscape Architecture	3
LA 1323	Computer-Aided Design for Landscape Architecture	3
LA 1525	Studio 1: Principles and Theory of Design	5
LA 3884	Landscape Construction: Site Grading	4
LA 4894	Landscape Construction: Materials and Methods	4
AGEC 3323	Agricultural Product Marketing and Sales	3
or AGEC 3423	Farm and Agribusiness Management	
or AGEC 3713	Agricultural Law	
or LSB 3213	Legal and Regulatory Environment of Business	
MGMT 3013	Fundamentals of Management (S)	3
MKTG 3213	Marketing (S)	3
ENTO 3421	Horticultural Insects	1
Electives		
Select 0 or hours to complete required total for degree		0
Hours Subtotal		**44**
Total Hours		**120**

1 College & Departmental requirements that may be used to meet General Education requirements.

2 If used as (S) course, hours in this block are reduced by three.

3 If ENGL 3323 Technical Writing is substituted for ENGL 1213 Composition II above, then hours in this block are reduced by 3.

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.
- A 2.25 GPA or higher is required in courses listed in the Major Requirements column above.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Horticulture: Public Horticulture, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p.)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
ENGL 1213	Composition II	3
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
MATH 1483	Mathematical Functions and Their Uses (A)	3
or MATH 1513	College Algebra (A)	
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
Select one of the following:		4
BIOL 1114	Introductory Biology (LN) [1]	
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN) [1]	
PBIO 1404	Plant Biology (LN)	
HORT 1013	Principles of Horticultural Science (LN)	3
Social & Behavioral Sciences (S)		
Course designated (S)		
AGEC 1113	Introduction to Agricultural Economics (S)	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		9
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
CHEM 1215	Chemical Principles I (LN)	5
SOIL 2124	Fundamentals of Soil Science (N)	4
Select one of the following:		3
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources	
BCOM 3113	Written Communication	
ENGL 3323	Technical Writing [3]	
Select one of the following:		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [2]	
SPCH 2713	Introduction to Speech Communication (S) [2]	
SPCH 3733	Elements of Persuasion (S) [2]	
ENTO 2993	Introduction to Entomology (LN)	3
HORT 2010	Internship in Horticulture or Landscape Management	1
HORT 2613	Woody Plant Materials	3
HORT 3153	Turf Management	3
or HORT 3833	Hydroponics and Soilless Crop Production	
HORT 3084	Plant Propagation	4
HORT 3513	Landscape Irrigation	3
PLP 3343	Principles of Plant Pathology	3
Hours Subtotal		**36**
Major Requirements		
HORT 2513	Herbaceous Plant Materials	3
HORT 3113	Greenhouse Management	3
HORT 4713	Public Garden Management	3
PLNT 4013	Principles of Weed Science	3
ACCT 2003	Survey of Accounting	3
or ACCT 2103	Financial Accounting	
MGMT 3013	Fundamentals of Management (S)	3
Select 15 hours (6 must be upper division) from HORT		15
Select 5 hours from Ferguson College of Agriculture or PBIO		5
Select 6 upper division hours from AGEC, LSB, MKTG, or MGMT		6
Electives		
Select 0 or hours to complete required total for degree		0
Hours Subtotal		**44**
Total Hours		**120**

1

College & Departmental requirements that may be used to meet General Education requirements.

2

If used as (S) course above, hours in this block are reduced by three.

3

If ENGL 3323 Technical Writing is substituted for ENGL 1213 Composition II above, then hours in this block are reduced by three.

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.
- A 2.25 GPA or higher is required in courses listed in the Major Requirements column above.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Horticulture: Turf Management, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p.)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
ENGL 1213	Composition II	3
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
MATH 1483	Mathematical Functions and Their Uses (A)	3
or MATH 1513	College Algebra (A)	
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
Select from one of the following:		4
BIOL 1114	Introductory Biology (LN) [1]	
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN) [1]	
PBIO 1404	Plant Biology (LN)	
HORT 1013	Principles of Horticultural Science (LN)	3
Social & Behavioral Sciences (S)		
Course designated (S)		
AGEC 1113	Introduction to Agricultural Economics (S)	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		9
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
CHEM 1215	Chemical Principles I (LN)	5
SOIL 2124	Fundamentals of Soil Science (N) [2]	4
Select one of the following:		*3*
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources	
BCOM 3113	Written Communication	
ENGL 3323	Technical Writing [3]	
Select one of the following:		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [2]	
SPCH 2713	Introduction to Speech Communication (S) [2]	
SPCH 3733	Elements of Persuasion (S) [2]	
ENTO 2993	Introduction to Entomology (LN)	3
HORT 2010	Internship in Horticulture or Landscape Management	1
HORT 2513	Herbaceous Plant Materials	3
or HORT 2613	Woody Plant Materials	
HORT 3153	Turf Management	3
or HORT 3833	Hydroponics and Soilless Crop Production	
HORT 3084	Plant Propagation	4
HORT 3513	Landscape Irrigation	3
PLP 3343	Principles of Plant Pathology	3
Hours Subtotal		**36**
Major Requirements		
ACCT 2003	Survey of Accounting	3
or ACCT 2103	Financial Accounting	
ENPP 3663	Turfgrass Integrated Pest Management	3
HORT 4453	Turfgrass Physiology and Ecology	3
HORT 4493	Athletic Field Management	3
HORT 4773	Applied Landscape Planning	3
or HORT 3613	Bidding and Estimating	
MGMT 3013	Fundamentals of Management (S)	3
PLNT 4013	Principles of Weed Science	3
SOIL 4234	Soil Nutrient Management	4
Select 4 hours from Ferguson College of Agriculture or MGMT		4
Select one area of emphasis (p. 2597)		15
Hours Subtotal		**44**
Electives		
Select 0 or hours to complete required total for degree		0
Hours Subtotal		**0**
Total Hours		**120**

1

College & Departmental requirements that may be used to meet General Education requirements.

2

If used as (S) course above, hours in this block are reduced by three.

3

If ENGL 3323 Technical Writing is substituted for ENGL 1213 Composition II above, then hours in this block are reduced by three.

Emphases

Code	Title	Hours
Soils Emphasis:		
Select 3 hours from:		3

SOIL 3433	Soil Genesis, Morphology, and Classification	
SOIL 4483	Soil Microbiology	
SOIL 4683	Soil, Water, and Weather	
SOIL 4893	Environmental Soil Chemistry	
Select 6 hours from:		6
SOIL 4213	Precision Agriculture	
SOIL 4363	Environmental Soil Science	
SOIL 4463	Soil and Water Conservation	
Select 6 hours from Ferguson College of Agriculture, PBIO or MGMT		6

Code	Title	Hours
Management Emphasis:		
MGMT 3011	Business, Government and Society	1
MGMT 3123	Managing Behavior and Organizations	3
MGMT 3313	Human Resource Management	3
MGMT 4073	Management and Ethical Leadership	3
MGMT 3 hours upper-division		3
Select 2 hours from HORT		2

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.
- A 2.25 GPA or higher is required in courses listed in the Major Requirements column above.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Horticulture: Urban Horticulture, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p.)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
ENGL 1213	Composition II	3
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
MATH 1483	Mathematical Functions and Their Uses (A)	3
or MATH 1513	College Algebra (A)	
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
Select from one of the following:		4
BIOL 1114	Introductory Biology (LN) [1]	
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN) [1]	
PBIO 1404	Plant Biology (LN) [1]	
HORT 1013	Principles of Horticultural Science (LN)	3
Social & Behavioral Sciences (S)		
Course designated (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1]	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		9
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
CHEM 1215	Chemical Principles I (LN)	5
SOIL 2124	Fundamentals of Soil Science (N)	4
Select one of the following:		3
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources	
BCOM 3113	Written Communication	
ENGL 3323	Technical Writing [3]	
Select one of the following:		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [2]	
SPCH 2713	Introduction to Speech Communication (S) [2]	
SPCH 3733	Elements of Persuasion (S) [2]	
ENTO 2993	Introduction to Entomology (LN)	3
HORT 2010	Internship in Horticulture or Landscape Management	1
HORT 2513	Herbaceous Plant Materials	3
or HORT 2613	Woody Plant Materials	
HORT 3153	Turf Management	3
or HORT 3833	Hydroponics and Soilless Crop Production	
HORT 3084	Plant Propagation	4
HORT 3513	Landscape Irrigation	3
PLP 3343	Principles of Plant Pathology	3
Hours Subtotal		**36**
Major Requirements		
HORT 3113	Greenhouse Management	3
HORT 3713	Urban Horticulture Production	3
HORT 3433	Commercial Vegetable Production	3
HORT 3213	Fruit and Nut Production	3
MGMT 3013	Fundamentals of Management (S)	3
Select 12 hours (3 must be upper division) from Ferguson College of Agriculture		12
Select 9 hours from HORT (3 must be upper division)		9
Select 8 hours (3 must be upper division) from: LSB, MKTG, MGMT, EEE, AGEC or ACCT		8
Electives		
Select 0 or hours to complete required total for degree		0
Hours Subtotal		**44**
Total Hours		**120**

1

College & Departmental requirements that may be used to meet General Education requirements.

2

If used as (S) course above, hours in this block are reduced by three.

3

If ENGL 3323 Technical Writing is substituted for ENGL 1213 Composition III above, then hours in this block are reduced by three.

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.
- A 2.25 GPA or higher is required in courses listed in the Major Requirements column above.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2029.

Landscape Architecture, BLA

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 126

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p.)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
MATH 1583	Applied Geometry and Trigonometry (A) [1]	3
or MATH 1613	Trigonometry (A)	
Humanities (H)		
LA 3673	History and Theory of Landscape Architecture (H) [1]	3
Course designated (H)		3
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
SOIL 1113	Land, Life and the Environment (N)	3
Select four hours from the following:		4
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN) [1]	
BIOL 1114	Introductory Biology (LN) [1]	
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [3]	3
or ECON 2103	Introduction to Microeconomics (S)	
Select one of the following:		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [1]	
SPCH 2713	Introduction to Speech Communication (S) [1]	
SPCH 3733	Elements of Persuasion (S) [1]	
Additional General Education		
Courses designated (A), (H), (N), or (S)		6
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College/Departmental Requirements		
Agricultural Sciences and Natural Resources		
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
LA 1013	Introduction to Landscape Architecture	3
Written and Oral Communications		
Select one of the following:		3
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources	
BCOM 3113	Written Communication	
ENGL 3323	Technical Writing [2]	
Hours Subtotal		**7**
Major Requirements		
Visual Communication:		
LA 1213	Visual Communication I for Landscape Architecture	3
LA 1223	Visual Communication II for Landscape Architecture	3
LA 1323	Computer-Aided Design for Landscape Architecture	3
Construction:		
LA 3884	Landscape Construction: Site Grading	4
LA 4894	Landscape Construction: Materials and Methods	4
Planning:		
LA 2413	Ecological Landscape Design	3
LA 4433	Land Use and City Planning	3
LA 4453	Principles of Landscape Analysis for Site Design	3
Design:		
LA 1525	Studio 1: Principles and Theory of Design	5
LA 2515	Studio 2: Site Design	5
LA 2525	Studio 3: Recreation and Open Space Design	5
LA 3515	Studio 4: Landscape Planting Design	5
Select two of the following:		10
LA 3525	Studio 5: Sustainable Construction and Design	
LA 4515	Studio 6: Urban Design	
LA 3020	Long-Term Internship in Landscape Architecture	
LA 4525	Studio 7: Community Development and Neighborhood Design	5
Plant Material:		
HORT 2613	Woody Plant Materials	3
Professional Practice:		
LA 3683	Professional Practice & Office Procedure	3
LA 4112	Landscape Architecture Career Survey	2
Internship:		
LA 3010	Internship in Landscape Architecture	1
Related Courses		

Select courses from among the following in consultation with a faculty advisor for additional breadth, or to create a specialty area.

Select 9 hours of the following:		9
AST 2313	Surveying	
Any ARCH course		
HORT 1013	Principles of Horticultural Science (LN)	
HORT 2513	Herbaceous Plant Materials	
HORT 3153	Turf Management	
HORT 3513	Landscape Irrigation	
LA 2513	Native American Symbolism in Landscape Design (D)	
LA 3020	Long-Term Internship in Landscape Architecture	
NREM 3013	Applied Ecology and Conservation	
NREM 4033	Ecology Of Invasive Species	
GEOG 3153	Conservation of Natural Resources (S)	
Hours Subtotal		**79**
Electives		
Hours Subtotal		**0**
Total Hours		**126**

[1]

College & Departmental requirements that may be used to meet General Education requirements.

[2]

If ENGL 3323 Technical Writing is substituted for ENGL 1213 Composition II above, then hours in this area are zero.

[3]

If used as (S) course above, hours in this block are reduced by three.

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

International Agriculture

The Master of International Agriculture Program is a multidisciplinary degree program, preparing students for successful careers in global agriculture. Blending theory, practical knowledge, and hands-on experience, the program prepares students to make significant contributions to the field of international agriculture. There are two degree options within the Master of International Agriculture Program: Master of Agriculture and Master of Science.

The Master of Science in International Agriculture program accommodates those students who prefer to take theoretical courses preparing them for research. This program will provide students with the theoretical, science and research backgrounds necessary to design, implement, and manage agricultural programs in developed and developing countries. It allows participants to blend theory and practice to improve the lives of people.

A Master of Agriculture in International Agriculture prepares candidates for positions in the public and private sectors related to international agricultural development and marketing. Graduates work in international agribusinesses, non-profit organizations, development agencies, government and diplomatic service, education, agricultural extension, agricultural trade associations and commodity groups, and other positions in global agriculture.

Admission Requirements

A baccalaureate degree in Agriculture or a related field is required for admission. The candidate must meet requirements for acceptance into the Graduate College and be recommended by the departmental graduate committee responsible for the program.

Degree Requirements

The requirements for this degree are the same as those listed in the Catalog, Graduate College section, under "The Master's Degree."

In addition, each candidate approved for study under this program will be assigned an advisor, who will assist the student will developing an advisory committee with whom he or she will develop a plan of study in accordance with guidelines and requirements established in the department responsible for the program.

Karl Rich, PhD—Professor and Director

Master of Agriculture in International Agriculture (MAIA)

The Master of Agriculture in International Agriculture (MAIA) is a multidisciplinary degree program that provides students with the diverse background necessary to design, implement and manage agricultural programs in developed and developing areas. The program prepares candidates for positions in the public and private sectors related to international agricultural development and marketing. Graduates work in international agribusinesses, non-profit organizations, development agencies, government and diplomatic service, education, agricultural extension, agricultural trade associations and commodity groups and other positions in global agriculture. Others pursue a personal desire to make a difference in the world by doing agricultural development work in a developing country or working in areas recovering from a natural disaster. The MAIA is for students who prefer to blend theory and practice to improve the lives of people, develop professional skills and network through an international agricultural experience, develop a focus area to support professional goals, develop broader understanding of world cultures and issues, and engage in international travel.

Two alternatives exist for satisfying requirements for the MAIA degree:

1. 36 credit hours and a creative component, or

2. 36 credit hours, including six hours for a professional internship.

A minimum of 21 credit hours must be earned at the 5000-level or above. The creative component or professional internship are expected to be in the area of international agriculture. Each student must take a minimum of 14 semester credit hours of approved core courses and a minimum of 22 semester credit hours of focus area courses. Each student is required to complete an international experience of four weeks or longer.

Master of Science in International Agriculture (MSIA)

The Master of Science in International Agriculture is designed to prepare candidates for positions in the public and private sectors related to agricultural sciences and natural resources or for continuation into a doctoral program. The MSIA accommodates those students who prefer to take theoretical courses preparing them for research. This program will provide students with the theoretical, science and research background necessary to design, implement and manage agricultural programs in developed and developing countries. It allows participants to blend theory and practice to improve the lives of people. Advanced study leading to the Master of Science degree in the field of International Agriculture prepares students for such professional careers as business analyst; international trade and development specialist; college-level educator; agricultural extension specialist; and a professional working with non-profit organizations, government sectors, and agricultural commodity groups. The program is multidisciplinary allowing students the freedom to focus on the area of study they choose.

Three alternatives exist for satisfying requirements for the MSIA degree:

1. 30 credit hours, consisting of 24 hours of coursework and six hours for a thesis

2. 32 credit hours, consisting of 30 hours of coursework and two hours of formal report

3. 32 credit hours, consisting of 30 hours of coursework and two hours for a creative component

Degree candidates are expected to conduct research related to a topic on international agriculture. The requirements include one course in statistics or quantitative/qualitative analysis and one course in research methodology. Each student is required to complete an international experience of four weeks or longer.

Courses

AGIN 5000 Master's Thesis/Report in International Agriculture
Description: For students working on a masters degree in International Agriculture. Independent research and thesis under the direction and supervision of a major professor. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Graduate
Schedule types: Independent Study
Department/School: Dean of Agriculture

AGIN 5102 International Agriculture Creative Component
Prerequisites: Graduate standing or consent of instructor.
Description: Development of independent project to improve or inform an international agriculture practice based on scholarship.
Credit hours: 2
Contact hours: Contact: 2 Other: 2
Levels: Graduate
Schedule types: Independent Study
Department/School: Dean of Agriculture

AGIN 5113 Global Agricultural Development Communications
Prerequisites: Graduate Standing.
Description: Role of Information Communication Technologies in global agricultural development and the storytelling process as a communication tool for global agricultural development.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Dean of Agriculture

AGIN 5213 Global Agricultural Entrepreneurship
Prerequisites: Graduate Standing.
Description: Use of entrepreneurship principles to develop solutions to emerging and/or existing problems and challenges in global agriculture.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Dean of Agriculture

AGIN 5312 Applied Issues in International Agriculture and Natural Resources
Prerequisites: Graduate standing or consent of instructor.
Description: Applied global issues in international agriculture and natural resource development, including sustainability, food security, trade, project evaluation, and international agricultural institutions. Written and oral reports and discussion of selected topics. Previously offered as AG 5010.
Credit hours: 2
Contact hours: Lecture: 2 Contact: 2
Levels: Graduate
Schedule types: Lecture
Department/School: Dean of Agriculture

AGIN 5313 Global Food Security and Sustainability
Prerequisites: Graduate Standing.
Description: Broad overview of the complexity of global food systems including key challenges to security and sustainability of agricultural production now and in the future.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Dean of Agriculture

AGIN 5333 Guided Reading in International Agriculture and Natural Resources
Prerequisites: Graduate standing or consent of Instructor.
Description: Understanding of international agricultural development objectives, challenges, and solutions to the most critical problems facing the developing world's food and agricultural systems, through readings of a set of classic and contemporary books and constructing book reports.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Dean of Agriculture

AGIN 5353 Advanced Case Studies in Agricultural Marketing and International Development
Prerequisites: Consent of Instructor.
Description: Advanced real world issues in marketing and international development of agricultural and food products. Development of an understanding of issues facing policy makers, producers, consumers, and other groups in examining the costs and benefits of various international marketing, trade and development programs.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Dean of Agriculture

AGIN 5413 Overview of Global Development
Prerequisites: Graduate Standing.
Description: Examines effective principles and practices of International development and provides a thorough understanding of current issues in development by guiding students to an understanding of how development issues are being approached, what methodologies are effective, and how to use the tools of development. Same course as GS 5413.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Dean of Agriculture

AGIN 5713 Participatory Tools and Processes for Community Engagement
Prerequisites: Graduate standing in AGIN or consent of instructor.
Description: Cultivates skills in the practical application of participatory tools and processes to interact more effectively with local communities. Provides facility in standard facilitation techniques alongside systems thinking tools to develop skills in managing group dynamics, encouraging team building, and helping groups come to consensus and sustainable decisions.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Dean of Agriculture

AGIN 5723 Participatory Systems Modeling
Prerequisites: AGIN 5713 or consent of instructor.
Description: Develops facility in the application and use of system dynamics models based on the interaction and engagement with stakeholder groups. Teaches system dynamics techniques and relevant software and applies these to various international agriculture problems. Exposes students to the theory and practice of using group model building techniques with stakeholders to enhance decision making.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Dean of Agriculture

AGIN 5800 International Agriculture Internship Experience
Prerequisites: Graduate standing or consent of instructor.
Description: Students conducting an international internship experience, under the direction and supervision of a faculty member. Previously offered as AG 5100. Offered for variable credit, 1-6 credit hours, maximum of 12 credit hours.
Credit hours: 1-6
Contact hours: Lecture: 1-6 Contact: 1-6
Levels: Graduate
Schedule types: Lecture
Department/School: Dean of Agriculture

AGIN 5801 International Agricultural Experience Proposal
Prerequisites: Consent of instructor.
Description: Students planning and preparing an international internship experience, under the direction and supervision of a faculty member.
Credit hours: 1
Contact hours: Contact: 1 Other: 1
Levels: Graduate
Schedule types: Independent Study
Department/School: Dean of Agriculture

AGIN 5990 Advanced Studies in International Agriculture and Natural Resources
Prerequisites: Consent of Instructor.
Description: Individual or small group study and/or research in international agriculture and natural resources. Offered for variable credit, 1-12 credit hours, maximum of 15 credit hours.
Credit hours: 1-12
Contact hours: Contact: 1-12 Other: 1-12
Levels: Graduate
Schedule types: Independent Study
Department/School: Dean of Agriculture

Natural Resource Ecology and Management

Faculty in the Department of Natural Resource Ecology and Management (NREM) have expertise in conducting interdisciplinary instruction, research and extension education that focuses on the natural resources of fisheries, forests, rangeland, and wildlife within and beyond the boundaries of Oklahoma. An important goal of the NREM faculty is to increase public understanding of the ecology and management of these natural resources as they relate to agriculture, forest and livestock production, hunting and fishing, wildlife habitat, ecotourism, other ecosystem services and the conservation of natural ecosystems.

The NREM faculty supports undergraduate and graduate programs in the general areas of fisheries, forestry, rangeland, and wildlife. The NREM curriculum prepares students to plan, implement and research the management, protection, and sustainable use of natural resources within Oklahoma and throughout the world. The department provides an integrated education in renewable natural resource management, conservation and utilization, land use policy and ethics, as well as a valuable perspective for understanding and solving critical contemporary environmental problems at local, regional, and global scales.

Courses in NREM undergraduate degree options fulfill the requirements for many applied and professional careers in the natural resource disciplines, including preparation for graduate programs, veterinary school, and certification with the Society of American Foresters. NREM also maintains strong ties to The Wildlife Society, The American Fisheries Society and The Society for Range Management. Graduates may be employed by governmental agencies, non-profit organizations, private industry, or individuals. Federal agencies hiring NREM graduates include U.S. Department of Agriculture, U.S. Forest Service, USDA-Natural Resources Conservation Service, U.S. Bureau of Land Management, U.S. Geological Survey, U.S. Fish and Wildlife Service, USDA-Agricultural Research Service, Bureau of Indian Affairs, National Park Service, Animal and Plant Health Inspection Service, and the U.S. Environmental Protection Agency. In addition, state, county, and municipal governments, including Oklahoma Forestry Service and Oklahoma Division of Wildlife Conservation, employ NREM graduates in a variety of resource management consultant, restoration, service, and technical positions.

Natural Resource Ecology and Management Undergraduate Degree Options

Fisheries and Aquatic Ecology is designed for students with interest in the management of fish and other aquatic species populations and their habitats in streams, rivers, lakes, and ponds. Students gain the skills in research techniques and methodology in fisheries science, including habitat measurements, population sampling techniques and abundance estimation, age and growth analysis, recreational surveys, data analysis and report writing. Recreational use, sustainable management of fish populations, natural resource policy and land use ethics are additional topic areas emphasized.

Forest Ecology and Management emphasizes the science-based conservation and management of forest lands, ecosystems, and related natural resources. Students gain skills that are necessary for the measurement, assessment, valuation and development of management strategies for forests and related natural resources. Successful completion of the curriculum will provide competency in the general areas of basic science, forest biology, forest mensuration, forest plant species identification, forest economics, natural resource policy, decision-making, problem solving, and communications. The option is accredited by the Society of American Foresters (SAF). Requirements for this option include the successful completion of field camps in May, which are scheduled to follow the sophomore and junior spring semesters and are held annually in diverse forest settings. Field forestry skills, forest ecology, integrated natural resource management, timber cruising, resource economics and land use ethics are emphasized at camp and integrated in the senior-level capstone course.

Rangeland Ecology and Management emphasizes understanding management of grasslands, shrub lands, and savannas for livestock forage production, wildlife habitat, and other ecosystem services such as carbon sequestration, soil health and off-site water yield. Courses teach the effects of wildfire, invasive species and other disturbances on biotic and abiotic processes, and strategies for restoration of damaged rangeland ecosystems. The importance of prescribed fire as a rangeland restoration tool, livestock grazing management, and the identification and value of native grass and forb species for livestock forage, wildlife food and habitat cover, and other uses are emphasized. Students learn to integrate their knowledge of soil, water, vegetation, wildlife habitat and natural resource policies into management of public or private rangelands for multiple uses.

Wildlife Ecology and Management provides insight into the biological basis for management of wildlife populations and habitats, with emphasis on current management problems. Students gain the skills in wildlife research techniques, including aging and sexing, wildlife and vegetation sampling, and wildlife population and habitat analysis through field sampling and use of wildlife population models. Students learn the fundamentals of why certain ecosystems support certain wildlife species and how these species are adapted to those environments. Recreational use, sustainable management of wildlife populations, natural resource policy and land use ethics are additional topic areas emphasized.

Wildlife Biology and Pre-Veterinary Science provides the ecological background and training in natural wildlife science and population dynamics in addition to the basic sciences necessary to prepare students for graduate education in veterinary medicine. The option combines research and management training in population ecology with basic biology, anatomy and chemistry of wildlife species and their habitat requirements.

Students entering the NREM department are encouraged to join and become active members of one of many student organizations: Society of American Foresters, Society for Range Management, The Wildlife Society, and the American Fisheries Society. Participation in one or more of these organizations provides students the opportunity to attend state, regional or national meetings where they will gain valuable advantages through networking, student competitions and interacting with various career-related activities.

Courses

NREM 1012 Introduction to Natural Resource Ecology and Management
Description: Introduction to the wide variety of natural resources found globally with a focus on Oklahoma ecoregions. Overview of the ecology and management of natural resources in the pine-hardwood forest, the Cross Timbers, and the tallgrass, mixed-grass and shortgrass prairies. Academic and career options presented through guest speakers.
Credit hours: 2
Contact hours: Lecture: 2 Contact: 2
Levels: Undergraduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 1014 Introduction to Natural History (LN)
Description: The study of living organisms especially their origins, life histories, behaviors, conservation, and unique adaptations for reproducing and relating to their environment. Laboratory emphasis is on observation and investigation of the diversity and adaptations of living organisms.
Credit hours: 4
Contact hours: Lecture: 3 Lab: 2 Contact: 5
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Natural Res Eco & Mgmt
General Education and other Course Attributes: Scientific Investigation, Natural Sciences

NREM 1113 Elements of Forestry
Description: Survey of forestry as an art, science and profession including forestry and natural resource management theory, forest distribution and ownership, history of forest resource policy development, forest protection, wildlife interactions, forest ecosystem process, current issues, and career opportunities. Previously offered as NREM 1114.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 1213 Introduction to Wood Properties and Products
Description: Anatomical, physical and mechanical properties of solid wood and wood products. Macroscopic and microscopic identification of wood. Principles of manufacture of lumber, plywood and wood composites. Biological deterioration of wood and main wood preservation techniques. One weekend field trip required. Previously offered as NREM 1214.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Natural Res Eco & Mgmt

NREM 2013 Ecology of Natural Resources
Prerequisites: BIOL 1114 or (BIOL 1113 and BIOL 1111) or PLNT 1213.
Description: Introductory focus on understanding and applying general ecological principles to agricultural and natural ecosystems. Emphasis on relationships between climate, soils, agricultural, and natural ecosystems. Topics include nutrient cycles, energy flow, species interactions, biological diversity, productivity, sustainability, and landscape and ecosystem management. Previously offered as RLEM 2913.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 2083 Geospatial Technologies for Natural Resources
Prerequisites: MATH 1513.
Description: Principles and application of geospatial technologies for natural resource ecology and management including remote sensing (serial photography and satellite data), geographic information systems (GIS) and global positioning system (GPS) technologies. Previously offered as NREM 3083.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 3 Contact: 5
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Natural Res Eco & Mgmt

NREM 2113 Wood Properties, Products, & Harvesting
Description: Management and planning of timber harvesting, including products derived from wood. Harvesting techniques, safety and cost analysis. Anatomical, physical and mechanical properties of solid wood and wood products. Macroscopic and microscopic identification of wood. Manufacture of lumber and wood composites, including wood preservation to prevent deterioration. Previously offered as FOR 2002, FOR 2113 and NREM 2112.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Natural Res Eco & Mgmt

NREM 2134 Dendrology
Description: Identification, taxonomy and distribution of forest trees and shrubs of the United States; their environmental requirements and utilization. Previously offered as FOR 2134.
Credit hours: 4
Contact hours: Lecture: 2 Lab: 4 Contact: 6
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Natural Res Eco & Mgmt

NREM 3012 Applied Ecology Laboratory
Prerequisites: NREM 3013 or concurrent, NREM major or instructor permission.
Description: Field experience aimed at navigating and working effectively and safely in the natural environment. Identification, measurement and interpretation of abiotic and biotic components to understand and describe ecosystem function and current natural resource management tools and issues. Focus on representative forest, grassland and aquatic ecosystems.
Credit hours: 2
Contact hours: Lab: 4 Contact: 4
Levels: Undergraduate
Schedule types: Lab
Department/School: Natural Res Eco & Mgmt
Additional Fees: NREM or FOR Course Field Trip fee of $46 and NREM or FOR Course Field Trip fee of $46 apply.

NREM 3013 Applied Ecology and Conservation
Prerequisites: BIOL 1114 or (BIOL 1113 and BIOL 1111), or BIOL 1604, or PBIO 1404, or PLNT 1213; Sophomore, Junior, or Senior class standing; SOIL 2124 preferred.
Description: Development of critical thinking for conservation and land management through the application of ecological concepts and theory. Principles of population, community, ecosystem and landscape ecology, with applications to management of wildlife, fisheries, forest and rangeland resources. Application of scientific method and literature to natural resource ecology and management.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 3063 Natural Resource Biometrics
Prerequisites: STAT 2013; and MATH 1513 or MATH 1483.
Description: Application of statistical concepts to problems in natural resource sampling and estimation including simple random sampling, stratified sampling, regression analysis, double sampling and ratio and regression estimation. Statistical analysis using spreadsheets. Applications to forest, range and wildlife management. Previously offered as NREM 3363.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Natural Res Eco & Mgmt

NREM 3091 Field Applications of Geospatial Technologies for Natural Resources
Prerequisites: NREM 2083.
Description: Field-based use of global navigation satellite systems, geographic information systems and topographic maps to measure and interpret the environment with application to fishery, forest, range, and wildlife planning and management.
Credit hours: 1
Contact hours: Lab: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lab
Department/School: Natural Res Eco & Mgmt

NREM 3101 Forest Resource Field Studies
Prerequisites: NREM 2134 and PBIO 1404 and SOIL 2124.
Description: One-week summer presession field experience at an off-campus site. Field study in the dynamics of forest ecosystems and related components including trees, soils, water, fauna, and associated flora as they relate to site productivity and the production of resource outputs, products, and services. Previously offered as NREM 3112.
Credit hours: 1
Contact hours: Lab: 2 Contact: 2
Levels: Undergraduate
Schedule types: Lab
Department/School: Natural Res Eco & Mgmt

NREM 3111 Natural Resource Field Studies
Description: One-week summer presession field experience at off-campus site. Field study, analysis, and assessment of natural resource ecosystems at multiple scales with application to integrated management of forest, wildlife, range, water, soil, and recreation resources to sustain a broad array of uses and values, and to understand associated ecological, social, policy, and ethical issues. Includes visits to private and public natural resource lands and projects. Previously offered as FOR 3103 and NREM 3103.
Credit hours: 1
Contact hours: Lab: 2 Contact: 2
Levels: Undergraduate
Schedule types: Lab
Department/School: Natural Res Eco & Mgmt

NREM 3123 Forest Measurements I
Prerequisites: MATH 1513; STAT 2013 (or concurrent).
Description: Measurement of trees, forests, and forest products. Application of mensurational techniques to forest growth and productivity. Methods of forest sampling and inventory. Use of topographic maps, U.S. Public Land Survey system maps, global navigation satellite systems and mapping software. Previously offered as NREM 2103.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Natural Res Eco & Mgmt

NREM 3133 Forest Measurements II
Prerequisites: NREM 2134 and NREM 3123.
Description: Forest-level measurements emphasizing statistical and tactical design of forest inventory methods with application and implementation in the field. Principles of forest growth and yield. Analysis, interpretation and presentation of data. Creation of professional reports. Overnight fieldtrips required. Previously offered as NREM 3102.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Natural Res Eco & Mgmt

NREM 3143 Forest Biology
Prerequisites: PBIO 1404.
Description: The response of trees and forest ecosystems to biotic and abiotic factors. Understanding of life history traits, tree structure, and genetics as they relate to the establishment, growth, and regeneration of species. Application of physiological and ecological principles in predicting the effects of resource availability, site quality, and competition on tree growth, forest growth, and community interactions. Previously offered as NREM 4213 and FOR 4563.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 3153 Forest Health and Disturbance Ecology
Prerequisites: NREM 2013, or (NREM 3012 and NREM 3013), or BIOL 3034.
Description: Dynamics of ecological disturbance, resilience and recovery in forests. Natural role of fire in forest ecosystems and theory of fire behavior. Traits, population dynamics, and life cycles of major diseases and insect groups related to infestations and outbreaks that threaten forests. Previously offered as NREM 3713.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 3224 Silviculture
Prerequisites: NREM 2013, or NREM 3012 and NREM 3013, or BIOL 3034.
Description: Theory and practice of controlling forest establishment, composition, structure, and growth to achieve multiple objectives including timber production, wildlife habitat, water quality, forest health, and recreation. Principles and techniques related to regeneration, thinning, prescribed fire, and harvest methods to increase the productivity, resilience, and output of desired ecosystem services. A two-day field trip is required. Previously offered as NREM 3223.
Credit hours: 4
Contact hours: Lecture: 3 Lab: 2 Contact: 5
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Natural Res Eco & Mgmt

NREM 3502 Wildlife Law Enforcement
Prerequisites: Junior standing and consent of instructor.
Description: Survey of state and federal wildlife laws with emphasis on Oklahoma statutory and regulatory laws pertaining to wildlife. Lectures, guest lectures, videotapes and field exercises. Previously offered as COSC 3502 and ZOOL 3502.
Credit hours: 2
Contact hours: Lecture: 2 Contact: 2
Levels: Undergraduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 3503 Principles of Wildlife Ecology and Management
Prerequisites: NREM 3013 or BIOL 3034 or concurrent.
Description: An introduction to the biological basis of the management of wildlife habitats and populations. Previously offered as NREM 4513, ZOOL 4513, WLDL 4513, and COSC 4513.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 3523 Fish and Wildlife Population Biology
Prerequisites: NREM 3012 and NREM 3013, or BIOL 3034 or concurrent enrollment.
Description: Dynamics of fish and wildlife populations resulting from reproduction, competition, predation, movement, and exploitation. Effects of life history patterns on population growth and management strategies. Methods for measuring distribution, abundance, survival, and growth of fish and wildlife populations. Management strategies for fish and wildlife populations.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 3613 Principles of Rangeland Management
Description: Overview of the science of applying ecological principles to managing rangeland resources, including rangeland characteristics; goods and services provided by rangelands; primary threats to rangelands; North American rangeland resources; principles of grazing management and current topics in range management. Previously offered as RLEM 3913.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 4001 Issues In Global Change
Prerequisites: (NREM 3012 and NREM 3013) or BIOL 3034.
Description: Student led discussion to learn the causes and consequences of global change and practical implications for natural resource ecology and management.
Credit hours: 1
Contact hours: Contact: 1 Other: 1
Levels: Undergraduate
Schedule types: Discussion
Department/School: Natural Res Eco & Mgmt

NREM 4013 Herbaceous Plants of the Great Plains
Description: Identification (by sight and dichotomous key), characteristics (vegetative and floral), ecological/agricultural importance, and management of important native range grasses and broadleaf plant families, genera, and species, with emphasis on rangeland management applications. May not be used for degree credit with NREM 5013.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Natural Res Eco & Mgmt

NREM 4023 Restoration Ecology
Prerequisites: 40 semester credit hours.
Description: Application of ecological theory to the practice of ecological restoration to improve populations, communities, and ecosystems degraded directly or indirectly by human activities.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 4033 Ecology Of Invasive Species
Prerequisites: BIOL 1114 or (BIOL 1113 and BIOL 1111); (PBIO 1404 and BIOL 1604 recommended).
Description: Ecological principles and their application to invasive species. Population level characteristics; community and ecosystem level effects of a wide variety of taxa including microbial, fungal, plant invertebrate, and vertebrate examples. Global consequences and governmental policies/programs designed to limit the spread of invasives. Same course as ENVR 4033.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 4043 Natural Resource Administration and Policy
Prerequisites: Senior standing.
Description: Natural resource policy and legislation; ethics relating to natural resources; natural resource organizations and how they function to include structure, supervision, and financing of federal, state, and private natural resource enterprises. Previously offered as NREM 4343 and FOR 4443. May not be used for degree credit with NREM 5843.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 4053 Natural Resource Recreation
Description: Ecological, historical, social and policy basis for recreational use and management of natural resources, including an analysis of planning, management, and administrative frameworks for providing a diversity of recreational opportunities, benefits, and resource values. Previously offered as NREM 4353 and FOR 4553. May not be used for degree credit with NREM 5853.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 4093 Natural Resources, People and Sustainable Development (I)
Description: Relationship between people, the land, and associated natural resources in the developing world, including the ecological and cultural basis for resource use and development. Examines issues of traditional agriculture and deforestation, and explores sustainable strategies for land use, resource management, and community development. Includes two-week study abroad component. Previously offered as NREM 4393.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt
General Education and other Course Attributes: International Dimension

NREM 4234 Forest Management and Economics
Prerequisites: NREM 3133, NREM 3224 and AGEC 1113.
Description: Regulation of forest growing stock to meet financial and biological management objectives; stand level optimization; linear programming principles in harvest scheduling; timberland taxation; timberland investment criteria; risk and uncertainty in timberland investment; economics of non-market goods. Previously offered as NREM 4323.
Credit hours: 4
Contact hours: Lecture: 3 Lab: 2 Contact: 5
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Natural Res Eco & Mgmt

NREM 4333 Forest Resource Management: Planning and Decision-Making
Prerequisites: NREM 4234.
Description: Integrated problem solving, to apply biological, quantitative, economic, political, and administrative principles in solving forest resource management problems. Previously offered as FOR 4333.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Natural Res Eco & Mgmt

NREM 4360 Ecotourism and Wilderness
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 4403 Wetland Ecology and Management
Prerequisites: NREM 3012 and NREM 3013, or BIOL 3034 or consent of instructor.
Description: Ecology, classification, restoration, and management of wetlands. Adaptations of wetland plants and animals, structure and function of wetlands, field identification of wetland plants, restoration techniques, wetland classification systems, management and conservation of wetlands, and regulatory processes. Previously offered as COSC 4403 and ZOOL 4403.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 3 Contact: 5
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Natural Res Eco & Mgmt
Additional Fees: NREM or FOR Course Field Trip fee of $40 applies.

NREM 4414 Fisheries Management
Prerequisites: NREM 3012 and NREM 3013, or BIOL 3034.
Description: Techniques and principles involved in management of fishes. Field trip fee required. Previously offered as COSC 4414, ZOOL 4414, and ZOOL 4524. May not be used for degree credit with NREM 5414 or NREM 5433.
Credit hours: 4
Contact hours: Lecture: 2 Lab: 4 Contact: 6
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Natural Res Eco & Mgmt

NREM 4424 Fisheries Techniques
Prerequisites: NREM 4414.
Description: Research techniques and methodology in fisheries science, including sampling design, habitat measurements, sampling gears and abundance estimation, age and growth analysis, recreational surveys, data analysis, and report writing. No credit for students with credit in NREM 5424. Previously offered as COSC 4424.
Credit hours: 4
Contact hours: Lecture: 3 Lab: 3 Contact: 6
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Natural Res Eco & Mgmt
Additional Fees: NREM or FOR Course Field Trip fee of $27 applies.

NREM 4443 Watershed Hydrology and Water Quality
Description: Processes that comprise the hydrologic cycle and how land use affects those processes and the quantity and quality of water from watersheds, focusing on surface water from forest, range and agricultural watersheds. Measurement and evaluation of water quantity and quality. Previously offered as NREM 4413 and FOR 4813.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Natural Res Eco & Mgmt

NREM 4452 Pond Management
Prerequisites: BIOL 1114 or (BIOL 1113 and BIOL 1111).
Description: Principles and practice of aquatic plant management, pond construction, and maintenance, fish population management, and human factors associated with pond ownership and management. No credit for students with credit in NREM 5452.
Credit hours: 2
Contact hours: Lecture: 2 Contact: 2
Levels: Undergraduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 4453 Aquaculture
Prerequisites: BIOL 1114 or (BIOL 1113 and BIOL 1111).
Description: Introduction to the principles of freshwater finfish production with an emphasis on warm water species. No credit for student having completed NREM 5453.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 4464 Ornithology
Prerequisites: BIOL 1604.
Description: Classification, evolution, distribution, identification, life histories, and morphological, ecological, and behavioral adaptations of birds. Two weekend field trips required. Same course as BIOL 4464. May not be used for degree credit with BIOL 5464, NREM 5564.
Credit hours: 4
Contact hours: Lecture: 3 Lab: 3 Contact: 6
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Natural Res Eco & Mgmt
Additional Fees: NREM or FOR Course Field Trip fee of $53 applies.

NREM 4522 Wildlife Management Applications and Planning
Prerequisites: NREM 4523 or concurrent.
Description: Applications of wildlife research and monitoring techniques to inventory and assess wildlife populations. Data collection methods, habitat assessment, and management plan development. Field trips required.
Credit hours: 2
Contact hours: Lab: 4 Contact: 4
Levels: Undergraduate
Schedule types: Lab
Department/School: Natural Res Eco & Mgmt

NREM 4523 Wildlife Management Techniques
Prerequisites: NREM 3503; ENGL 3323 strongly recommended.
Description: Theoretical and conceptual basis for research and management techniques in wildlife science. Experimental design, wildlife population and habitat analysis, wildlife and vegetation sampling, habitat management techniques, and aging and sexing techniques. Previously offered as COSC 4524, COSC 4523, ZOOL 4523, NREM 4524.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 4533 Wildlife Management for Game Species
Prerequisites: NREM 3012 and NREM 3013, or BIOL 3034; and NREM 3503.
Description: Life history attributes and habitat relationships of game species relative to life history strategies; conservation and management strategies for game species; and federal and state policies influencing game species management.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 4543 Wildlife Management for Biodiversity
Prerequisites: NREM 3013 and NREM 3503 recommended.
Description: Identification, life history, and conservation management issues affecting non-game species in North America, stressing rare, threatened, and endangered species occurring in Oklahoma. Principles of landscape ecology, wildlife management, and conservation biology applied to management scenarios aimed at recovery of rare species and biodiversity conservation at broad scales. Previously offered as COSC 4543 and ZOOL 4543.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 4603 Rangeland and Pasture Utilization
Prerequisites: NREM 3613.
Description: Investigation of livestock and forage interactions that impact productivity in the utilization of rangeland and improved pastures. Same course as ANSI 4203. May not be used for degree credit with NREM 5603.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Natural Res Eco & Mgmt

NREM 4613 Rangeland Resources Planning
Prerequisites: 40 semester credit hours including NREM 3613 and ANSI 3653.
Description: Inventory of ranch resources, survey and evaluation of ranch practices, and economic analysis. Development of a comprehensive ranch management plan. Managing rangeland and ranch resources in a social context. Written and oral reports. Field trips required. Same course as ANSI 4973. Previously offered as RLEM 4973 and AGRN 4973.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 4741 Wildland Firefighter Training
Description: Training for Type 2 (FFT2) wildland firefighting positions with US government agencies. Provides qualifications to participate in prescribed fire and other wildland fire operations Including: ignition, control, mop-up, suppression, and monitoring.
Credit hours: 1
Contact hours: Lecture: 1 Contact: 1
Levels: Undergraduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 4783 Prescribed Fire
Prerequisites: NREM 3613.
Description: When to use prescribed fire and how to use prescribed fire to accomplish specific land management objectives. Writing prescribed fire plans, policy and laws, weather, equipment, conducting burns, and post-burn mop-up. Previously offered as RLEM 4983.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 4793 Advanced Prescribed Fire
Prerequisites: NREM 4783 or consent of instructor.
Description: Preparing fire plans and executing prescribed fires as the fireboss. No credit for both NREM 4793 and NREM 5793. Previously offered as RLEM 4993.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 3 Contact: 5
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Natural Res Eco & Mgmt

NREM 4960 Undergraduate Internship
Prerequisites: Consent of instructor.
Description: Supervised internship with an approved natural resource business, government agency, or nongovernment organization, including a diversity of learning opportunities in a work environment. For every hour of credit, 45 hours of work are required. Graded on a pass-fail basis. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Natural Res Eco & Mgmt

NREM 4980 Undergraduate Research
Prerequisites: Upper-division standing, GPA of 2.50 or better and consent of instructor.
Description: Participation in faculty research or execution of a research problem formulated by the student. Previously offered as FOR 4500. Offered for variable credit, 1-3 credit hours, maximum of 3 credit hours.
Credit hours: 1-3
Contact hours: Lecture: 1-3 Contact: 1-3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 4990 Special Topics in Natural Resource Ecology and Management
Description: Advanced topics and new developments in natural resource ecology and management. Previously offered as RLEM 4990. Offered for variable credit, 1-3 credit hours, maximum of 12 credit hours.
Credit hours: 1-3
Contact hours: Lecture: 1-3 Contact: 1-3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 5000 Master's Thesis Report
Description: Independent research planned, conducted and reported in consultation with a major professor. Previously offered as RLEM 5000. Offered for variable credit, 1-12 credit hours, max 12 (Thesis) 4 (Report).
Credit hours: 1-12
Contact hours: Lecture: 1-12 Contact: 1-12
Levels: Graduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 5013 Herbaceous Plants of the Great Plains
Description: Identification (by sight and dichotomous key), characteristics (vegetative and floral), ecological/agricultural importance, and management of important native range grasses and broadleaf plant families, genera, and species. May not be used for degree credit with NREM 4013.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Natural Res Eco & Mgmt

NREM 5020 Graduate Seminar
Description: Special topics in Natural Resource Ecology and Management; philosophy, methods and interpretation of research. Previously offered as RLEM 5020. Offered for fixed credit, 1 credit hour, maximum of 10 credit hours.
Credit hours: 1
Contact hours: Lecture: 1 Contact: 1
Levels: Graduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 5023 Restoration Ecology
Description: Application of ecological theory to ecological restoration with the goal of improving populations, communities and ecosystems degraded directly or indirectly by human activities. Case studies and applications of ecological principles to restorations across circumstances and systems will be discussed. May not be used for degree credit with NREM 4023.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 5030 Special Problems in Natural Resource Ecology and Management
Description: Special problems in areas of natural resource ecology and management other than those covered in the student's thesis research. Previously offered as FOR 5030. Offered for variable credit, 1-9 credit hours, maximum of 9 credit hours.
Credit hours: 1-9
Contact hours: Lecture: 1-9 Contact: 1-9
Levels: Graduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 5033 Ecology of Invasive Species
Description: Ecological principles and their application to invasive species. Discussion of population level characteristics and community and ecosystem level effects of a wide variety of taxa including invasive microbial, fungal, plant, invertebrate, and vertebrate examples. Current global consequences and governmental policies/programs designed to limit the spread of invasives. May not be used for degree credit with NREM 4033 or ENVR 4033.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 5043 Ecology and Evolution of Symbiosis
Description: Ecology and evolution of symbiotic and mutualistic interactions in different ecosystems. Theory, current questions, and general patterns involving biotic interactions of plants and animals with other plants, animals, or microbes.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 5053 Global Ecology and Biogeochemistry
Description: Examines key nutrient pools and transformations in the atmosphere, soils, and hydrosphere, with an emphasis on the role of living organisms in nutrient transformations and fluxes. Emphasis placed on processes relevant to biogeochemical cycles at ecosystem and global scales in reference to aspects of global change.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 5063 Production Ecology
Prerequisites: NREM 3012 and NREM 3013, or BIOL 3034.
Description: Mechanisms driving the growth and productivity of terrestrial ecosystems in response to resource availability, genetics, disturbance, and climate. Factors affecting the distribution and productivity of biomes, relationship between leaf area and productivity, effects of diversity on productivity, the proximal causes of increased growth associated with resource additions, and using process models to predict growth. Previously offered as NREM 4103.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 5073 Modeling Ecosystem Processes and Species Distributions
Prerequisites: Basic understanding of population ecology and statistics strongly encouraged.
Description: Theories of modeling ecosystem processes and species distributions; model building; applying models with real data. No prior modeling experience is expected. Basic understanding of ecology and statistics strongly encouraged.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 5083 Applied Landscape Ecology
Description: Advanced ecology and management of grasslands, shrublands, and forests. Understanding the effects of grazing, fire and other disturbances on biotic and abiotic processes. Vegetation dynamics, wildlife habitat evaluation, woody plant encroachment, rangeland monitoring, and landscape ecology. Field trips required at additional cost to students. Previously offered as NREM 5054.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 5130 Topics In Forestry
Description: Advanced study on special topics in forestry. Offered for variable credit, 1-3 credit hours, maximum of 9 credit hours.
Credit hours: 1-3
Contact hours: Contact: 1-3 Other: 1-3
Levels: Graduate
Schedule types: Independent Study
Department/School: Natural Res Eco & Mgmt

NREM 5133 Advanced Topics in Forest Biometrics
Prerequisites: NREM 3063 or equivalent; STAT 5013 concurrently or equivalent.
Description: Quantitative description of forest populations and methods for modeling forest growth and development. Sampling techniques for forest populations. Previously offered as FOR 5053.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 5193 Spatial and Non-Spatial Database Management
Prerequisites: One course in statistics and programming experience.
Description: Methods of acquiring, managing and analyzing spatial data using geographic information systems. Management of non-spatial data using relational database managers. Development of applications using these tools for evaluating and managing natural resources. Previously offered as SOIL 5193.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 5234 Forest Management and Economics
Description: Regulation of forest growing stock to meet financial and biological management objectives; stand level optimization; linear programming principles in harvest scheduling; timberland taxation; timberland investment criteria; risk and uncertainty in timberland investment; economics of non-market goods. May not be used for degree credit with NREM 4234.
Credit hours: 4
Contact hours: Lecture: 3 Lab: 2 Contact: 5
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Natural Res Eco & Mgmt

NREM 5313 Human Dimensions of Natural Resources
Description: Principles and applications of managing natural resources in the human social context. Importance of sociology to natural resource management, design of human dimension studies related to use of forest, wildlife, fish, and range resources, complexities and challenges of balancing natural resource sustainability with human needs, and the role of leadership, education, and communication in addressing human-natural resource needs.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 5333 Forest Recourse Management: Planning and Decision-Making
Prerequisites: NREM 4234.
Description: Integrated problem solving, to apply biological, quantitative, economic, political, and administrative principles in solving forest resource management problems. May not be used for degree credit with NREM 4333.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Natural Res Eco & Mgmt

NREM 5403 Advanced Wetland Ecology
Prerequisites: A course in aquatic ecology or wetland management recommended.
Description: Principles and theory of wetland ecology with a focus on wetland processes, functions, and services. Topics include wetland geomorphology, biogeochemistry and hydrology of wetlands, wetland functions and services, wetland development, wetland restoration, water issues, wetland policy, philosophy of wetland management, and educating society about wetlands. Same course as BIOL 5403.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 5414 Fisheries Management
Prerequisites: NREM 3012 and NREM 3013, or BIOL 3034.
Description: Techniques and principles involved in management of fishes. Field trip fee required. May not be used for degree credit with NREM 4414 or NREM 5433.
Credit hours: 4
Contact hours: Lecture: 2 Lab: 4 Contact: 6
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Natural Res Eco & Mgmt

NREM 5424 Fisheries Techniques
Prerequisites: NREM 4414.
Description: Research techniques and methodology in fisheries science, including sampling design, habitat measurements, sampling gears and abundance estimation, age and growth analysis, recreational surveys, data analysis and report writing. No credit for students with credit in NREM 4424. Previously offered as COSC 5424.
Credit hours: 4
Contact hours: Lecture: 2 Lab: 4 Contact: 6
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Natural Res Eco & Mgmt

NREM 5430 Special Topics in Fisheries
Prerequisites: Consent of instructor.
Description: Advanced study on special topics in fisheries. Offered for variable credit, 1-3 credit hours, maximum of 9 credit hours.
Credit hours: 1-3
Contact hours: Lecture: 1-3 Contact: 1-3
Levels: Graduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 5433 Fisheries Science
Prerequisites: NREM 4414 or equivalent or consent of instructor.
Description: Principles of fisheries science as they relate to fish and aquatic biota, their habitats, and the humans who utilize them. Previously offered as COSC 5433.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 5443 Watershed Hydrology and Water Quality
Description: Processes that comprise the hydrologic cycle and how land use affects those processes and the quantity and quality of water from watersheds, focusing on surface water from forest, range and agricultural watersheds. Measurement and evaluation of water quantity and quality. Intended for graduate students new to the water resources field. No credit for students having completed NREM 4443.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Natural Res Eco & Mgmt

NREM 5452 Pond Management
Prerequisites: BIOL 1114 or (BIOL 1113 and BIOL 1111).
Description: Principles and practice of aquatic plant management, pond construction and maintenance, fish population management, and human factors associated with pond ownership and management. No credit for students with degree credit in NREM 4452.
Credit hours: 2
Contact hours: Lecture: 2 Contact: 2
Levels: Graduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 5453 Aquaculture
Prerequisites: BIOL 1114 or (BIOL 1113 and BIOL 1111).
Description: Introduction to the principles of freshwater finfish production with an emphasis on warm water species. No credit for student having completed NREM 4453.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 5473 Stream Ecology
Prerequisites: Course in ecology strongly recommended.
Description: Ecology of streams and rivers, physical and chemical properties, biotic assemblages and interactions, ecosystem processes and theories and human impact. Two day field trip required at additional costs to students. Previously offered as NREM 5464.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate, Undergraduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 5483 Ecohydrology
Prerequisites: Ecology course strongly recommended.
Description: Concepts, framework and challenges in ecohydrology. Soil water control on vegetation structure, function and distribution. Vegetation feedback on water budget in water limited ecosystems. Ecological and hydrological interaction associated with land use, land cover change and climate variability.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 5493 Social Dimensions in Aquatic Ecology
Prerequisites: Consent of instructor.
Description: Role of humans as implementers of policy, as users of resources, and as scientists in aquatic ecology.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 5513 Applied Wildlife Behavior
Description: Importance of wildlife behavior to Individual survival, reproduction, and implications for population ecology, community ecology, conservation, and management. Wildlife Is broadly defined In this class; topics Include habitat selection, dispersal, & migration.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Natural Res Eco & Mgmt

NREM 5523 Population Ecology
Prerequisites: BIOL 3034, MATH 1513.
Description: Theory and principles of predicting and analyzing population abundance and dynamics. Life history theory, foraging theory, habitat selection, population genetics, and species interactions. Same course as BIOL 5523.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Natural Res Eco & Mgmt

NREM 5530 Special Topics in Wildlife
Prerequisites: Consent of instructor.
Description: Advanced study on special topics in Wildlife. Offered for variable credit, 1-3 credit hours, maximum of 9 credit hours.
Credit hours: 1-3
Contact hours: Lecture: 1-3 Contact: 1-3
Levels: Graduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 5533 Occupancy Modeling of Animal Populations
Description: Theory and practice for the use of occupancy modeling in natural resource management and ecological research. Topics covered include estimation of encounter probabilities, study design considerations, single-species single-season models, multi-season models, multi-state models, multi-scale models, false-positive models, and multi-species models.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Natural Res Eco & Mgmt

NREM 5564 Ornithology
Description: Classification, evolution, distribution, identification, life histories, and morphological, ecological, and behavioral adaptations of birds. Two weekend field trips required. May not be used for degree credit with BIOL 4464, NREM 4464. Previously offered as BIOL 5464.
Credit hours: 4
Contact hours: Lecture: 3 Lab: 3 Contact: 6
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Natural Res Eco & Mgmt

NREM 5603 Rangeland and Pasture Utilization
Prerequisites: NREM 3613 and ANSI 3653.
Description: Investigation of lifestock and forage interactions that impact productivity in the utilization of rangeland and improved pastures. May not be used for degree credit with ANSI 4203 or NREM 4603.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Natural Res Eco & Mgmt

NREM 5630 Special Topics in Rangeland Science
Prerequisites: Consent of instructor.
Description: Advanced study on special topics in rangeland science. Previously offered as NREM 5660. Offered for variable credit, 1-3 credit hours, maximum of 9 hours.
Credit hours: 1-3
Contact hours: Lecture: 1-3 Contact: 1-3
Levels: Graduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 5673 Rangeland Resources Watershed Management
Description: Management of anthropogenic activities and physical/biological functions or processes on water and rangeland watersheds. Emphasizes preventative and restorative strategies in a natural resource rangeland setting. Course available online only through distance education.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 5682 Grassld Plant Identification
Prerequisites: Consent of instructor.
Description: Study and identification of plants that have ecological and/or agricultural importance in the Great Plains. Grassland ecosystems and plant characteristics including forage value, palatability, and utilization by both domestic livestock and wildlife. Cultural and historical uses of grassland. Course available online only through distance education.
Credit hours: 2
Contact hours: Lecture: 2 Contact: 2
Levels: Graduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 5683 Grazing Ecology and Management
Prerequisites: Graduate standing.
Description: Ecological principles of livestock grazing and applications to grazing land management for production and conservation.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 5692 Grassland Monitoring and Assessment.
Description: Vegetation sampling theory and plot selection. Quantitative measures used in vegetation analysis, root growth, and utilization. Use of the similarity index, and plant community health and trends for grassland monitoring and assessment. Course available online only through distance education.
Credit hours: 2
Contact hours: Lecture: 2 Contact: 2
Levels: Graduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 5693 Principles of Forage Quality and Evaluation to Ruminate
Prerequisites: Consent of instructor.
Description: Chemical characteristics of forage components and the laboratory procedures used to evaluate forages for grazing livestock. Interactions with ruminant physiology and digestion that influence forage feeding value. Students should have a strong background in the basic principles of chemistry, ruminant nutrition, and plant physiology. Course available online only through distance education.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 5713 Grassland Fire Ecology
Description: Ecological effects of fire on grassland ecosystems. Examination of the history of fire, societal use of fire, fire behavior in relation to fuel and weather, and conducting and safety of prescribed burns. Course available online only through distance education.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 5723 Ecol Fire Dependent Ecosystems
Prerequisites: Any ecology course.
Description: Role of fire and the interactions with land use, weather, and climate change in fire-dependent ecosystems. Responses of species composition, diversity, annual net primary productivity, nutrient cycling, and ecosystem management in diverse ecosystems.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 5783 Prescribed Fire
Description: When to use prescribed fire and how to use prescribed fire to accomplish specific land management objectives. Writing prescribed fire plans, policy and laws, weather, equipment, conducting burns, and post-burn mop-up. Field trips required. Previously offered as RLEM 5983.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 5793 Advanced Prescribed Fire
Prerequisites: NREM 4783 or consent of instructor.
Description: Preparing fire plans and executing prescribed fires as the fireboss. No credit for both NREM 4793 and NREM 5793. Previously offered as RLEM 5993.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 3 Contact: 5
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Natural Res Eco & Mgmt

NREM 5843 Natural Resource Administration and Policy
Description: Natural resource policy and legislation; ethics relating to natural resources; natural resource organizations and how they function to include structure, supervision, and financing of federal, state, and private natural resource enterprises. May not be used for degree credit with NREM 4043.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 5853 Natural Resource Recreation
Description: Ecological, historical, social and policy basis for recreational use and management of natural resources, including an analysis of planning, management, and administrative frameworks for providing a diversity of recreational opportunities, benefits, and resource values. May not be used for degree credit with NREM 4053.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

NREM 6000 Doctoral Dissertation
Description: Independent research planned, conducted and reported in consultation with major professor. Previously offered as RLEM 6000. Offered for variable credit, 1-15 credit hours, maximum of 45 credit hours.
Credit hours: 1-15
Contact hours: Contact: 1-15 Other: 1-15
Levels: Graduate
Schedule types: Independent Study
Department/School: Natural Res Eco & Mgmt

NREM 6010 Advanced Topics and Conference
Prerequisites: MS degree.
Description: Supervised study of advanced topics. A reading and conference course designed to acquaint the advanced student with fields not covered in other courses. Previously offered as RLEM 6010. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Lecture: 1-6 Contact: 1-6
Levels: Graduate
Schedule types: Lecture
Department/School: Natural Res Eco & Mgmt

Undergraduate Programs

- Natural Resource Ecology & Management: Fisheries & Aquatic Ecology, BSAG (p. 2621)
- Natural Resource Ecology & Management: Forest Ecology & Management, BSAG (p. 2623)
- Natural Resource Ecology & Management: Rangeland Ecology & Management, BSAG (p. 2625)
- Natural Resource Ecology & Management: Wildlife Biology & Preveterinary Science, BSAG (p. 2627)
- Natural Resource Ecology & Management: Wildlife Ecology & Management, BSAG (p. 2630)

Graduate Programs

The Department offers MS and PhD degrees in Natural Resource Ecology and Management with specializations in Fisheries and Aquatic Ecology, Forest Resources, Rangeland Ecology and Management, and Wildlife Ecology and Management. The NREM department also houses the Oklahoma Cooperative Fish and Wildlife Research Unit (OKCFWRU) that provides funding and mentoring for some NREM graduate students in fisheries and wildlife topic areas. In addition, students may work toward MS and PhD degrees in the Environmental Science Graduate Program and the PhD degree in the Plant Science Graduate Program with faculty members from the Department.

The overall goals of the Department's graduate program are to provide high-quality advanced training and instruction in the application of the scientific method to problems in natural resource ecology and management. This includes problem analysis and identification, research methods, statistical analysis and/or modeling, synthesis of results, and dissemination of findings through publications and presentations. The Department strives to develop the capability for original and creative work under the guidance of established professionals and scientists. Graduate instruction is a critical component of the research, instruction, and Extension missions of the Department.

Students work directly with a member of the NREM faculty to design a program of study to serve individual career goals. The prerequisite for graduate study in the Department is a bachelor's degree in an area aligned with the student's research interests with a minimum overall

GPA of 3.00. Please refer to the website https://agriculture.okstate.edu/departments-programs/natural-resource/ for a full description of the application process. A student must be accepted by a member of the Department's faculty prior to official admission to the program.

Minors

- Fisheries and Aquatic Ecology (FAEC), Minor (p. 2619)
- Forestry (FOR), Minor (p. 2620)
- Natural Resource Ecology and Management (NREM), Minor (p. 2632)
- Rangeland Ecology and Management (REM), Minor (p. 2633)
- Wildlife Ecology (WLEC), Minor (p. 2634)

Faculty

Robert J. (Jim) Ansley Jr., PhD—Professor and Head
Regents Professors: Samuel D. Fuhlendorf, PhD; Gail W.T. Wilson, PhD
Professors: Craig A. Davis, PhD; Scott R. Loss, PhD; Daniel E. Shoup, PhD; Rodney E. Will, Jr., PhD; Chris Zou, PhD
Associate Professors: Kevin Allen, PhD; W. Sue Fairbanks, PhD; Laura E. Goodman, PhD; Omkar Joshi, PhD; Timothy J. O'Connell, PhD
Assistant Professors: Colter Chitwood, PhD; Courtney Duchardt, PhD; Bryan D. Murray, PhD; Jia Yang, PhD; Lu Zhai, PhD
Adjunct Faculty in the Oklahoma Cooperative Fish and Wildlife Research Unit: James Long, PhD; Robert Lonsinger, PhD
Non-Tenure Track Faculty: Marley Beem, PhD; Nicole Colston, PhD; Anna K. Moeller, PhD; John R. Weir, MS

Fisheries and Aquatic Ecology (FAEC), Minor

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Total Hours: 22

Code	Title	Hours
Minor Requirements		
BIOL 4434	Limnology	4
NREM 3013	Applied Ecology and Conservation	3
NREM 4403	Wetland Ecology and Management	3
or NREM 4424	Fisheries Techniques	
NREM 4414	Fisheries Management	4
Select 8 hours of the following:		8
BIOL 4413	Biology of Fishes	
ENTO 4484	Aquatic Entomology	
NREM 3012	Applied Ecology Laboratory	
NREM 4403	Wetland Ecology and Management	
or NREM 4424	Fisheries Techniques	
NREM 4452	Pond Management	
NREM 4453	Aquaculture (if not previously used)	
Total Hours		**22**

- A grade-point average of 2.0 for courses that count for the minor.

Additional OSU Requirements

Undergraduate Minors

- An undergraduate minor must include between fifteen and thirty hours, inclusive of undergraduate coursework.
- A minimum of six credit hours for the minor must be earned in residence at OSU.
- The courses required for a minor may be included in the course requirements for any undergraduate degree or they may be in addition to degree requirements, depending on the overlap between the minor and degree requirements. However, an undergraduate minor must be earned in an academic field other than the student's declared degree option. The minor may not duplicate the degree major or option (for example, a student who earns a BA in Art with an Art History option may earn a minor in Studio Art but not Art History).
- A student generally follows the minor requirements associated with his or her matriculation year or newer requirements that have been established since matriculation. The time limit for following requirements from a given academic year is six years.

For additional information on requirements on minors, click here (https://adminfinance.okstate.edu/site-files/documents/policies/requirements-for-undergraduate-and-graduate-minors.pdf).

Forestry (FOR), Minor

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Total Hours: 23

Code	Title	Hours
Minor Requirements		
NREM 1113	Elements of Forestry	3
NREM 2134	Dendrology	4
NREM 3013	Applied Ecology and Conservation	3
NREM 3123	Forest Measurements I	3
NREM 3224	Silviculture	4
Select a minimum of 6 additional hours (at least three hours must be upper-division) of the following:		6
NREM 2113	Wood Properties, Products, & Harvesting	
NREM 3012	Applied Ecology Laboratory	
NREM 3101	Forest Resource Field Studies	
NREM 3111	Natural Resource Field Studies	
NREM 3143	Forest Biology	
NREM 4234	Forest Management and Economics	
NREM 4333	Forest Resource Management: Planning and Decision-Making	
NREM 4443	Watershed Hydrology and Water Quality	
Total Hours		**23**

- A grade-point average of 2.0 for courses that count for the minor.

Additional OSU Requirements

Undergraduate Minors

- An undergraduate minor must include between fifteen and thirty hours, inclusive of undergraduate coursework.
- A minimum of six credit hours for the minor must be earned in residence at OSU.
- The courses required for a minor may be included in the course requirements for any undergraduate degree or they may be in addition to degree requirements, depending on the overlap between the minor and degree requirements. However, an undergraduate minor must be earned in an academic field other than the student's declared degree option. The minor may not duplicate the degree major or option (for example, a student who earns a BA in Art with an Art History option may earn a minor in Studio Art but not Art History).
- A student generally follows the minor requirements associated with his or her matriculation year or newer requirements that have been established since matriculation. The time limit for following requirements from a given academic year is six years.

For additional information on requirements on minors, click here (https://adminfinance.okstate.edu/site-files/documents/policies/requirements-for-undergraduate-and-graduate-minors.pdf).

Natural Resource Ecology & Management: Fisheries & Aquatic Ecology, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 125

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p.)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
MATH 1513	College Algebra (A) [1]	3
STAT 2013	Elementary Statistics (A) [1]	3
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
Select four hours from the following:		4
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN) [1]	
BIOL 1114	Introductory Biology (LN) [1]	
Course designated (N)		3
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1]	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		6
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College Requirements		
CHEM 1215	Chemical Principles I (LN)	4
or CHEM 1314	Chemistry I (LN)	
Written and Oral Communications		
Select one of the following:		3
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources	
BCOM 3113	Written Communication	
ENGL 3323	Technical Writing [3]	
Select one of the following: [4]		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S)	
SPCH 2713	Introduction to Speech Communication (S)	
SPCH 3733	Elements of Persuasion (S)	
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
Select one of the following:		4
ENTO 4484	Aquatic Entomology	
SOIL 2124	Fundamentals of Soil Science (N)	
NREM 3013	Applied Ecology and Conservation	3
Departmental Requirements		
Select one of the following:		4
BIOL 1604	Animal Biology	
NREM 2134	Dendrology	
NREM 1012	Introduction to Natural Resource Ecology and Management	2
NREM 2083	Geospatial Technologies for Natural Resources	3
NREM 3012	Applied Ecology Laboratory	2
NREM 3503	Principles of Wildlife Ecology and Management	3
NREM 4001	Issues In Global Change	1
NREM 4043	Natural Resource Administration and Policy	3
PBIO 1404	Plant Biology (LN)	4
Hours Subtotal		**40**
Major Requirements		
Core Courses		
Select one of the following:		3
ANSI 3423	Animal Genetics	
BIOL 3023	General Genetics	
BIOL 4413	Biology of Fishes	3
BIOL 4434	Limnology	4
CHEM 1225	Chemical Principles II (LN)	5
or CHEM 1515	Chemistry II (LN)	
Select one of the following: [2]		4
GEOL 1114	Physical Geology (LN)	
PHYS 1014	Descriptive Physics (N)	
NREM 3523	Fish and Wildlife Population Biology	3
NREM 4414	Fisheries Management	4
NREM 4424	Fisheries Techniques	4
NREM 4443	Watershed Hydrology and Water Quality	3
NREM 4452	Pond Management	2
NREM 4453	Aquaculture	3
STAT 3013	Intermediate Statistical Analysis	3
or STAT 4013	Statistical Methods I (A)	
Related Courses		

Select courses from among the following or other courses in consultation with a faculty advisor for additional breadth, or to create a specialty emphasis area. [5]		
Select one of the following:		2
AGEC 3503	Natural Resource Economics	
AGEC 3723	Environmental Law for Agriculture and Natural Resources	
ENVR 4512	Introduction to National Environmental Policy Act	
GEOG 3153	Conservation of Natural Resources (S)	
HIST 4523	American Environmental History (H)	
NREM 3502	Wildlife Law Enforcement	
NREM 4053	Natural Resource Recreation	
POLS 4363	Environmental Law And Policy	
POLS 4593	Natural Resources and Environmental Policy	
SOC 4433	Environmental Sociology (S)	
Select 2 hours of the following:		2
ANSI 3543	Principles of Animal Nutrition	
BIOL 3114	Vertebrate Zoology	
BIOL 3153	Animal Behavior	
BIOL 3513	Principles of Conservation Biology	
BIOL 4113	Conservation Genetics	
BIOL 4133	Evolution	
BIOL 4174	Mammalogy	
BIOL 4303	Organismal Ecotoxicology	
BIOL 4363	Principles of Toxicology	
GEOG 4203	Fundamentals of Geographic Information Systems	
GEOG 4263	Geospatial Applications for Unmanned Aerial Systems	
GEOG 4333	Remote Sensing	
GEOG 4343	Geographic Information Systems: Resource Management Applications	
NREM 3063	Natural Resource Biometrics	
NREM 3091	Field Applications of Geospatial Technologies for Natural Resources	
NREM 3101	Forest Resource Field Studies	
NREM 3111	Natural Resource Field Studies	
NREM 3143	Forest Biology	
NREM 3224	Silviculture	
NREM 3502	Wildlife Law Enforcement	
NREM 3613	Principles of Rangeland Management	
NREM 4023	Restoration Ecology	
NREM 4033	Ecology Of Invasive Species	
NREM 4053	Natural Resource Recreation	
NREM 4093	Natural Resources, People and Sustainable Development (I)	
NREM 4403	Wetland Ecology and Management	
NREM 4522	Wildlife Management Applications and Planning	
NREM 4523	Wildlife Management Techniques	
NREM 4533	Wildlife Management for Game Species	
NREM 4543	Wildlife Management for Biodiversity	
NREM 4960	Undergraduate Internship	
NREM 4980	Undergraduate Research	
NREM 4990	Special Topics in Natural Resource Ecology and Management	
PBIO 4005	Field Botany	
Hours Subtotal		**45**
Electives		
Select 0 hours or hours to complete required total for degree		0
Total Hours		**125**

1

College & Departmental requirements that may be used to meet General Education requirements.

2

If used as (N) course above, then hours are reduced by course hours.

3

If ENGL 3323 Technical Writing is used to satisfy ENGL 1213 Composition II above; hours in this block are reduced by 3.

4

If used as (S) course above, then hours are reduced by three.

5

May not use a course used above in Core Courses. Also may not use the same class for credit in both groups below.

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Natural Resource Ecology & Management: Forest Ecology & Management, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 125

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p.)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
MATH 1513	College Algebra (A) [1]	3
STAT 2013	Elementary Statistics (A) [1]	3
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
Select four hours from the following:		4
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN) [1]	
BIOL 1114	Introductory Biology (LN) [1]	
Course designated (N)		3
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1]	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		6
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College Requirements		
CHEM 1215	Chemical Principles I (LN) [2]	4
or CHEM 1314	Chemistry I (LN)	
Select one of the following:		3
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources	
BCOM 3113	Written Communication	
ENGL 3323	Technical Writing [3]	
Select one of the following:		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [4]	
SPCH 2713	Introduction to Speech Communication (S) [4]	
SPCH 3733	Elements of Persuasion (S) [4]	
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
Select one of the following:		4
SOIL 2124	Fundamentals of Soil Science (N)	
ENTO 4484	Aquatic Entomology	
NREM 3013	Applied Ecology and Conservation	3
Departmental Requirements		
Select one of the following:		4
BIOL 1604	Animal Biology	
NREM 2134	Dendrology	
NREM 1012	Introduction to Natural Resource Ecology and Management	2
NREM 2083	Geospatial Technologies for Natural Resources	3
NREM 3012	Applied Ecology Laboratory	2
NREM 3503	Principles of Wildlife Ecology and Management	3
NREM 4001	Issues In Global Change	1
NREM 4043	Natural Resource Administration and Policy	3
PBIO 1404	Plant Biology (LN)	4
Hours Subtotal		**40**
Major Requirements		
Core Courses		
NREM 1113	Elements of Forestry	3
NREM 2113	Wood Properties, Products, & Harvesting	3
NREM 3091	Field Applications of Geospatial Technologies for Natural Resources	1
NREM 3101	Forest Resource Field Studies	1
NREM 3111	Natural Resource Field Studies	1
NREM 3123	Forest Measurements I	3
NREM 3133	Forest Measurements II	3
NREM 3143	Forest Biology	3
NREM 3153	Forest Health and Disturbance Ecology	3
NREM 3224	Silviculture	4
NREM 4234	Forest Management and Economics	4
NREM 4333	Forest Resource Management: Planning and Decision-Making	3
NREM 4443	Watershed Hydrology and Water Quality	3
Select one of the following:		3
NREM 3613	Principles of Rangeland Management	
NREM 4053	Natural Resource Recreation	
NREM 4414	Fisheries Management	
Related Courses		

Select 7 hours of the following or of other courses in consultation with a faculty advisor for additional breadth, or to create a specialty emphasis area: [5]		7
ACCT 2003	Survey of Accounting	
AGEC 3423	Farm and Agribusiness Management	
BIOL 3513	Principles of Conservation Biology	
ENTO 2993	Introduction to Entomology (LN)	
ENTO 3461	Insects in Forest Ecosystems	
GEOG 4203	Fundamentals of Geographic Information Systems	
GEOG 4263	Geospatial Applications for Unmanned Aerial Systems	
GEOG 4333	Remote Sensing	
GEOG 4343	Geographic Information Systems: Resource Management Applications	
GEOL 1114	Physical Geology (LN)	
HORT 2613	Woody Plant Materials	
HORT 3013	Arboriculture	
LSB 3213	Legal and Regulatory Environment of Business	
MGMT 3013	Fundamentals of Management (S)	
MKTG 3213	Marketing (S)	
NREM 3063	Natural Resource Biometrics	
NREM 3502	Wildlife Law Enforcement	
NREM 3613	Principles of Rangeland Management	
NREM 4023	Restoration Ecology	
NREM 4033	Ecology Of Invasive Species	
NREM 4053	Natural Resource Recreation	
NREM 4093	Natural Resources, People and Sustainable Development (I)	
NREM 4403	Wetland Ecology and Management	
NREM 4414	Fisheries Management	
NREM 4452	Pond Management	
NREM 4453	Aquaculture	
NREM 4533	Wildlife Management for Game Species	
NREM 4543	Wildlife Management for Biodiversity	
NREM 4783	Prescribed Fire	
NREM 4793	Advanced Prescribed Fire	
NREM 4960	Undergraduate Internship	
NREM 4980	Undergraduate Research	
NREM 4990	Special Topics in Natural Resource Ecology and Management	
PHYS 1114	College Physics I (LN)	
PLP 3343	Principles of Plant Pathology	
SOIL 4463	Soil and Water Conservation	
Hours Subtotal		**45**
Electives		
Select 0 hours or hours to complete required total for degree		0
Total Hours		**125**

1

College & Departmental requirements that may be used to meet General Education requirements.

2

If used as (N) course above, then hours are reduced by course hours.

3

If ENGL 3323 Technical Writing is used to satisfy ENGL 1213 Composition II above; hours in this block are reduced by 3.

4

If used as (S) course above, then hours are reduced by three.

5

May not use a course used above in Core Courses.

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Natural Resource Ecology & Management: Rangeland Ecology & Management, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 125

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p.)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
MATH 1513	College Algebra (A) [1]	3
STAT 2013	Elementary Statistics (A) [1]	3
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
Select four hours from the following:		4
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN) [1]	
BIOL 1114	Introductory Biology (LN) [1]	
Course designated (N)		3
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1]	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		6
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College Requirements		
CHEM 1215	Chemical Principles I (LN) [2]	4
or CHEM 1314	Chemistry I (LN)	
Natural Sciences		
Select one of the following:		3
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources	
BCOM 3113	Written Communication	
ENGL 3323	Technical Writing [3]	
Select one of the following:		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [4]	
SPCH 2713	Introduction to Speech Communication (S) [4]	
SPCH 3733	Elements of Persuasion (S) [4]	
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
Select one of the following:		4
SOIL 2124	Fundamentals of Soil Science (N)	
ENTO 4484	Aquatic Entomology	
NREM 3013	Applied Ecology and Conservation	3
Departmental Requirements		
Select one of the following:		4
BIOL 1604	Animal Biology	
NREM 2134	Dendrology	
NREM 1012	Introduction to Natural Resource Ecology and Management	2
NREM 2083	Geospatial Technologies for Natural Resources	3
NREM 3012	Applied Ecology Laboratory	2
NREM 3503	Principles of Wildlife Ecology and Management	3
NREM 4001	Issues In Global Change	1
NREM 4043	Natural Resource Administration and Policy	3
PBIO 1404	Plant Biology (LN)	4
Hours Subtotal		**40**
Major Requirements		
Core Courses		
ANSI 3543	Principles of Animal Nutrition	3
CHEM 1225	Chemical Principles II (LN) [2]	5
or CHEM 1515	Chemistry II (LN)	
NREM 3063	Natural Resource Biometrics	3
NREM 3613	Principles of Rangeland Management	3
NREM 4023	Restoration Ecology	3
NREM 4033	Ecology Of Invasive Species	3
NREM 4443	Watershed Hydrology and Water Quality	3
NREM 4603	Rangeland and Pasture Utilization	3
NREM 4613	Rangeland Resources Planning	3
NREM 4783	Prescribed Fire	3
PBIO 4005	Field Botany	5
SOIL 3433	Soil Genesis, Morphology, and Classification	3
Related Courses		
Select 5 hours of the following or of other courses in consultation with a faculty advisor for additional breadth, or to create a specialty emphasis area: [5]		5
AGEC 3423	Farm and Agribusiness Management	
AGEC 3503	Natural Resource Economics	

ANSI 1021 & ANSI 1023	Introduction to the Animal Sciences Lab and Introduction to the Animal Sciences
or ANSI 1124	Introduction to the Animal Sciences
ANSI 3423	Animal Genetics
ANSI 3433	Animal Breeding
ANSI 3653	Applied Animal Nutrition
ANSI 4613	Beef Cow-Calf Management
BIOL 3034	General Ecology
BIOL 3513	Principles of Conservation Biology
BIOL 4113	Conservation Genetics
BIOL 4133	Evolution
BIOL 4174	Mammalogy
BIOL 4303	Organismal Ecotoxicology
BIOL 4413	Biology of Fishes
ENTO 2993	Introduction to Entomology (LN)
ENTO 4223	Ecological Methodology
ENVR 1113	Elements of Environmental Science (N)
ENVR 4512	Introduction to National Environmental Policy Act
GEOG 3023	Climatology (N)
GEOG 3033	Meteorology (N)
GEOG 3153	Conservation of Natural Resources (S)
GEOG 3333	Spatial Analysis (A)
GEOG 4053	Biogeography, Biodiversity, and Humankind
GEOG 4203	Fundamentals of Geographic Information Systems
GEOG 4263	Geospatial Applications for Unmanned Aerial Systems
GEOG 4333	Remote Sensing
GEOG 4343	Geographic Information Systems: Resource Management Applications
GEOL 3503	Environmental Geology (N)
NREM 2134	Dendrology
NREM 3091	Field Applications of Geospatial Technologies for Natural Resources
NREM 3101	Forest Resource Field Studies
NREM 3111	Natural Resource Field Studies
NREM 3143	Forest Biology
NREM 3153	Forest Health and Disturbance Ecology
NREM 3224	Silviculture
NREM 3502	Wildlife Law Enforcement
NREM 4053	Natural Resource Recreation
NREM 4093	Natural Resources, People and Sustainable Development (I)
NREM 4403	Wetland Ecology and Management
NREM 4452	Pond Management
NREM 4453	Aquaculture
NREM 4464	Ornithology
NREM 4522	Wildlife Management Applications and Planning
NREM 4523	Wildlife Management Techniques
NREM 4533	Wildlife Management for Game Species
NREM 4543	Wildlife Management for Biodiversity
NREM 4793	Advanced Prescribed Fire
NREM 4960	Undergraduate Internship
NREM 4980	Undergraduate Research
NREM 4990	Special Topics in Natural Resource Ecology and Management
PBIO 3024	Plant Diversity
PBIO 3114	Plant Taxonomy
PBIO 4463	Plant Physiology
PLP 3343	Principles of Plant Pathology
PLNT 1213	Introduction to Plant and Soil Systems (N)
POLS 4593	Natural Resources and Environmental Policy
SOIL 4463	Soil and Water Conservation
SOIL 4483	Soil Microbiology
SOIL 4683	Soil, Water, and Weather
Hours Subtotal	**45**
Electives	
Select 0 hours or hours to complete required total for degree	0
Total Hours	**125**

1

College & Departmental requirements that may be used to meet General Education requirements.

2

If used as (N) course above, then hours are reduced by course hours.

3

If ENGL 3323 Technical Writing is used to satisfy ENGL 1213 Composition II above; hours in this block are reduced by 3.

4

If used as (S) course above, then hours are reduced by three.

5

May not use a course used above in Core Courses.

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Natural Resource Ecology & Management: Wildlife Biology & Preveterinary Science, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 130

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p.)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
MATH 2103	Business Calculus (A) [1]	3
STAT 2013	Elementary Statistics (A) [1]	3
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
Select four hours from the following:		4
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN) [1]	
BIOL 1114	Introductory Biology (LN) [1]	
Course designated (N)		3
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1]	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		6
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College Requirements		
CHEM 1314	Chemistry I (LN) [2]	4
or CHEM 1215	Chemical Principles I (LN)	
Select one of the following:		3
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources	
BCOM 3113	Written Communication	
ENGL 3323	Technical Writing [3]	
Select one of the following:		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [4]	
SPCH 2713	Introduction to Speech Communication (S) [4]	
SPCH 3733	Elements of Persuasion (S) [4]	
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
Select one of the following:		4
SOIL 2124	Fundamentals of Soil Science (N)	
ENTO 4484	Aquatic Entomology	
NREM 3013	Applied Ecology and Conservation	3
Departmental Requirements		
Select one of the following:		4
BIOL 1604	Animal Biology	
NREM 2134	Dendrology	
NREM 1012	Introduction to Natural Resource Ecology and Management	2
NREM 2083	Geospatial Technologies for Natural Resources	3
NREM 3012	Applied Ecology Laboratory	2
NREM 3503	Principles of Wildlife Ecology and Management	3
NREM 4001	Issues In Global Change	1
NREM 4043	Natural Resource Administration and Policy	3
PBIO 1404	Plant Biology (LN) [2]	4
Hours Subtotal		**40**
Major Requirements		
Core Courses		
ANSI 3543	Principles of Animal Nutrition	3
Select one of the following:		3
BIOC 3653	Survey of Biochemistry	
BIOC 3713	Biochemistry I	
BIOC 3723	Biochemistry and Molecular Biology Laboratory	
BIOL 3023	General Genetics	3
CHEM 1515	Chemistry II (LN) [2]	5
Select one of the following:		5
CHEM 3013 & CHEM 3012	Survey of Organic Chemistry and Survey of Organic Chemistry Laboratory	
or		
CHEM 3053 & CHEM 3153 & CHEM 3112	Organic Chemistry I and Organic Chemistry II and Organic Chemistry Laboratory	
NREM 4523	Wildlife Management Techniques	3
BIOL 3204	Physiology	4
MICR 2123	Introduction to Microbiology	3
MICR 2132	Introduction to Microbiology Laboratory	2

PHYS 1114	College Physics I (LN) [2]	4
PHYS 1214	College Physics II (LN) [2]	4
Related Courses		
Select courses from among the options, or other courses in consultation with a faculty advisor for additional breadth, or to create a specialty emphasis area [5]		11
Select an option (p. 2628)		
Hours Subtotal		**50**
Electives		
Select 0 hours or hours to complete required total for degree		0
Total Hours		**130**

1

College & Departmental requirements that may be used to meet General Education requirements.

2

If used as (N) course above, then hours are reduced by course hours.

3

If ENGL 3323 Technical Writing is used to satisfy ENGL 1213 Composition II above; hours in this block are reduced by 3.

4

If used as (S) course above, then hours are reduced by three.

5

May not use a course used above in Core Courses.

Options

Option 1

Code	Title	Hours
Select two of the following:		7
NREM 4464	Ornithology	
BIOL 4184	Herpetology	
BIOL 4413	Biology of Fishes	
BIOL 4174	Mammalogy	
Select 4 hours of the following:		4
AG 3010	Internships in Agriculture	
ANSI 1021 & ANSI 1023	Introduction to the Animal Sciences Lab and Introduction to the Animal Sciences	
or ANSI 1124	Introduction to the Animal Sciences	
ANSI 3444	Animal Reproduction	
ANSI 3653	Applied Animal Nutrition	
ANSI 3753	Basic Nutrition for Pets	
BIOC 3713	Biochemistry I [3]	
BIOC 3723	Biochemistry and Molecular Biology Laboratory	
BIOC 3813	Biochemistry II	
BIOL 3114	Vertebrate Zoology	
BIOL 3153	Animal Behavior	
BIOL 3163	Environmental Biology	
BIOL 3513	Principles of Conservation Biology	
BIOL 4104	General Parasitology	
BIOL 4113	Conservation Genetics	
BIOL 4215	Mammalian Physiology	
BIOL 4273	Environmental Physiology	
BIOL 4283	Endocrinology	
BIOL 4293	Behavioral Neuroendocrinology	
BIOL 4303	Organismal Ecotoxicology	
BIOL 4363	Principles of Toxicology	
ENTO 2993	Introduction to Entomology (LN)	
ENTO 3003	Livestock Entomology	
ENTO 4854	Medical and Veterinary Entomology	
GEOG 4203	Fundamentals of Geographic Information Systems	
GEOG 4263	Geospatial Applications for Unmanned Aerial Systems	
GEOG 4333	Remote Sensing	
GEOG 4343	Geographic Information Systems: Resource Management Applications	
MICR 3033	Cell and Molecular Biology	
MICR 3143	Medical Mycology	
MICR 3223	Advanced Microbiology	
MICR 4123	Virology	
NREM 3091	Field Applications of Geospatial Technologies for Natural Resources	
NREM 3101	Forest Resource Field Studies	
NREM 3111	Natural Resource Field Studies	
NREM 3143	Forest Biology	
NREM 3153	Forest Health and Disturbance Ecology	
NREM 3224	Silviculture	
NREM 3502	Wildlife Law Enforcement	
NREM 3613	Principles of Rangeland Management	
NREM 4023	Restoration Ecology	
NREM 4033	Ecology Of Invasive Species	
NREM 4093	Natural Resources, People and Sustainable Development (I)	
NREM 4403	Wetland Ecology and Management	
NREM 4414	Fisheries Management	
NREM 4424	Fisheries Techniques	
NREM 4452	Pond Management	
NREM 4453	Aquaculture	
NREM 4464	Ornithology	
NREM 4522	Wildlife Management Applications and Planning	
NREM 4533	Wildlife Management for Game Species	
NREM 4543	Wildlife Management for Biodiversity	
NREM 4613	Rangeland Resources Planning	
NREM 4783	Prescribed Fire	
NREM 4793	Advanced Prescribed Fire	
NREM 4960	Undergraduate Internship	
NREM 4980	Undergraduate Research	
NREM 4990	Special Topics in Natural Resource Ecology and Management	
PBIO 4005	Field Botany	
PLNT 1213	Introduction to Plant and Soil Systems (N)	

Option 2

Complete the first year of professional program.

With the approval of the advisor, department head, and dean, a maximum of 11 hours from an accredited dental, medical, optometry, osteopathic, pharmacy, podiatry, or veterinary medical school may be used to complete hours.

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Natural Resource Ecology & Management: Wildlife Ecology & Management, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 125

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p.)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
MATH 1513	College Algebra (A) [1]	3
STAT 2013	Elementary Statistics (A) [1]	3
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
Select four hours from the following:		4
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN) [1]	
BIOL 1114	Introductory Biology (LN) [1]	
Course designated (N)		3
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1]	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		6
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College Requirements		
CHEM 1215	Chemical Principles I (LN) [2]	4
or CHEM 1314	Chemistry I (LN)	
Select one of the following:		3
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources	
BCOM 3113	Written Communication	
ENGL 3323	Technical Writing [3]	
Select one of the following:		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S) [4]	
SPCH 2713	Introduction to Speech Communication (S) [4]	
SPCH 3733	Elements of Persuasion (S) [4]	
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
Select one of the following:		4
SOIL 2124	Fundamentals of Soil Science (N)	
ENTO 4484	Aquatic Entomology	
NREM 3013	Applied Ecology and Conservation	3
Departmental Requirements		
Select one of the following:		4
BIOL 1604	Animal Biology	
NREM 2134	Dendrology	
NREM 1012	Introduction to Natural Resource Ecology and Management	2
NREM 2083	Geospatial Technologies for Natural Resources	3
NREM 3012	Applied Ecology Laboratory	2
NREM 3503	Principles of Wildlife Ecology and Management	3
NREM 4001	Issues In Global Change	1
NREM 4043	Natural Resource Administration and Policy	3
PBIO 1404	Plant Biology (LN) [2]	4
Hours Subtotal		**40**
Major Requirements		
Core Courses		
Select one of the following:		3
ANSI 3423	Animal Genetics	
BIOL 3023	General Genetics	
CHEM 1225	Chemical Principles II (LN) [2]	5
or CHEM 1515	Chemistry II (LN)	
NREM 3523	Fish and Wildlife Population Biology	3
NREM 4522	Wildlife Management Applications and Planning	2
NREM 4523	Wildlife Management Techniques	3
NREM 4533	Wildlife Management for Game Species	3
NREM 4543	Wildlife Management for Biodiversity	3
PBIO 4005	Field Botany	5
Select one of the following:		3
NREM 4403	Wetland Ecology and Management	
NREM 4414	Fisheries Management	
BIOL 4413	Biology of Fishes	
Select two of the following:		8
BIOL 4174	Mammalogy	
BIOL 4184	Herpetology	

NREM 4464	Ornithology	
Related Courses		
Select courses from among the following, or other courses in consultation with a faculty advisor for additional breadth, or to create a specialty emphasis area [5]		
Select one of the following:		2
AGEC 3503	Natural Resource Economics	
AGEC 3723	Environmental Law for Agriculture and Natural Resources	
ENVR 4512	Introduction to National Environmental Policy Act	
GEOG 3153	Conservation of Natural Resources (S)	
HIST 4523	American Environmental History (H)	
NREM 3502	Wildlife Law Enforcement	
NREM 4053	Natural Resource Recreation	
POLS 4363	Environmental Law And Policy	
POLS 4593	Natural Resources and Environmental Policy	
SOC 4433	Environmental Sociology (S)	
Select 5 hours of the following:		5
ANSI 3543	Principles of Animal Nutrition	
ANSI 3653	Applied Animal Nutrition	
BIOL 3153	Animal Behavior	
BIOL 3513	Principles of Conservation Biology	
BIOL 4113	Conservation Genetics	
BIOL 4133	Evolution	
BIOL 4413	Biology of Fishes	
ENTO 2993	Introduction to Entomology (LN)	
GEOG 4203	Fundamentals of Geographic Information Systems	
GEOG 4263	Geospatial Applications for Unmanned Aerial Systems	
GEOG 4333	Remote Sensing	
GEOG 4343	Geographic Information Systems: Resource Management Applications	
NREM 2134	Dendrology	
NREM 3063	Natural Resource Biometrics	
NREM 3091	Field Applications of Geospatial Technologies for Natural Resources	
NREM 3101	Forest Resource Field Studies	
NREM 3111	Natural Resource Field Studies	
NREM 3143	Forest Biology	
NREM 3153	Forest Health and Disturbance Ecology	
NREM 3224	Silviculture	
NREM 3502	Wildlife Law Enforcement	
NREM 3613	Principles of Rangeland Management	
NREM 4023	Restoration Ecology	
NREM 4033	Ecology Of Invasive Species	
NREM 4053	Natural Resource Recreation	
NREM 4093	Natural Resources, People and Sustainable Development (I)	
NREM 4403	Wetland Ecology and Management	
NREM 4414	Fisheries Management	
NREM 4424	Fisheries Techniques	
NREM 4443	Watershed Hydrology and Water Quality	
NREM 4452	Pond Management	
NREM 4453	Aquaculture	
NREM 4613	Rangeland Resources Planning	
NREM 4783	Prescribed Fire	
NREM 4793	Advanced Prescribed Fire	
NREM 4960	Undergraduate Internship	
NREM 4980	Undergraduate Research	
NREM 4990	Special Topics in Natural Resource Ecology and Management	
Hours Subtotal		**45**
Electives		
Select 0 hours or hours to complete required total for degree		0
Total Hours		**125**

1

College & Departmental requirements that may be used to meet General Education requirements.

2

If used as (N) course above, then hours are reduced by course hours.

3

If ENGL 3323 Technical Writing is used to satisfy ENGL 1213 Composition II above; hours in this block are reduced by 3.

4

If used as (S) course above, then hours are reduced by three.

5

May not use a course used above in Core Courses.

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Natural Resource Ecology and Management (NREM), Minor

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Total Hours: 20

Code	Title	Hours
Minor Requirements		
NREM 3013	Applied Ecology and Conservation	3
Select a minimum of 11 additional hours of the following:		11
NREM 1014	Introduction to Natural History (LN)	
NREM 1113	Elements of Forestry	
NREM 3153	Forest Health and Disturbance Ecology	
NREM 3503	Principles of Wildlife Ecology and Management	
NREM 3613	Principles of Rangeland Management	
NREM 4414	Fisheries Management	
Select 6 additional hours not already used previously, or select from the following:		6
NREM 1012	Introduction to Natural Resource Ecology and Management	
NREM 2083	Geospatial Technologies for Natural Resources	
NREM 3012	Applied Ecology Laboratory	
NREM 3101	Forest Resource Field Studies	
NREM 3111	Natural Resource Field Studies	
NREM 3224	Silviculture	
NREM 4023	Restoration Ecology	
NREM 4033	Ecology Of Invasive Species	
NREM 4043	Natural Resource Administration and Policy	
NREM 4053	Natural Resource Recreation	
NREM 4093	Natural Resources, People and Sustainable Development (I)	
NREM 4403	Wetland Ecology and Management	
NREM 4443	Watershed Hydrology and Water Quality	
NREM 4464	Ornithology	
NREM 4613	Rangeland Resources Planning	
NREM 4783	Prescribed Fire	
SOIL 2124	Fundamentals of Soil Science (N)	
Total Hours		**20**

- A grade average of 2.0 for courses that count for the minor.

Additional OSU Requirements

Undergraduate Minors

- An undergraduate minor must include between fifteen and thirty hours, inclusive of undergraduate coursework.
- A minimum of six credit hours for the minor must be earned in residence at OSU.
- The courses required for a minor may be included in the course requirements for any undergraduate degree or they may be in addition to degree requirements, depending on the overlap between the minor and degree requirements. However, an undergraduate minor must be earned in an academic field other than the student's declared degree option. The minor may not duplicate the degree major or option (for example, a student who earns a BA in Art with an Art History option may earn a minor in Studio Art but not Art History).
- A student generally follows the minor requirements associated with his or her matriculation year or newer requirements that have been established since matriculation. The time limit for following requirements from a given academic year is six years.

For additional information on requirements on minors, click here (https://adminfinance.okstate.edu/site-files/documents/policies/requirements-for-undergraduate-and-graduate-minors.pdf).

Rangeland Ecology and Management (REM), Minor

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Total Hours: 22

Code	Title	Hours
Minor Requirements		
NREM 3013	Applied Ecology and Conservation	3
NREM 3613	Principles of Rangeland Management	3
NREM 4603	Rangeland and Pasture Utilization	3
SOIL 2124	Fundamentals of Soil Science (N)	4
Select a minimum of 9 hours of the following:		9
NREM 2013	Ecology of Natural Resources	
NREM 2083	Geospatial Technologies for Natural Resources	
NREM 3012	Applied Ecology Laboratory	
NREM 4023	Restoration Ecology	
NREM 4033	Ecology Of Invasive Species	
NREM 4613	Rangeland Resources Planning	
NREM 4783	Prescribed Fire	
NREM 4793	Advanced Prescribed Fire	
Total Hours		**22**

- A grade-point average of 2.0 for courses that count for the minor.

Additional OSU Requirements

Undergraduate Minors

- An undergraduate minor must include between fifteen and thirty hours, inclusive of undergraduate coursework.
- A minimum of six credit hours for the minor must be earned in residence at OSU.
- The courses required for a minor may be included in the course requirements for any undergraduate degree or they may be in addition to degree requirements, depending on the overlap between the minor and degree requirements. However, an undergraduate minor must be earned in an academic field other than the student's declared degree option. The minor may not duplicate the degree major or option (for example, a student who earns a BA in Art with an Art History option may earn a minor in Studio Art but not Art History).
- A student generally follows the minor requirements associated with his or her matriculation year or newer requirements that have been established since matriculation. The time limit for following requirements from a given academic year is six years.

For additional information on requirements on minors, click here (https://adminfinance.okstate.edu/site-files/documents/policies/requirements-for-undergraduate-and-graduate-minors.pdf).

Additional OSU Requirements

Undergraduate Minors

- An undergraduate minor must include between fifteen and thirty hours, inclusive of undergraduate coursework.
- A minimum of six credit hours for the minor must be earned in residence at OSU.
- The courses required for a minor may be included in the course requirements for any undergraduate degree or they may be in addition to degree requirements, depending on the overlap between the minor and degree requirements. However, an undergraduate minor must be earned in an academic field other than the student's declared degree option. The minor may not duplicate the degree major or option (for example, a student who earns a BA in Art with an Art History option may earn a minor in Studio Art but not Art History).
- A student generally follows the minor requirements associated with his or her matriculation year or newer requirements that have been established since matriculation. The time limit for following requirements from a given academic year is six years.

For additional information on requirements on minors, click here (https://adminfinance.okstate.edu/site-files/documents/policies/requirements-for-undergraduate-and-graduate-minors.pdf).

Wildlife Ecology (WLEC), Minor

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Total Hours: 22

Code	Title	Hours
Minor Requirements		
NREM 3013	Applied Ecology and Conservation	3
NREM 3503	Principles of Wildlife Ecology and Management	3
PBIO 1404	Plant Biology (LN)	4
Select a minimum of 12 additional hours of the following:		12
BIOL 4174	Mammalogy	
BIOL 4413	Biology of Fishes	
NREM 3012	Applied Ecology Laboratory	
NREM 4464	Ornithology	
NREM 4533	Wildlife Management for Game Species	
NREM 4543	Wildlife Management for Biodiversity	
Total Hours		**22**

- A grade-point average of 2.0 for courses that count for the minor.

Additional OSU Requirements

Undergraduate Minors

- An undergraduate minor must include between fifteen and thirty hours, inclusive of undergraduate coursework.
- A minimum of six credit hours for the minor must be earned in residence at OSU.
- The courses required for a minor may be included in the course requirements for any undergraduate degree or they may be in addition to degree requirements, depending on the overlap between the minor and degree requirements. However, an undergraduate minor must be earned in an academic field other than the student's declared degree option. The minor may not duplicate the degree major or option (for example, a student who earns a BA in Art with an Art History option may earn a minor in Studio Art but not Art History).
- A student generally follows the minor requirements associated with his or her matriculation year or newer requirements that have been established since matriculation. The time limit for following requirements from a given academic year is six years.

For additional information on requirements on minors, click here (https://adminfinance.okstate.edu/site-files/documents/policies/requirements-for-undergraduate-and-graduate-minors.pdf).

Plant and Soil Sciences

The goal of the department is to meet societal needs for food, fiber, energy, and intrinsic value related to the conservation and management of plant and soil resources. Teaching, research, and extension efforts are designed to spur innovation and provide understanding regarding management of agricultural and environmental resources to increase long-term sustainability food production systems.

Undergraduate students select an option of study from: agronomic business, crop production and management, plant biotechnology and improvement, or soil and water resources. Students may choose to specialize in an area such as: entrepreneurship, forage and livestock production, pest management, plant genetics, precision agriculture or environmental management. In addition, students can fulfill prerequisites for professional programs such as pharmacy school. Students interested in professional certification will complete the necessary course requirements in their degree programs. Students have flexibility to work with their academic advisors to develop a plan of study to suit their interests. Many undergraduate students work with the research faculty on projects providing the student an opportunity to assist in gathering new information related to plant breeding and genetics, biotechnology, environmental remediation, plant physiology, crop production, weed science, soil nutrient management, soil chemistry, soil physics, water quality and land restoration.

Upon completion of a Bachelor of Science program, students are employed by private firms, public institutions, state and federal agencies, or non-profit organizations that require personnel with expertise in plant and soil systems. Typical careers include: federal employment in soil and rangeland conservation; crop consulting; technical sales and service for seed, fertilizer or agricultural chemical supply companies; farm or ranch operation; research positions as plant and soil scientists with federal agencies, state agricultural experiment stations or private industries; teaching and extension positions with colleges and universities; and a broad range of employment or ownership in retail businesses supplying feed, seed, grain, fertilizers, equipment, agricultural chemicals and other agricultural supplies and services. Our undergraduate program has also successfully prepared students to pursue advanced degrees in plant and soil sciences, agricultural economics, environmental science, and other related disciplines. Demand for individuals with experience in plant and soil sciences will continue as long as society demands a safe, secure food supply balanced with a desire to conserve natural resources.

Minor in Agronomy or Soil Science

The Department of Plant and Soil Sciences offers two minors, Agronomy (20 hours) and Soil Science (19 hours). Students pursuing a minor in Agronomy will take courses in areas that are most important for understanding the science of crop production, including genetics and biotechnology, weed science and nutrient management in order to prepare them for careers that support crop production. The Soil Science minor has a great deal of flexibility (12 credits of controlled electives) that will allow students to explore diverse aspects of soils ranging from chemistry to conservation while helping them prepare for a variety of environment-related careers.

Courses

PLNT 1101 Orientation to Plant and Soil Sciences
Description: Introduction to areas of study, professional activities and career opportunities in plant and soil sciences.
Credit hours: 1
Contact hours: Lecture: 1 Contact: 1
Levels: Undergraduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

PLNT 1213 Introduction to Plant and Soil Systems (N)
Description: Introduction to the concepts of plant and soil systems including cropland, rangeland and pastureland. A systems approach to the importance of plant and soil resources to the producer, consumer and citizen; modern management and production practices; maintenance of natural resources. Previously offered as AGRN 1213.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences
General Education and other Course Attributes: Natural Sciences

PLNT 2011 Agronomic Problem Solving
Prerequisites: PLNT 1213 or HORT 1013 or PBIO 1404 and MATH 1513 or Instructor Permission.
Description: Practical solutions to common agronomic and soil science issues.
Credit hours: 1
Contact hours: Lab: 2 Contact: 2
Levels: Undergraduate
Schedule types: Lab
Department/School: Plant & Soil Sciences

PLNT 2013 Applied Plant Science
Prerequisites: PLNT 1213 or BOT 1404 or FOR 1123 or HORT 1013.
Description: Application of agronomic principles to the management, improvement and use of plants. Structure and growth of crop plants relating to management strategies and adaptation to varying abiotic and biotic factors. Hands-on identification of crops, weeds, and seed quality factors; application of tools and techniques. Previously offered as PLNT 2012 and AGRN 2012.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Plant & Soil Sciences

PLNT 2041 Career Development in Plant and Soil Sciences
Prerequisites: Sophomore standing in plant and soil sciences.
Description: Develop professional skills, learn about career development resources, and understand the steps of the application and interview process. Engage industry professionals to learn about experiences and viewpoints regarding the job market. Identify career path, develop action plan to meet job requirements and gain basic understanding of personal financial management. Previously offered as AGRN 2041.
Credit hours: 1
Contact hours: Lecture: 1 Contact: 1
Levels: Undergraduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

PLNT 3012 Crops of Oklahoma
Prerequisites: PLNT 1213.
Description: Production, distribution, classification, utilization, and current issues or improvements of major crops in Oklahoma. This course includes, but is not limited to, wheat, soybean, sorghum, corn, peanuts, cotton, sunflowers, and bermuda grass. Previously offered as PLNT 3011.
Credit hours: 2
Contact hours: Lecture: 2 Contact: 2
Levels: Undergraduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

PLNT 3554 Plant Genetics and Biotechnology
Prerequisites: BIOL 1114 or (BIOL 1113 and BIOL 1111).
Description: Basic principles of heredity. Interrelationship between classical genetics and molecular genetics emphasized. Mendelian genetics, cytogenetics, mutations, gene regulation and genetic engineering. Previously offered as AGRN 3554.
Credit hours: 4
Contact hours: Lecture: 3 Lab: 2 Contact: 5
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Plant & Soil Sciences

PLNT 3790 Seed and Plant Identification
Prerequisites: PLNT 1213.
Description: Identification and classification of agronomically important crop and weed species from seed and from seedling, vegetative, flowering or mature plants. Offered for fixed credit, 1 credit hours, maximum of 2 credit hours.
Credit hours: 1
Contact hours: Contact: 1 Other: 1
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Plant & Soil Sciences

PLNT 4013 Principles of Weed Science
Prerequisites: PLNT 1213 or HORT 1013.
Description: Basic principles of weed biology and ecology, introduction to herbicide chemistry, and methods for preventative, cultural, mechanical, chemical, and biological weed management in cropping systems, turf, and natural landscapes. Laboratories are applied and will include weed identification, calibration of field equipment, applied grower problems, and herbicide damage identification. Previously offered as PLNT 3113 and PLNT 3211. May not be used for Degree Credit with PLNT 5013.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Plant & Soil Sciences

PLNT 4033 Applied Agricultural Meteorology
Prerequisites: PLNT 1213 and SOIL 2124.
Description: Fundamental meteorology concepts in field-scale setting. Drivers of climate and weather and the assessment of the impacts of climate and weather on agricultural systems. Integration of weather and climate information into the process of formulating sound, data-based decisions related to various agricultural operations.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

PLNT 4080 Professional Internship
Prerequisites: Consent of instructor.
Description: Internship must be at an approved agribusiness unit or other agency serving agronomic agriculture. Requires a final conference with on campus adviser and a written report. Previously offered as AGRN 4080. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Plant & Soil Sciences

PLNT 4113 Advanced Weed Science
Prerequisites: PLNT 3111 and PLNT 3221.
Description: Integrated approach for weed management. Weed life cycles and biology, weed crop interferences, herbicide families and their characteristics, and finally a systematic and integrated weed management system. Methods of conducting and interpreting research results in appropriate topics. Previously offered as AGRN 4113.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

PLNT 4123 Plant-Environment Interactions
Prerequisites: PBIO 1404.
Description: Environmental impact on plant life cycle; (i.e. germination, flowering and senescence); plant growth responses (e.g. photosynthesis, phototropism, biomass production) to light quality, precipitation, temperature, and population or community changes. Previously offered as AGRN 4123. May not be used for Degree Credit with PLNT 5123.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

PLNT 4133 Temperature Stress Physiology
Prerequisites: CHEM 1215 and BIOL 1114 (or BIOL 1113 and BIOL 1111) or PBIO 1404
Description: Effects of heat, chilling and freezing stress on plants. Responses to temperature extremes at the molecular to whole plant levels with emphasis on mechanisms of injury and resistance. Same course as HORT 4133. Offered in combination with HORT 5133 and PLNT 5133. May not be used for degree credit with HORT 5133 and PLNT 5133.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

PLNT 4353 Plant Breeding
Prerequisites: PLNT 3554 or equivalent.
Description: Basic principles dealing with the improvement of plants through application of genetic principles. Previously offered as AGRN 4353. May not be used for Degree Credit with PLNT 5353.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

PLNT 4443 Cropping Systems
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

PLNT 4453 Plant Molecular Breeding
Prerequisites: ANSI 3423 or BIOL 3023 or consent of instructor.
Description: Use and application of genomic knowledge and molecular technology to improve agriculturally important plants. Major topics include applications of genome sequence, genetic mapping, and gene cloning structural and comparative genomics and their application in molecular breeding of agronomic crops. May not be used for degree credit with PLNT 5453.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

PLNT 4470 Problems and Special Study
Prerequisites: Consent of instructor.
Description: Problems in plant science selected from topics in range and turf, plant breeding and genetics, crop management and physiology, and weed control. Previously offered as AGRN 4470. Offered for variable credit, 1-3 credit hours, maximum of 12 credit hours.
Credit hours: 1-3
Contact hours: Contact: 1-3 Other: 1-3
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Plant & Soil Sciences

PLNT 4543 Cropping Systems
Prerequisites: PLNT 1213 or HORT 1013 or BOT 1404; PLNT 2013.
Description: Principles of developing and managing cropping systems in the Great Plains for the efficient use and conservation of soil and water resources while promoting yield, managing soil fertility, and effectively controlling pests. May not be used for degree credit with PLNT 5543.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

PLNT 4571 Professional Preparation in Plant and Soil Sciences
Prerequisites: Senior standing in plant and soil sciences.
Description: Preparation for professional certification exams and career opportunities in plant and soil sciences. Same course as SOIL 4571. Previously offered as AGRN 4571.
Credit hours: 1
Contact hours: Lecture: 1 Contact: 1
Levels: Undergraduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

PLNT 4573 Bioenergy Feedstock Production
Prerequisites: PLNT 1213.
Description: Understand production and management practices for potential bioenergy feedstocks. Distinguish feedstock sources and end products. Identify physiological mechanisms to improve yield and quality under current and future climates. Use simulation and GIS tools to project biomass and ethanol yields. May not be used for Degree Credit with PLNT 5573.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

PLNT 4923 Applications of Biotechnology in Pest Management
Prerequisites: BIOL 1114 or (BIOL 1113 and BIOL 1111) and CHEM 1215 or equivalents.
Description: Applications of biotechnology in managing arthropod pests of plants, animals, plant pathogens, and weeds. Introduction to underlying technology, products being developed and deployed, effectiveness and associated problems or concerns resulting from their use. Same course as ENTO 4923, PLP 4923, and PLNT 4922. May not be used for Degree Credit with PLNT 5923.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

PLNT 4933 Gene Editing and Genetically Modified Crops
Prerequisites: PLNT 3554 or ANSI 3423 or BIOL 3023 or Consent of Instructor.
Description: Principles and techniques in editing and overexpressing genes in transgenic crops with improved agronomic traits. Controversies and consumer concerns over transgenic plants, biotechnology regulations and global status of biotech crops. Laboratory techniques in recombinant DNA cloning, transformation, and tissue culture. May not be used for Degree Credit with PLNT 5933.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Plant & Soil Sciences

PLNT 4990 Senior Thesis in Plant and Soil Sciences
Prerequisites: Consent of instructor.
Description: Supervised undergraduate research in topics related to plant and soil sciences. Completion of an approved research project based on a thesis topic in plant or soil science will include submission of a written report and a public defense of the work. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Plant & Soil Sciences

PLNT 5000 Master's Thesis
Prerequisites: Consent of advisor.
Description: Research planned, conducted and reported in consultation with a major professor. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Graduate
Schedule types: Independent Study
Department/School: Plant & Soil Sciences

PLNT 5013 Principles of Weed Science
Prerequisites: PLNT 1213 or HORT 1013.
Description: Basic principles of weed biology and ecology, introduction to herbicide chemistry, and methods for preventative, cultural, mechanical, chemical, and biological weed management in cropping systems, turf, and natural landscapes. Laboratories are applied and will include weed identification, calibration of field equipment, applied grower problems, and herbicide damage identification. May not be used for degree credit with PLNT 4013.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Plant & Soil Sciences

PLNT 5020 Graduate Seminar
Prerequisites: Graduate standing.
Description: Discussions of research philosophy, methods, interpretation and presentations. Profession development and contributions to the scientific community. Same course as SOIL 5020. Offered for fixed credit, 1 credit hour, maximum of 3 credit hours.
Credit hours: 1
Contact hours: Contact: 1 Other: 1
Levels: Graduate
Schedule types: Independent Study
Department/School: Plant & Soil Sciences

PLNT 5110 Problems and Special Study
Prerequisites: Consent of instructor.
Description: Supervised study of special problems and topics not covered in other graduate courses. Previously offered as AGRN 5110. Offered for variable credit, 1-4 credit hours, maximum of 12 credit hours.
Credit hours: 1-4
Contact hours: Contact: 1-4 Other: 1-4
Levels: Graduate
Schedule types: Independent Study
Department/School: Plant & Soil Sciences

PLNT 5113 Advanced Weed Science
Description: Integrated approach for weed management. Weed life cycles and biology, weed crop interferences, herbicide families and their characteristics, and finally a systematic and integrated weed management system. Methods of conducting and interpreting research results in appropriate topics. Previously offered as AGRN 4113. May not be used for degree credit with PLNT 4113.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

PLNT 5123 Plant-Environment Interactions
Prerequisites: PBIO 1404.
Description: Environmental impact on plant life cycle; (i.e. germination, flowering and senescence); plant growth responses (e.g. photosynthesis, phototropism, biomass production) to light quality, precipitation, temperature, and population or community changes. May not be used for degree credit with PLNT 4123.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

PLNT 5133 Temperature Stress Physiology
Description: Effects of heat, chilling and freezing stress on plants. Responses to temperature extremes at the molecular to whole plant levels with emphasis on mechanisms of injury and resistance. Same course as HORT 5133. Offered in combination with HORT 4133 and PLNT 4133. No credit with degree credit in HORT 4133 and PLNT 4133.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

PLNT 5230 Research
Prerequisites: Consent of a faculty member supervising the research.
Description: Supervised independent research on selected topics. Offered for variable credit, 1-4 credit hours, maximum of 8 credit hours.
Credit hours: 1-4
Contact hours: Contact: 1-4 Other: 1-4
Levels: Graduate
Schedule types: Independent Study
Department/School: Plant & Soil Sciences

PLNT 5293 Plant Response to Water Stress
Prerequisites: BIOC 3653, BOT 3463.
Description: Physiological ramifications of water deficit stress on cells, tissues, plants and canopies. Discussion of the soil/plant/atmosphere continuum, and avoidance and tolerance mechanisms leading to drought resistance. Photosynthesis, transpiration, and water-use efficiency and their relationship to biomass accumulation and crop yield. Previously offered as AGRN 5293.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

PLNT 5313 Simulation Models in Research, Management and Policy
Prerequisites: PLNT 1213.
Description: Use crop simulation models (CSM) and decision support systems to address challenges associated with food, fuel, feed and fiber production. Utilize CMS as research, management, and policy tools. Evaluate CSM as surrogates to field studies and to design experiments to fill in knowledge gaps.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

PLNT 5353 Plant Breeding
Prerequisites: PLNT 3554 or equivalent.
Description: Basic principles dealing with the improvement of plants through application of genetic principles. May not be used for degree credit with PLNT 4353.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

PLNT 5403 Physiological Action of Herbicides
Prerequisites: BOT 3463.
Description: The mode of action, uptake and translocation, and metabolism of herbicides in crops and weeds. Previously offered as AGRN 5403.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

PLNT 5412 Plant Breeding Methods
Prerequisites: PLNT 3554 or PLNT 4353 or consent of instructor.
Description: Development and application of genetic principles to breeding methodology of self- and cross-pollinated crops; emphasis on selection methods pertinent to plant improvement; methods of new cultivar development, release, and commercialization. Previously offered as PLNT 5414.
Credit hours: 2
Contact hours: Lecture: 2 Contact: 2
Levels: Graduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

PLNT 5413 Data Science for Agriculture and Natural Resources
Description: Data science principles and skills in the context of agricultural and natural resources research. Topics include data capture, quality control, data manipulation, visualization, reproducible analysis, and communication of results. Emphasis on workflows and analytical techniques tailored for agricultural and natural resource management research.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

PLNT 5433 Biotechnology in Plant Improvement
Prerequisites: PLNT 3554, PLNT 4353, and BIOL 3014 or consent of instructor.
Description: Use of emerging technologies in cell biology and molecular genetics to study and manipulate plants. Emphasis on genetic systems which influence productivity and end-product utilization. The integration of biotechnology into plant breeding programs and issues concerning the release of genetically engineered organisms into the environment. Previously offered as AGRN 5433.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

PLNT 5453 Plant Molecular Breeding
Prerequisites: ANSI 3423 or BIOL 3023 or consent of instructor.
Description: Use and application of genomic knowledge and molecular technology to improve agriculturally important plants. Major topics include applications of genome sequence, genetic mapping, and gene cloning structural and comparative genomics and their application in molecular breeding of agronomic crops. May not be used for degree credit with PLNT 4453.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

PLNT 5543 Cropping Systems
Description: Principles of developing and managing cropping systems in the Great Plains for the efficient use and conservation of soil and water resources while promoting yield, managing soil fertility, and effectively controlling pests. May not be used for degree credit with PLNT 4543.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

PLNT 5573 Bioenergy Feedstock Production
Prerequisites: PLNT 1213.
Description: Understand production and management practices for potential bioenergy feedstocks. Distinguish feedstock sources and end products. Identify physiological mechanisms to improve yield and quality under current and future climates. Use simulation and GIS tools to project biomass and ethanol yields. May not be used for degree credit with PLNT 4573.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

PLNT 5923 Applications of Biotechnology in Pest Management
Prerequisites: BIOL 1114 or (BIOL 1113 and BIOL 1111) and CHEM 1215 or equivalents.
Description: Applications of biotechnology in managing arthropod pests of plants, animals, plant pathogens, and weeds. Introduction to underlying technology, products being developed and deployed, effectiveness and associated problems or concerns resulting from their use. May not be used for degree credit with PLNT 4923.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

PLNT 5933 Gene Editing and Genetically Modified Crops
Prerequisites: PLNT 3554 or ANSI 3423 or BIOL 3023 or consent of instructor.
Description: Principles and techniques in editing and overexpressing genes in transgenic crops with improved agronomic traits. Controversies and consumer concerns over transgenic plants, biotechnology regulations and global status of biotech crops. Laboratory techniques in recombinant DNA cloning, transformation, and tissue culture. May not be used for degree credit with PLNT 4933.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Plant & Soil Sciences

PLNT 6000 Doctoral Thesis
Prerequisites: Consent of adviser.
Description: Independent research to be conducted and reported with the supervision of a major professor as partial requirement for the PhD degree. Offered for variable credit, 1-6 credit hours, maximum of 36 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Graduate
Schedule types: Independent Study
Department/School: Plant & Soil Sciences

PLNT 6010 Advanced Topics and Conference
Prerequisites: MS degree.
Description: Supervised study of advanced topics. A reading and conference course designed to acquaint the advanced student with fields not covered in other courses. Offered for variable credit, 1-6 credit hours, maximum of 12 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Graduate
Schedule types: Independent Study
Department/School: Plant & Soil Sciences

PLNT 6410 Topics in Plant Breeding and Genetics
Prerequisites: Consent of instructor.
Description: Selected topics in the statistical and experimental analysis of quantitative traits, evolutionary development of domesticated plants and animals, and techniques used in breeding crop plants. Previously offered as AGRN 6410. Offered for variable credit, 1-3 credit hours, maximum of 6 credit hours.
Credit hours: 1-3
Contact hours: Contact: 1-3 Other: 1-3
Levels: Graduate
Schedule types: Independent Study
Department/School: Plant & Soil Sciences

SOIL 1113 Land, Life and the Environment (N)
Description: Provide information about soils at local, regional, national, and global scales as well as basic soil properties and how they are influenced by human activity. Discussion topics include soil's importance to world food security and human health, agricultural production, environmental quality, and sustainable ecosystems. Students will gain practical knowledge of sustainable soil management in support of the production and ecological regulator functions of the soils.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences
General Education and other Course Attributes: Natural Sciences

SOIL 2124 Fundamentals of Soil Science (N)
Prerequisites: CHEM 1215 or CHEM 1314 or CHEM 1414.
Description: Introduction to soil physical, chemical and biological properties and processes necessary in formulating land use decisions related to agricultural, engineering and environmental concerns. Soil formation, classification and conservation. Analysis/evaluation of soils in field and laboratory settings. Course previously offered as AGRN 2124.
Credit hours: 4
Contact hours: Lecture: 3 Lab: 2 Contact: 5
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Plant & Soil Sciences
General Education and other Course Attributes: Natural Sciences

SOIL 3033 Soils and Societies (S)
Description: Influence of the soil in shaping human decisions that affect food supply, cultural practices, economic growth, and establishment of societies. Survey of past and current land uses and land use changes that lead to the demise of societies or advancement of people's lives. Themes include key human utilization of the soil in Oklahoma and in the United States, roles of soil in waste treatment, and advances in assessment and utilization of soil that affect human lives. Soils in art, mythology, pop culture, healthcare, and warfare.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences
General Education and other Course Attributes: Social & Behavioral Sciences

SOIL 3433 Soil Genesis, Morphology, and Classification
Prerequisites: SOIL 2124.
Description: Basic principles dealing with how and why soils differ, their descriptions, geographic distributions and modern classification of soils. Soil genesis and classification a prerequisite to sound land use planning and land management. Course previously offered as AGRN 3433. May not be used for Degree Credit with SOIL 5353.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Plant & Soil Sciences
Additional Fees: PSS or SOIL Course Field Trip fee of $40 applies.

SOIL 4210 Describing and Interpreting Soils
Prerequisites: SOIL 2124.
Description: Describe and classify soil properties in the field and interpret for suitable agriculture, urban, and other land uses. Course previously offered as AGRN 4210. May not be used for Degree Credit with SOIL 5210. Offered for fixed 1 credit hour, maximum of 3 credit hours.
Credit hours: 1
Contact hours: Contact: 1 Other: 1
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Plant & Soil Sciences

SOIL 4213 Precision Agriculture
Prerequisites: MATH 1513, senior standing.
Description: Introduction to the concepts of precision agriculture including analysis of spatial variability, relationships of fertility and crop response, geographical information systems, variable rate technology, optical sensing, global positioning systems, and yield monitoring. Case studies included for detailed analyses. Same course as BAE 4213. May not be used for Degree Credit with SOIL 5213.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

SOIL 4234 Soil Nutrient Management
Prerequisites: SOIL 2124.
Description: Soil fertility and use of fertilizer materials for conservation, maintenance, and improvement of soil productivity and to minimize environmental concerns. Course previously offered as AGRN 4234. May not be used for Degree Credit with SOIL 5234.
Credit hours: 4
Contact hours: Lecture: 3 Lab: 2 Contact: 5
Levels: Undergraduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Plant & Soil Sciences

SOIL 4363 Environmental Soil Science
Prerequisites: BIOL 1114 or (BIOL 1113 and BIOL 1111) and SOIL 2124.
Description: Re-emphasis of soil science concepts vital in the understanding of processes that are within the realms of the ecological regulator function of the soil; discussions on the role of soil as the foundation of forest, rangeland/pastureland, agricultural, urban and suburban, as well as wetland ecosystems; impact of soil processes on global environmental concerns; soil as the ultimate recipient of waste; impact of soil processes on groundwater and surface water quality. Same course as ENVR 4363. Course previously offered as AGRN 4363. May not be used for Degree Credit with SOIL 5363.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

SOIL 4463 Soil and Water Conservation
Prerequisites: SOIL 2124.
Description: Assess the importance, quality and quantity of soil and water as natural resources for ecosystems and societies. Principles of soil erosion processes and management practices to decrease erosion in urban, cropland and rangeland systems. Understand the principles of hydrology cycle to improve water use efficiency of precipitation and irrigation resources. Examine resource mismanagement that have resulted in desertification, salinization and deforestation. Course previously offered as AGRN 4463. May not be used for Degree Credit with SOIL 5463.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

SOIL 4470 Problems and Special Study
Prerequisites: Consent of the instructor.
Description: Problems in soil science selected from topics in soil chemistry and fertility, soil physics, soil biology, soil conservation, and soil morphology. Offered for variable credit, 1-3 credit hours, maximum of 12 credit hours.
Credit hours: 1-3
Contact hours: Contact: 1-3 Other: 1-3
Levels: Undergraduate
Schedule types: Independent Study
Department/School: Plant & Soil Sciences

SOIL 4483 Soil Microbiology
Prerequisites: SOIL 2124 and BIOL 1114 or (BIOL 1113 and BIOL 1111) or consent of instructor.
Description: An overview of microorganisms living in the soil and their activities which are significant to agricultural practices and the environment. No credit for both SOIL 4483 and SOIL 5383. Course previously offered as AGRN 4483. May not be used for Degree Credit with SOIL 5383.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

SOIL 4571 Professional Preparation in Plant and Soil Sciences
Prerequisites: Senior standing in plant and soil sciences.
Description: Preparation for professional certification exams and career opportunities in plant and soil sciences. Same course as PLNT 4571.
Credit hours: 1
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

SOIL 4683 Soil, Water, and Weather
Prerequisites: SOIL 2124 and PHYS 1114.
Description: Introduction to the physics of the soil-plant-atmosphere continuum. A focus on physical properties of soil and interactions with water and weather in terrestrial ecosystems. Course previously offered as AGRN 4683. May not be used for Degree Credit with SOIL 5683.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

SOIL 4893 Environmental Soil Chemistry
Prerequisites: SOIL 2124 and CHEM 1225 or CHEM 1515.
Description: Chemical of soil systems with an emphasis on environmental health and quality. Topics include organic matter dynamics, the role of plant and microbial inputs, ion exchange processes, sorption phenomena, properties of clay minerals, and soil acidity. Same course as ENVR 4893. Previously offered as SOIL 3893 and AGRN 3893.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Undergraduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

SOIL 5000 Master's Thesis
Prerequisites: Consent of adviser.
Description: Research planned, conducted and reported in consultation with a major professor. 1-6 credits, 6 max total credits under Plan I, and 2 max total credits under Plan II. Offered for variable credit, 1-6 credit hours, maximum of 6 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Graduate
Schedule types: Independent Study
Department/School: Plant & Soil Sciences

SOIL 5020 Graduate Seminar
Prerequisites: Graduate standing.
Description: Discussion of research philosophy, methods, interpretation, and presentations. Profession development and contributions to the scientific community. Same course as PLNT 5020. Offered for fixed 1 credit hour, maximum of 3 credit hours.
Credit hours: 1
Contact hours: Lecture: 1 Contact: 1
Levels: Graduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

SOIL 5110 Problems and Special Study
Prerequisites: Consent of instructor.
Description: Supervised study of special problems and topics not covered in other graduate courses. Offered for variable credit, 1-4 credit hours, maximum of 12 credit hours.
Credit hours: 1-4
Contact hours: Contact: 1-4 Other: 1-4
Levels: Graduate
Schedule types: Independent Study
Department/School: Plant & Soil Sciences

SOIL 5112 Research Methods in Plant and Soil Sciences
Prerequisites: Graduate standing.
Description: Exploration of various methodologies helpful in field scale research. Application and understanding biometry as it relates to research result interpretation. Course previously offered as SOIL 5111.
Credit hours: 2
Contact hours: Lecture: 2 Contact: 2
Levels: Graduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

SOIL 5120 Teaching Practicum in Plant and Soil Sciences
Description: College-level teaching experience under the mentorship of a faculty member who assists in planning of class activities, provides guidance in teaching-related projects, observes classes and provides feedback regarding course delivery and classroom management. Offered for variable credit, 1-3 credit hours, maximum of 3 credit hours.
Credit hours: 1-3
Contact hours: Contact: 1-3 Other: 1-3
Levels: Graduate
Schedule types: Independent Study
Department/School: Plant & Soil Sciences

SOIL 5131 Professional Development Colloquium in Plant and Soil Sciences
Description: Professional preparation of graduate students for future careers. Discussions on topics related to the application process and successful careers in the academic, private industry and government sectors. Concerns of international students, career-life balance and other post-graduate school career issues are discussed.
Credit hours: 1
Contact hours: Contact: 1 Other: 1
Levels: Graduate
Schedule types: Discussion
Department/School: Plant & Soil Sciences

SOIL 5210 Describing and Interpreting Soils
Prerequisites: SOIL 2124.
Description: Describe and classify soil properties in the field and interpret for suitable agriculture, urban, and other land uses. May not be used for degree credit with SOIL 4210. Offered for fixed 1 credit hour, maximum of 3 credit hours.
Credit hours: 1
Contact hours: Contact: 1 Other: 1
Levels: Graduate
Schedule types: Independent Study
Department/School: Plant & Soil Sciences

SOIL 5213 Precision Agriculture
Prerequisites: MATH 1513, senior standing.
Description: Introduction to the concepts of precision agriculture including analysis of spatial variability, relationships of fertility and crop response, geographical information systems, variable rate technology, optical sensing, global positioning systems, and yield monitoring. Case studies included for detailed analyses. May not be used for degree credit with SOIL 4213.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

SOIL 5223 Soil Chemical Processes and Impact on Environmental Quality
Prerequisites: SOIL 4893 and CHEM 2113 or CHEM 3324 or equivalent.
Description: A comprehensive study of chemical processes applied to fate and transport of contaminants and agricultural productivity. Chemical and physical properties of soil minerals as they pertain to solution and surface chemistry. Nutrient and contaminant availability and speciation as dictated by ion exchange, precipitation/dissolution, and adsorption reactions. Review of current research in soil and environmental chemistry literature. Course previously offered as SOIL 5224.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

SOIL 5230 Research
Prerequisites: Consent of a faculty member supervising the research.
Description: Supervised independent research on selected topics. Offered for variable credit, 1-4 credit hours, maximum of 8 credit hours.
Credit hours: 1-4
Contact hours: Contact: 1-4 Other: 1-4
Levels: Graduate
Schedule types: Independent Study
Department/School: Plant & Soil Sciences

SOIL 5234 Soil Nutrient Management
Prerequisites: SOIL 2124.
Description: Soil fertility and use of fertilizer materials for conservation, maintenance, and improvement of soil productivity and to minimize environmental concerns. May not be used for degree credit with SOIL 4234.
Credit hours: 4
Contact hours: Lecture: 3 Lab: 2 Contact: 5
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Plant & Soil Sciences

SOIL 5353 Advanced Soil Genesis and Classification
Prerequisites: SOIL 3433.
Description: Processes and factors of soil formation. Comparison of world soil morphology and classification systems. Course previously offered as AGRN 5353.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Plant & Soil Sciences

SOIL 5363 Environmental Soil Science
Prerequisites: BIOL 1114 or (BIOL 1113 and BIOL 1111) and SOIL 2124.
Description: Re-emphasis of soil science concepts vital in the understanding of processes that are within the realms of the ecological regulator function of the soil; discussions on the role of soil as the foundation of forest, rangeland/pastureland, agricultural, urban and suburban, as well as wetland ecosystems; impact of soil processes on global environmental concerns; soil as the ultimate recipient of waste; impact of soil processes on groundwater and surface water quality. May not be used for degree credit with SOIL 4363.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

SOIL 5383 Advanced Soil Microbiology
Description: A comprehensive overview of microorganisms living in the soil and their activities which are of agricultural and environmental significance. Provide experience in analytical skills related to soil microbial processes. No credit for both SOIL 4483 and SOIL 5383.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

SOIL 5463 Soil and Water Conservation
Prerequisites: SOIL 2124.
Description: Assess the importance, quality and quantity of soil and water as natural resources for ecosystems and societies. Principles of soil erosion processes and management practices to decrease erosion in urban, cropland and rangeland systems. Understand the principles of hydrology cycle to improve water use efficiency of precipitation and irrigation resources. Examine resource mismanagement that have resulted in desertification, salinization and deforestation. May not be used for degree credit with SOIL 4463.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

SOIL 5483 Soil Bioremediation and Sustainability
Prerequisites: SOIL 4483.
Description: Microbial activities, biodiversity, sustainability, and their interrelationships in soil and the environment. Soil enzymology, environmental sustainability, and bioremediation of agricultural and industrial chemicals, heavy metals, chlorinated organics and explosives. Formulation of strategies that promote soil productivity and environmental sustainability.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

SOIL 5583 Soil Physics Measurement Techniques
Prerequisites: SOIL 4683.
Description: Training in field and laboratory techniques for physical analysis of soil properties and processes. Develop research proposal and conduct research project related to soil physics. Course previously offered as AGRN 5583.
Credit hours: 3
Contact hours: Lecture: 2 Lab: 2 Contact: 4
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Plant & Soil Sciences

SOIL 5683 Soil, Water, and Weather
Prerequisites: SOIL 2124 and CHEM 1225.
Description: Introduction to the physics of the soil-plant-atmosphere continuum. A focus on physical properties of soil and interactions with water and weather in terrestrial ecosystems. May not be used for degree credit with SOIL 4683.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

SOIL 5813 Soil-Plant Nutrient Cycling and Environmental Quality
Prerequisites: SOIL 4234 or equivalent.
Description: Theory and application of soil plant relationships in production and non-production environments. Nutrient cycling, mass balance, soil nutrient supply and plant response. Methods to reduce the impact of nutrients on environmental quality, soil-plant buffering and response models. Course previously offered as AGRN 5813.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

SOIL 5893 Environmental Soil Chemistry
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

SOIL 5894 Soil Biogeochemistry
Prerequisites: SOIL 4893 or Consent of Instructor.
Description: Foundational and emerging concepts in soil biogeochemistry with an emphasis on transformation and fates of carbon, nitrogen, and phosphorus from molecular to global scales. Discussions are focused on molecular-scale processes occurring at the interface between mineral surfaces, microbes, and plants all the way to the controls on nutrient storage and cycling at the ecosystem-scale. Student-led discussions on peer-reviewed literature and exploration of key topics in soil biogeochemistry.
Credit hours: 4
Contact hours: Lecture: 3 Lab: 2 Contact: 5
Levels: Graduate
Schedule types: Lab, Lecture, Combined lecture and lab
Department/School: Plant & Soil Sciences

SOIL 6000 Doctoral Thesis
Prerequisites: Consent of instructor.
Description: Independent research to be conducted and reported with the supervision of a major professor as partial requirement for the PhD degree. Offered for variable credit, 1-6 credit hours, maximum of 36 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Graduate
Schedule types: Independent Study
Department/School: Plant & Soil Sciences

SOIL 6010 Advanced Topics and Conference
Prerequisites: MS degree.
Description: Supervised study of advanced topics. A reading and conference course designed to acquaint the advanced student with fields not covered in other courses. Offered for variable credit, 1-6 credit hours, maximum of 12 credit hours.
Credit hours: 1-6
Contact hours: Contact: 1-6 Other: 1-6
Levels: Graduate
Schedule types: Independent Study
Department/School: Plant & Soil Sciences

SOIL 6583 Soil Physics Theory
Prerequisites: SOIL 4683 or equivalent and MATH 2233 or equivalent.
Description: Theoretical understanding and modeling skills required to analyze and predict mass and energy transport in the soil-plant-atmosphere continuum. Application of analytical and numerical models for diverse transport phenomena including water, heat, and solute transport through soil.
Credit hours: 3
Contact hours: Lecture: 3 Contact: 3
Levels: Graduate
Schedule types: Lecture
Department/School: Plant & Soil Sciences

Undergraduate Programs

- Plant and Soil Sciences: Agronomic Business, BSAG (p. 2647)
- Plant and Soil Sciences: Crop Production and Management, BSAG (p. 2649)
- Plant and Soil Sciences: Plant Biotechnology and Improvement, BSAG (p. 2651)
- Plant and Soil Sciences: Soil and Water Resources, BSAG (p. 2653)

Minors

- Agronomy (AGRN), Minor (p. 2646)
- Soil Science (SOIL), Minor (p. 2655)

Graduate Programs

Programs of coursework and research are offered leading to a Master of Science degree in Plant and Soil sciences, a Doctor of Philosophy degree in Crop Science, or a Doctor of Philosophy degree in Soil Science. Specific program focuses are available in the areas of plant breeding and molecular biology, biotechnology, bioenergy, environmental remediation, forage, and pasture management, weed science, crop physiology, crop management, conservation cropping systems, soil morphology and genesis, soil microbiology, soil fertility and plant nutrition, soil physics, soil-water management, soil chemistry, soil and water quality, and waste management. Applicants should indicate their specific area of interest upon application. Plant and soil sciences faculty also serve on advisory committees for the Environmental Science interdisciplinary degree programs.

The graduate programs in plant and soil sciences prepare individuals for successful careers in a variety of areas including research, teaching, environmental sciences, waste management, farming and ranching, extension education, agricultural business, and all aspects of crop production.

Prerequisites

Admission to the graduate program requires a BS degree in plant and soil sciences, agronomy, or a closely related field. Applicants should have completed basic courses in plant and soil sciences, agronomy, biology, chemistry, and mathematics required of undergraduate majors. Deficiencies in fundamental course requirements will be met by the student under the direction of the student's advisory committee. Applicants must be accepted by an adviser in an appropriate discipline prior to official admission.

Degree Requirements

Students must follow approved plans of study that meet the minimum University and program requirements for the respective degrees they are pursuing.

The plans of study for graduate programs are developed individually for each candidate and must adhere to guidelines in the Plant and Soil Sciences graduate student handbook and be approved by the student's advisory committee. The graduate degrees in plant and soil sciences requires a minimum of 30 credit hours beyond the BS degree for a Master of Science degree or 78 credit hours beyond the BS degree for a Doctor of Philosophy degree. These include six credit hours of PLNT/SOIL 5000 Master's Thesis or 15 credit hours of PLNT/SOIL 6000 Doctoral dissertation. All students must meet certain requirements in basic disciplines such as statistics, mathematics, botany, and chemistry. The study of a foreign language is not required but can be incorporated if the student and advisory committee feel that it is desirable.

Faculty

Wade Thomason, PhD—Professor and Head
Regents Professors: Brett F. Carver, PhD; Yanqi Wu, PhD; Liuling Yan, PhD
Professors: Sergio M. Abit Jr., PhD; D. Brian Arnall, PhD; Shiping Deng, PhD; Tyson E. Ochsner, PhD; Million Tadege, PhD; Wade Thomason, PhD; Kevin Wagner, PhD; Jiangqi Wen, PhD
Associate Professors: Phillip Alderman, PhD; Beatrix J. Haggard, PhD; Josh Lofton, PhD
Assistant Professors: Amanda de Oliveira Silva, PhD; Jennifer Dudak, PhD; Liberty Galvin, PhD; Steven Phillips, PhD; Sumit Sharma, PhD; Swati Shrestha, PhD

Agronomy (AGRN), Minor

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Total Hours: 20

Code	Title	Hours
Minor Requirements		
PLNT 1213	Introduction to Plant and Soil Systems (N)	3
PLNT 2013	Applied Plant Science	3
PLNT 4013	Principles of Weed Science	3
SOIL 2124	Fundamentals of Soil Science (N)	4
SOIL 4234	Soil Nutrient Management	4
Select 3 hours of the following:		3
PLNT 4033	Applied Agricultural Meteorology	
PLNT 4123	Plant-Environment Interactions	
PLNT 4353	Plant Breeding	
PLNT 4470	Problems and Special Study	
PLNT 4573	Bioenergy Feedstock Production	
SOIL 4213	Precision Agriculture	
PLNT 2011	Agronomic Problem Solving	
PLNT 3011	Crops of Oklahoma	
PLNT 4443	Cropping Systems	
Total Hours		**20**

- A grade-point average of 2.0 for courses that count for the minor.

Additional OSU Requirements

Undergraduate Minors

- An undergraduate minor must include between fifteen and thirty hours, inclusive of undergraduate coursework.
- A minimum of six credit hours for the minor must be earned in residence at OSU.
- The courses required for a minor may be included in the course requirements for any undergraduate degree or they may be in addition to degree requirements, depending on the overlap between the minor and degree requirements. However, an undergraduate minor must be earned in an academic field other than the student's declared degree option. The minor may not duplicate the degree major or option (for example, a student who earns a BA in Art with an Art History option may earn a minor in Studio Art but not Art History).
- A student generally follows the minor requirements associated with his or her matriculation year or newer requirements that have been established since matriculation. The time limit for following requirements from a given academic year is six years.

For additional information on requirements on minors, click here (https://adminfinance.okstate.edu/site-files/documents/policies/requirements-for-undergraduate-and-graduate-minors.pdf).

Plant and Soil Sciences: Agronomic Business, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p.)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
STAT 2013	Elementary Statistics (A) [1]	3
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
CHEM 1314	Chemistry I (LN) [1]	4
or CHEM 1215	Chemical Principles I (LN)	
Course designated (N)		3
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1]	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		9
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College Requirements		
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
ENTO 2993	Introduction to Entomology (LN)	3
Departmental Requirements		
Select one of the following:		3
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources	
BCOM 3113	Written Communication	
BCOM 3443	Business Communication for International Students	
ENGL 3323	Technical Writing [2]	
Select one of the following:		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S)	
SPCH 2713	Introduction to Speech Communication (S)	
SPCH 3733	Elements of Persuasion (S) [3]	
PLNT 1213	Introduction to Plant and Soil Systems (N)	3
PLNT 2041	Career Development in Plant and Soil Sciences	1
PLNT 4033	Applied Agricultural Meteorology	3
PLNT 4080	Professional Internship	3
or PLNT 4990	Senior Thesis in Plant and Soil Sciences	
PLNT 4571	Professional Preparation in Plant and Soil Sciences	1
SOIL 2124	Fundamentals of Soil Science (N)	4
SOIL 4234	Soil Nutrient Management	4
Select one of the following:		3
MATH 1483	Mathematical Functions and Their Uses (A)	
MATH 1513	College Algebra (A) [4]	
MATH 2103	Business Calculus (A)	
MATH 2144	Calculus I (A)	
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN)	4
or BIOL 1114	Introductory Biology (LN)	
CHEM 1515	Chemistry II (LN) [5]	5
or CHEM 1225	Chemical Principles II (LN)	
Select one of the following:		3
PHYS 1014	Descriptive Physics (N)	
BIOC 2344	Chemistry and Applications of Biomolecules	
CHEM 3013	Survey of Organic Chemistry	
Hours Subtotal		**44**
Major Requirements		
Core Courses		
PLNT 2013	Applied Plant Science	3
PLNT 3012	Crops of Oklahoma	2
PLNT 4013	Principles of Weed Science	3
ANSI 4203	Rangeland and Pasture Utilization	3
or NREM 4603	Rangeland and Pasture Utilization	
PLNT 4443	Cropping Systems	3
SOIL 4213	Precision Agriculture	3
AGEC 3323	Agricultural Product Marketing and Sales	3
AGEC 3713	Agricultural Law	3
ACCT 2103	Financial Accounting	3
or ACCT 2003	Survey of Accounting	
or AGEC 3183	Agribusiness Accounting and Taxation	
Related Courses		
Select 10 hours of the following:		10
AGEC 3213	Quantitative Methods in Agricultural Economics	
AGEC 3333	Agricultural Marketing and Price Analysis	

AGEC 3403	Agricultural Small Business Management	
AGEC 3463	Agricultural Cooperatives	
AGEC 3503	Natural Resource Economics	
AGEC 3603	Agricultural Finance	
AGEC 3703	Issues in Agricultural Policy	
AGEC 4333	Commodity Futures Markets	
AGEC 4403	Advanced Farm and Ranch Management	
AGEC 4423	Advanced Agribusiness Management	
AGEC 4503	Environmental Economics and Resource Development	
AGEC 4513	Farm Appraisal	
AGEC 4703	American Agricultural Policy	
ECON 3033	Economics of Entrepreneurship and Innovation	
PBIO 1404	Plant Biology (LN)	
PLNT 2011	Agronomic Problem Solving	
PLNT 4123	Plant-Environment Interactions	
PLNT 4470	Problems and Special Study	
PLNT 4573	Bioenergy Feedstock Production	
Hours Subtotal		**36**
Electives		
Select 0 hours or hours to complete required total for degree		0
Total Hours		**120**

1

College & Departmental requirements that may be used to meet General Education requirements.

2

If ENGL 3323 Technical Writing is used to satisfy ENGL 1213 Composition II above; hours in this block are reduced by 3.

3

If used as (S) course above, hours in this block reduced by 3.

4

If used as (A) course above, hours in this block reduced by 3.

5

If used as (N) course above, hours in this block reduced by 5.

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Plant and Soil Sciences: Crop Production and Management, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p.)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
STAT 2013	Elementary Statistics (A) [1]	3
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
CHEM 1314	Chemistry I (LN) [1]	4
or CHEM 1215	Chemical Principles I (LN)	
Course designated (N)		3
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1]	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		9
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College Requirements		
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
ENTO 2993	Introduction to Entomology (LN)	3
Departmental Requirements		
Select one of the following:		3
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources	
BCOM 3113	Written Communication	
BCOM 3443	Business Communication for International Students	
ENGL 3323	Technical Writing [2]	
Select one of the following:		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S)	
SPCH 2713	Introduction to Speech Communication (S)	
SPCH 3733	Elements of Persuasion (S) [3]	
PLNT 1213	Introduction to Plant and Soil Systems (N)	3
PLNT 2041	Career Development in Plant and Soil Sciences	1
PLNT 4033	Applied Agricultural Meteorology	3
PLNT 4080	Professional Internship	3
or PLNT 4990	Senior Thesis in Plant and Soil Sciences	
PLNT 4571	Professional Preparation in Plant and Soil Sciences	1
SOIL 2124	Fundamentals of Soil Science (N)	4
SOIL 4234	Soil Nutrient Management	4
Select one of the following:		3
MATH 1483	Mathematical Functions and Their Uses (A)	
MATH 1513	College Algebra (A) [4]	
MATH 2103	Business Calculus (A)	
MATH 2144	Calculus I (A)	
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN)	4
or BIOL 1114	Introductory Biology (LN)	
CHEM 1515	Chemistry II (LN) [5]	5
or CHEM 1225	Chemical Principles II (LN)	
Select one of the following:		3
PHYS 1014	Descriptive Physics (N)	
BIOC 2344	Chemistry and Applications of Biomolecules	
CHEM 3013	Survey of Organic Chemistry	
Hours Subtotal		**44**
Major Requirements		
Core Courses		
PBIO 1404	Plant Biology (LN)	4
Select one of the following:		3
PBIO 4463	Plant Physiology	
PLNT 4123	Plant-Environment Interactions	
HORT 4963	Horticulture Physiology	
PLNT 2013	Applied Plant Science	3
PLNT 3012	Crops of Oklahoma	2
PLNT 4013	Principles of Weed Science	3
PLNT 4353	Plant Breeding	3
ANSI 4203	Rangeland and Pasture Utilization	3
or NREM 4603	Rangeland and Pasture Utilization	
PLNT 4443	Cropping Systems	3
SOIL 4213	Precision Agriculture	3
Related Courses		
Select 9 hours of the following:		9
Upper-division PLNT including PLNT 4470, PLNT 4933, PLNT 4573		

PLNT 2011	Agronomic Problem Solving
PBIO 3263	Plants and People (N)
PBIO 4423	Plant Mineral Nutrition
PLP 3343	Principles of Plant Pathology
PLP 3553	Fungi: Myths and More
ENPP 3663	Turfgrass Integrated Pest Management
ENTO 3003	Livestock Entomology
ENTO 3421	Horticultural Insects
ENTO 3461	Insects in Forest Ecosystems
ENTO 4854	Medical and Veterinary Entomology
or ENPP 5923	Applications of Biotechnology in Pest Management
SOIL 3433	Soil Genesis, Morphology, and Classification
SOIL 4363	Environmental Soil Science
SOIL 4463	Soil and Water Conservation
SOIL 4483	Soil Microbiology
SOIL 4683	Soil, Water, and Weather
SOIL 4893	Environmental Soil Chemistry
SOIL 3033	Soils and Societies (S)
ANSI 1021 & ANSI 1023	Introduction to the Animal Sciences Lab and Introduction to the Animal Sciences
or ANSI 1124	Introduction to the Animal Sciences
ANSI 2123	Livestock Feeding
ANSI 3423	Animal Genetics
ANSI 3543	Principles of Animal Nutrition
ANSI 3653	Applied Animal Nutrition
ANSI 4203	Rangeland and Pasture Utilization
HORT 3113	Greenhouse Management
HORT 4133	Temperature Stress Physiology
HORT 4953	Plant Growth and Development
AST 1413	Introduction to Engineering in Agriculture
AST 2313	Surveying
AST 3011	Ag Structures
or AST 3211	Engines and Power
AST 3222	Metals and Welding
AST 4112	Land Measurement and Site Analysis
AST 4203	Agricultural Water Management
ENVR 4033	Ecology of Invasive Species
AST 4213	Safety and Health in Agriculture
GEOG 2344	Digital Tools for Environmental Problem-Solving (LN)
GEOG 3023	Climatology (N)
GEOG 3033	Meteorology (N)
NREM 3013	Applied Ecology and Conservation
NREM 3012	Applied Ecology Laboratory
NREM 3613	Principles of Rangeland Management
NREM 4033	Ecology Of Invasive Species
BIOL 3023	General Genetics
Hours Subtotal	**36**
Electives	
Select 0 hours or hours to complete required total for degree	0
Total Hours	**120**

1

College & Departmental requirements that may be used to meet General Education requirements.

2

If ENGL 3323 Technical Writing is used to satisfy ENGL 1213 Composition II above; hours in this block are reduced by 3.

3

If used as (S) course above, hours in this block reduced by 3.

4

If used as (A) course above, hours in this block reduced by 3.

5

If used as (N) course above, hours in this block reduced by 5.

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Plant and Soil Sciences: Plant Biotechnology and Improvement, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p.)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
STAT 2013	Elementary Statistics (A) [1]	3
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
CHEM 1314	Chemistry I (LN) [1]	4
Course designated (N)		3
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1]	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		9
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College Requirements		
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
ENTO 2993	Introduction to Entomology (LN)	3
Departmental Requirements		
Select one of the following:		3
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources	
BCOM 3113	Written Communication	
BCOM 3443	Business Communication for International Students	
ENGL 3323	Technical Writing [2]	
Select one of the following:		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S)	
SPCH 2713	Introduction to Speech Communication (S)	
SPCH 3733	Elements of Persuasion (S) [3]	
PLNT 1213	Introduction to Plant and Soil Systems (N)	3
PLNT 2041	Career Development in Plant and Soil Sciences	1
PLNT 4033	Applied Agricultural Meteorology	3
PLNT 4080	Professional Internship	3
or PLNT 4990	Senior Thesis in Plant and Soil Sciences	
PLNT 4571	Professional Preparation in Plant and Soil Sciences	1
SOIL 2124	Fundamentals of Soil Science (N)	4
SOIL 4234	Soil Nutrient Management	4
Select one of the following:		3
MATH 1513	College Algebra (A) [4]	
MATH 2103	Business Calculus (A)	
MATH 2144	Calculus I (A)	
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN)	4
or BIOL 1114	Introductory Biology (LN)	
CHEM 1515	Chemistry II (LN) [5]	5
or CHEM 1225	Chemical Principles II (LN)	
Hours Subtotal		**41**
Major Requirements		
Core Courses		
PBIO 1404	Plant Biology (LN)	4
PBIO 4463	Plant Physiology	3
or PLNT 4123	Plant-Environment Interactions	
or HORT 4963	Horticulture Physiology	
PLNT 2013	Applied Plant Science	3
PLNT 3012	Crops of Oklahoma	2
PLNT 4013	Principles of Weed Science	3
PLNT 4353	Plant Breeding	3
PLNT 4933	Gene Editing and Genetically Modified Crops	3
BIOL 3023	General Genetics	3
or ANSI 3423	Animal Genetics	
CHEM 3053	Organic Chemistry I	3
or CHEM 3013	Survey of Organic Chemistry	
BIOC 3713	Biochemistry I	3
or BIOC 3653	Survey of Biochemistry	
Related Courses		
Select 9 hours of the following:		9
BIOC 2344	Chemistry and Applications of Biomolecules	
BIOC 3723	Biochemistry and Molecular Biology Laboratory	
BIOC 3813	Biochemistry II	

	CHEM 3153	Organic Chemistry II
	HORT 3113	Greenhouse Management
	HORT 4133	Temperature Stress Physiology
	HORT 4953	Plant Growth and Development
	MICR 2123	Introduction to Microbiology
	MICR 2132	Introduction to Microbiology Laboratory
	MICR 3223	Advanced Microbiology
	PBIO 4005	Field Botany
	or PBIO 3114	Plant Taxonomy
	PLNT 2011	Agronomic Problem Solving
	PLP 3343	Principles of Plant Pathology
	SOIL 4483	Soil Microbiology
	ENVR 4033	Ecology of Invasive Species
	NREM 4033	Ecology Of Invasive Species
	PHYS 1014	Descriptive Physics (N)
	Upper-level PLNT	
Hours Subtotal		**39**
Electives		
Select 0 hours or hours to complete required total for degree		0
Total Hours		**120**

1

College & Departmental requirements that may be used to meet General Education requirements.

2

If ENGL 3323 Technical Writing is used to satisfy ENGL 1213 Composition II above; hours in this block are reduced by 3.

3

If used as (S) course above, hours in this block reduced by 3.

4

If used as (A) course above, hours in this block reduced by 3.

5

If used as (N) course above, hours in this block reduced by 5.

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Plant and Soil Sciences: Soil and Water Resources, BSAG

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Minimum Overall Grade Point Average: 2.00
Total Hours: 120

Code	Title	Hours
General Education Requirements		
English Composition		
See Academic Regulation 3.5 (p.)		
ENGL 1113	Composition I	3
or ENGL 1313	Critical Analysis and Writing I	
Select one of the following:		3
ENGL 1213	Composition II	
ENGL 1413	Critical Analysis and Writing II	
ENGL 3323	Technical Writing	
American History & Government		
Select one of the following:		3
HIST 1103	Survey of American History	
HIST 1483	American History to 1865 (H)	
HIST 1493	American History Since 1865 (DH)	
POLS 1113	American Government	3
Analytical & Quantitative Thought (A)		
STAT 2013	Elementary Statistics (A) [1]	3
Humanities (H)		
Courses designated (H)		6
Natural Sciences (N)		
Must include one Laboratory Science (L) course		
CHEM 1314	Chemistry I (LN) [1]	4
Course designated (N)		3
Social & Behavioral Sciences (S)		
AGEC 1113	Introduction to Agricultural Economics (S) [1]	3
Additional General Education		
Courses designated (A), (H), (N), or (S)		9
Hours Subtotal		**40**
Diversity (D) & International Dimension (I)		
May be completed in any part of the degree plan		
Select at least one Diversity (D) course		
Select at least one International Dimension (I) course		
College Requirements		
UNIV 1111	First Year Seminar (or other approved first year seminar course)	1
ENVR 1113	Elements of Environmental Science (N)	3
or NREM 2013	Ecology of Natural Resources	
Departmental Requirements		
Select one of the following:		3
AGCM 3103	Written Communications in Agricultural Sciences and Natural Resources	
BCOM 3113	Written Communication	
BCOM 3443	Business Communication for International Students	
ENGL 3323	Technical Writing [2]	
Select one of the following:		3
AGCM 3203	Oral Communications in Agricultural Sciences & Natural Resources (S)	
SPCH 2713	Introduction to Speech Communication (S)	
SPCH 3733	Elements of Persuasion (S) [3]	
PLNT 1213	Introduction to Plant and Soil Systems (N)	3
PLNT 2041	Career Development in Plant and Soil Sciences	1
PLNT 4033	Applied Agricultural Meteorology	3
PLNT 4080	Professional Internship	3
or PLNT 4990	Senior Thesis in Plant and Soil Sciences	
PLNT 4571	Professional Preparation in Plant and Soil Sciences	1
SOIL 2124	Fundamentals of Soil Science (N)	4
SOIL 4234	Soil Nutrient Management	4
Select one of the following:		3
MATH 1513	College Algebra (A) [4]	
MATH 2103	Business Calculus (A)	
MATH 2144	Calculus I (A)	
BIOL 1113 & BIOL 1111	Introductory Biology (N) and Introductory Biology Laboratory (LN)	4
or BIOL 1114	Introductory Biology (LN)	
CHEM 1515	Chemistry II (LN) [5]	5
or CHEM 1225	Chemical Principles II (LN)	
Select one of the following:		4
CHEM 3013 & CHEM 3012	Survey of Organic Chemistry and Survey of Organic Chemistry Laboratory	
BIOC 2344	Chemistry and Applications of Biomolecules	
PHYS 1014	Descriptive Physics (N)	
PHYS 1114	College Physics I (LN)	
Hours Subtotal		**45**
Major Requirements		
Core Courses		
SOIL 3033	Soils and Societies (S)	3
SOIL 3433	Soil Genesis, Morphology, and Classification	3
SOIL 4363	Environmental Soil Science	3
SOIL 4483	Soil Microbiology	3
SOIL 4683	Soil, Water, and Weather	3
SOIL 4893	Environmental Soil Chemistry	3
GEOL 1114	Physical Geology (LN)	4
GEOL 4463	Physical Hydrogeology	3
or NREM 4443	Watershed Hydrology and Water Quality	
Related Courses		
Select 10 hours of the following:		10
GEOL 1224	Evolution of the Earth (LN)	
GEOL 2254	Practical Mineralogy	
Upper-division GEOL courses		

SOIL 4213	Precision Agriculture	
SOIL 4463	Soil and Water Conservation	
SOIL 4470	Problems and Special Study	
PLNT 2011	Agronomic Problem Solving	
PLNT 4443	Cropping Systems	
PLNT 4470	Problems and Special Study	
Other upper-division PLNT courses		
ENVR 3113	Environmental Sampling and Analysis	
ENVR 4033	Ecology of Invasive Species	
NREM 3012	Applied Ecology Laboratory	
NREM 3013	Applied Ecology and Conservation	
NREM 3613	Principles of Rangeland Management	
NREM 4033	Ecology Of Invasive Species	
NREM 4043	Natural Resource Administration and Policy	
GEOG 2344	Digital Tools for Environmental Problem-Solving (LN)	
GEOG 3023	Climatology (N)	
GEOG 3033	Meteorology (N)	
GEOG 3153	Conservation of Natural Resources (S)	
GEOG 4333	Remote Sensing	
AGEC 3503	Natural Resource Economics	
AGEC 3703	Issues in Agricultural Policy	
AGEC 3713	Agricultural Law	
Upper-division HORT or PLP courses that will count towards chosen minor		
Hours Subtotal		**35**
Electives		
Select 0 hours or hours to complete required total for degree		0
Total Hours		**120**

[1]

College & Departmental requirements that may be used to meet General Education requirements.

[2]

If ENGL 3323 Technical Writing is used to satisfy ENGL 1213 Composition II above; hours in this block are reduced by 3.

[3]

If used as (S) course above, hours in this block reduced by 3.

[4]

If used as (A) course above, hours in this block reduced by 3.

[5]

If used as (N) course above, hours in this block reduced by 5.

Other Requirements

- A minimum of 40 semester credit hours and 100 grade points must be earned in courses numbered 3000 or above.
- A 2.00 GPA or higher in upper-division hours.

Additional State/OSU Requirements

- At least: 60 hours at a four-year institution; 30 hours completed at OSU; 15 of the final 30 or 50% of the upper-division hours in the major field completed at OSU.
- Limit of: one-half of major course requirements as transfer work; one-fourth of hours earned by correspondence; 8 transfer correspondence hours.
- Students will be held responsible for degree requirements in effect at the time of matriculation and any changes that are made, so long as these changes do not result in semester credit hours being added or do not delay graduation.
- Degrees that follow this plan must be completed by the end of Summer 2030.

Soil Science (SOIL), Minor

Requirements for Students Matriculating in or before Academic Year 2024-2025. Learn more about University Academic Regulation 3.1 (p. 976).

Total Hours: 19

Code	Title	Hours
Minor Requirements		
SOIL 2124	Fundamentals of Soil Science (N)	4
Select one of the following:		3
BAE 2013	Computational Methods in Biosystems Engineering	
CIVE 3813	Environmental Engineering Science	
ENVR 1113	Elements of Environmental Science (N)	
HORT 1013	Principles of Horticultural Science (LN)	
NREM 2013	Ecology of Natural Resources	
PLNT 1213	Introduction to Plant and Soil Systems (N)	
Select two of the following:		6
SOIL 3433	Soil Genesis, Morphology, and Classification	
SOIL 4234	Soil Nutrient Management	
SOIL 4483	Soil Microbiology	
SOIL 4683	Soil, Water, and Weather	
SOIL 4893	Environmental Soil Chemistry	
Select two of the following:		6
SOIL 3033	Soils and Societies (S)	
SOIL 4213	Precision Agriculture	
SOIL 4363	Environmental Soil Science	
SOIL 4463	Soil and Water Conservation	
Total Hours		**19**

- A grade-point average of 2.0 for courses that count for the minor.

Additional OSU Requirements

Undergraduate Minors

- An undergraduate minor must include between fifteen and thirty hours, inclusive of undergraduate coursework.
- A minimum of six credit hours for the minor must be earned in residence at OSU.
- The courses required for a minor may be included in the course requirements for any undergraduate degree or they may be in addition to degree requirements, depending on the overlap between the minor and degree requirements. However, an undergraduate minor must be earned in an academic field other than the student's declared degree option. The minor may not duplicate the degree major or option (for example, a student who earns a BA in Art with an Art History option may earn a minor in Studio Art but not Art History).
- A student generally follows the minor requirements associated with his or her matriculation year or newer requirements that have been established since matriculation. The time limit for following requirements from a given academic year is six years.

For additional information on requirements on minors, click here (https://adminfinance.okstate.edu/site-files/documents/policies/requirements-for-undergraduate-and-graduate-minors.pdf).