

# DEPARTMENT OF AGRICULTURE

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**Executive Director**, Dr. Stephen Richter

**Director of Agriculture**, Dr. Andrea Sexten

(859) 622-2228

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## Faculty

B. Jones, C. Hagan, J. Kenealy, K. Luitel, M. McDermott, J. Settimi, and A. Sexton

The Department of Agriculture offers Bachelor of Science and Associate of Applied Science degrees in Agriculture and Animal and Veterinary Sciences. Concentrations in the Agriculture degree program include Agribusiness Management, Fruit, Vegetable, Nursery and Greenhouse Production, Livestock Management, Agriculture Engineering Technology, Turfgrass and Landscape Management, and Agronomy, Soils and Natural Resources. Concentrations in the Animal and Veterinary Sciences degree program include Animal Science and Pre-Veterinary Medicine. The Department also offers a degree program for Career and Technical Education – Agriculture Education Concentration in collaboration with the College of Education and Applied Human Sciences.

A minor is offered in Agriculture. Students may receive the Associate degree and then continue for a Bachelors degree with no loss of credit. Students must obtain a “C” average in Department classes. The Pre-Veterinary Medicine program has an excellent veterinary school acceptance rate. More detailed information can be obtained by reading the section on Pre-Veterinary medicine.

Students have ample opportunities to personalize their education. Academic credit can be earned for Cooperative Education. Students may receive up to eight hours of Co-Op credit for the Associate Degree and 12 for the Bachelor of Science Degree. Students can also obtain credit for experiential learning in the Department’s facilities through practicum courses. In addition, students are encouraged to participate in Independent Studies with faculty mentors.

## Department Goals

The Department of Agriculture’s vision is to be the first choice of students interested in addressing issues relating to food, energy, and the human environment within a sound economic framework.

The mission of the Department of Agriculture is to provide programs designed to develop leaders, entrepreneurs and educators for the global challenges in which agriculture plays a significant role. Areas of study include Pre-Veterinary Medicine, Agriculture Education, Agricultural Business, Food Production, the Human Environment, and Agriculture Engineering Technology.

Programs in the Department stress the latest technical information with applications through required laboratories and practicums at the University farms or through cooperative education. The Department operates greenhouses, fruit and vegetable plots, a plant nursery and specimen garden and turf plots to support the horticultural instruction area. The University also owns and operates approximately 1000 acres

devoted to the programs in agriculture. This includes state of the art facilities for beef, dairy, swine, sheep and crop enterprises.

The Department will also provide service to the University, community, region, profession, and industry; provide opportunities for faculty/staff/student collaboration in scholarly and creative activities; and engage in continuous improvement processes to ensure its programs, services, and infrastructure are current and relevant.

EKU Farms will provide a technologically current, high quality learning environment for instruction. It will demonstrate agricultural practices and techniques that are consistent with the instructional program, are environmentally sound and have practical application. Information will also be disseminated to the regional agricultural community. ECU Farms will also promote and conduct service activities such as field days, tours, seminars, demonstrations, meetings, and open houses to serve the needs of diverse consumer groups.

## Program Objectives

Graduates in the agriculture area are well trained for careers in many diverse aspects of agriculture such as government agencies (Kentucky Department of Agriculture, USDA, Cooperative Extension Service, NRCS), 4-H programs, soil conservation, farm management and operations, agribusiness including agriculture financial agencies/institutions, sales, feed sales, food plant supervision, retail-store management, technical service, agriculture education Career and Technical Education, and the livestock industry, to name a few. Students can also continue their education in graduate school or in veterinary medicine.

## Animal and Veterinary Sciences

In Animal and Veterinary Sciences, students will receive hands on training in animal handling and research that will include opportunities to work directly with both large and small animals. The Pre-Veterinary curriculum will allow students to meet entrance requirements for veterinary schools throughout the United States and abroad. The rigorous coursework will also prepare students to pursue advanced degrees in veterinary science, animal science, human medicine, biomedical science, biotechnology, genetics, nutrition, microbiology, reproduction, behavior, or any of the other basic sciences. The Animal Science curriculum will provide career training allowing graduates to pursue a wide array of opportunities in the public and private sector in areas such as pharmaceutical and feed sales, farm management, biotechnology research and development, communication and marketing consultant, food science, agriculture finance and banking, extension and 4-H agents, government agency employees, and pursuing advanced degrees.

## Horticulture

In the horticulture area, the abundance of hands-on practical experiences allow graduates in the horticulture programs to pursue careers in the regional and local food industry, the turf industry as golf course superintendents, sports turf managers, sales and service areas, professional landscape industry, the nursery industry, and in the greenhouse industry.

## Career and Technical Education - Agriculture Education Concentration

Graduates of the BS degree program in Career and Technical Education - Agriculture Education Concentration are prepared for teaching careers in secondary schools. They are prepared to lead programs in horticulture and agriculture and to advise their chapter’s FFA members in carrying out their annual program of activities.

Numerous opportunities are available for extracurricular activities to complement the academic training. These include the Agriculture Club, Horticulture Club, Delta Tau Alpha (honorary society), student chapter of the Golf Course Superintendents Association of America, and Pre-Vet Club. Numerous local and national trips are taken to expand students' learning experiences.

## The Institute of Agriculture, Natural Resources, and the Environment

The Institute of Agriculture, Natural Resources, and the Environment is comprised of the Department of Agriculture, the Center for Environmental Education, and the Division of Natural Areas. Consistent with Eastern Kentucky University's long and successful history of managing agricultural and natural resources for the greater benefit of the campus and local community, the Institute will enhance opportunities for collaborative growth and program support in developing interdisciplinary programs and administering EKU's farms and natural areas for land stewardship and resource management. The Institute offers associate, baccalaureate, and university certificate programs.

The Institute also supports a broad range of interdisciplinary activities, programs, and opportunities for students, including (1) applied learning through internships in agriculture, natural resource management, and environmental education at EKU farms and natural areas; (2) courses, educational programming, and public engagement at our six field stations totaling over 3,200 acres: Meadowbrook Farm, Lilley Cornett Woods Appalachian Research Station, Maywoods Environmental and Educational Laboratory, Taylor Fork Ecological Area, Cardinal Lane Outdoor Laboratory, and Gladie Cultural and Environmental Learning Center; and (4) job-placement opportunities with state, federal, and non-governmental organizations; and (5) interdisciplinary university certificates that will enrich their degree programs.

## Bachelor's

- Agriculture, Bachelor of Science with a Concentration in Agribusiness Management (B.S.) (<http://catalogs.eku.edu/undergraduate/science-technology-engineering-mathematics/agriculture/agriculture-concentration-agribusiness-management-bs/>)
- Agriculture, Bachelor of Science with a Concentration in Agriculture Engineering Technology (B.S.) (<http://catalogs.eku.edu/undergraduate/science-technology-engineering-mathematics/agriculture/agriculture-concentration-engineering-technology-bs/>)
- Agriculture, Bachelor of Science with a Concentration in Agronomy, Soils and Natural Resources (B.S.) (<http://catalogs.eku.edu/undergraduate/science-technology-engineering-mathematics/agriculture/agriculture-concentration-agronomy-soils-natural-resources-bs/>)
- Agriculture, Bachelor of Science with a Concentration in Fruit, Vegetable, Nursery and Greenhouse Production (B.S.) (<http://catalogs.eku.edu/undergraduate/science-technology-engineering-mathematics/agriculture/agriculture-concentration-fruit-vegetable-nursery-greenhouse-production-bs/>)
- Agriculture, Bachelor of Science with a Concentration in Livestock Management (B.S.) (<http://catalogs.eku.edu/undergraduate/science-technology-engineering-mathematics/agriculture/agriculture-concentration-livestock-management-bs/>)
- Agriculture, Bachelor of Science with a Concentration in Turfgrass and Landscape (B.S.) (<http://catalogs.eku.edu/undergraduate/science-technology-engineering-mathematics/agriculture/agriculture-concentration-turfgrass-landscape-bs/>)

- Animal and Veterinary Sciences, Bachelor of Science with a Concentration in Animal Science (B.S.) (<http://catalogs.eku.edu/undergraduate/science-technology-engineering-mathematics/agriculture/animal-veterinary-sciences-concentration-bs/>)
- Animal and Veterinary Sciences, Bachelor of Science with a Concentration in Pre#Veterinary (B.S.) (<http://catalogs.eku.edu/undergraduate/science-technology-engineering-mathematics/agriculture/animal-veterinary-sciences-concentration-preveterinary-bs/>)

## Associate's

- Technical Agriculture, Associate of Applied Science (A.A.S.) (<http://catalogs.eku.edu/undergraduate/science-technology-engineering-mathematics/agriculture/technical-agriculture-aas/>)

## Minor

- Agriculture, Minor (<http://catalogs.eku.edu/undergraduate/science-technology-engineering-mathematics/agriculture/agriculture-minor/>)

## Certificate

- Animal and Veterinary Sciences, University Certificate (<http://catalogs.eku.edu/undergraduate/science-technology-engineering-mathematics/agriculture/animal-vet-science-certificate/>)
- Crops, Soils and Resource Conservation, University Certificate (<http://catalogs.eku.edu/undergraduate/science-technology-engineering-mathematics/agriculture/crops-soils-resource-conservation-certificate/>)
- Greenhouse and Fruit/Vegetable Production, University Certificate (<http://catalogs.eku.edu/undergraduate/science-technology-engineering-mathematics/agriculture/greenhouse-fruit-vegetable-production-certificate/>)
- Turfgrass and Landscape Horticulture, University Certificate (<http://catalogs.eku.edu/undergraduate/science-technology-engineering-mathematics/agriculture/turfgrass-landscape-horticulture-certificate/>)

## Courses

### Agriculture

#### AGR 105. Introductory Topics in Agriculture. (3 Credits)

I, II. A non-structured course for incoming students who have met the secondary skills standard examination requirements in the area of agriculture. Departmental chair approval required prior to enrollment. May be taken to a maximum of 6 hours.

#### AGR 111. Introduction to American Agriculture. (3 Credits)

A. An overview of the agriculture industry in the United States including significant past events, current status and trends. Complexities of laws and regulations and their influence on the producer and consumer.

#### AGR 115. Operation of Agricultural Equipment. (2 Credits)

(2) I. Lecture, laboratory and field experiences related to agricultural power equipment, and their safe operation, including hydraulics, electricity, chemical, and processing & handling facilities. 1 Lec/2 Lab.

#### AGR 125. Principles of Animal Science. (3 Credits)

I. Corequisite: AGR 126. Management and production of livestock enterprises; types, market classes, and grades of beef cattle, sheep and swine, and the breeds and products of dairy cattle.

**AGR 126. Animal Science Laboratory. (1 Credit)**

I. Corequisite: AGR 125. Applied principles in the proper handling, restraint, and management techniques in beef, dairy, sheep, swine, and horses.

**AGR 130. Plant Science. (3 Credits)**

I. Corequisite: AGR 131. Principles of plant growth, reproduction, and plant-soil relationships. Provides foundations of information for further study in agricultural and horticultural crop production and soil management. Credit will not be awarded to students who have credit for OHO 131.

**AGR 131. Plant Science Laboratory. (1 Credit)**

I. Corequisite: AGR 130. Laboratory and field experiences related to plant growth, development, and management of crops. Credit will not be awarded to students who have credit for OHO 132.

**AGR 170. Appl Unmanned Aerial Sys Agri. (3 Credits)**

I. Introduction to the application of UAS/drones in agriculture. Typical applications and an overview of foundational skills needed to safely operate UAS systems in the U.S. airspace. 2 Lec/2 Lab.

**AGR 213. Principles of Agricultural Mechanics and Energy Systems. (3 Credits)**

I, II. Principles of operation, maintenance, and repair of electrical motors; basic electrical circuits, electrical power generation and electrical controls for agricultural mechanization systems and power requirements for agricultural structures; theoretical and practical experience.

**AGR 215. Principles of Soils. (3 Credits)**

I, II. Corequisite: AGR216. Soil origin, classification and properties, soil conservation, soil microorganisms, organic matter, soil water, soil minerals, lime and commercial fertilizers, soil erosion, soil management.

**AGR 216. Principles of Soils Laboratory. (1 Credit)**

(1) I,II. Corequisite: AGR 215. Laboratory and field experiences related to soils, and their properties, including soil sampling, fertility, pH, liming, water and texture. 2 Lab.

**AGR 225. Evaluation and Selection of Livestock. (3 Credits)**

II. An evaluation of dairy cattle, beef cattle, swine and sheep; use of records, body type ratings, and carcass information as they relate to functional anatomy and efficiency of production; sire selection and pedigree interpretation. 2 Lec/2 Lab.

**AGR 250. Introduction to Horses. (3 Credits)**

A. History and role of horses and the equine industry, breeds of horses and ponies for work and pleasure, includes terminology, management and responsibilities, breeding, pests, current issues and care of horses.

**AGR 255. Companion Animal Management. (3 Credits)**

A. Care and management of dogs, cats, rabbits, birds, reptiles and tropical fish. Companion animal breeds, behavior, nutrition, genetics and reproduction will be emphasized.

**AGR 300. Travel Study in Agriculture Technology. (1-6 Credits)**

A. A travel course for groups and individuals in agriculture and horticulture to study new and emerging technologies in agriculture and horticulture, structural organizations of agricultural enterprises, and professional and interpersonal relationships. May be retaken once.

**AGR 301. Directed Work Experience. (1-4 Credits)**

I, II. Agriculture majors only; minimum sophomore standing or departmental approval. A minimum of three hours per week per hour of credit using university or other approved facilities. May be retaken for a maximum of 4 credit hours.

**AGR 302. Directed Work Experience- Management Practicum. (3 Credits)**

I, II. Student will schedule nine hours of work per week during the semester on a university farm to practice management and production skills related to a livestock herd or machinery operations. Options may be taken to a maximum of 12 hours. AGR 302A Agricultural Mechanization Option. AGR 302B Beef Cattle Option. AGR 302C Swine Option. AGR 302D Dairy Cattle Option. AGR 302E Crops Option. AGR 302F Sheep Option. AGR 304 Pest Management. (4) II. Identification of the principal agriculture and horticulture insect disease and weed pests in Kentucky. Control measures are identified with special emphasis on the safe use of chemicals and equipment calibration.

**AGR 302A. Agricultural Mechanization Option. (3 Credits)****AGR 302B. Beef Cattle Option. (3 Credits)****AGR 302C. Swine Option. (3 Credits)****AGR 302D. Dairy Cattle Option. (3 Credits)****AGR 302E. Crops Option. (3 Credits)****AGR 302F. Sheep Option. (3 Credits)****AGR 304. Pest Management. (4 Credits)**

Identification of the principal agriculture and horticulture insect disease and weed pests in Kentucky. Control measures are identified with special emphasis on the safe use of chemicals and equipment calibration. Credit will not be awarded for both AGR 304 and OHO 304. 3 Lec/2 Lab.

**AGR 305. Professional Skills Seminar. (1 Credit)**

A. Prerequisite: completion of 30 hours in the Associate or more than 60 hours and less than 90 hours in the Bachelor Degree Program. Course prepares students for the job market including; resume development, cover letter preparation, job interview skills and oral presentations.

**AGR 308. Agricultural Economics. (3 Credits)**

I, II. Prerequisite: ECO 120. An introduction to the economic environment of the agribusiness sector. Examines the role of agriculture in the U.S. and world economies. Includes concepts and principles concerning individual agribusiness decision making.

**AGR 310. Principles of Agribusiness Management. (3 Credits)**

II. Prerequisite: AGR 308. Organization and operation of the farm related agricultural business with emphasis on budgeting, enterprise selection, financial statements, and resource management. Includes microcomputer applications and survey of government regulations that are applicable to topic.

**AGR 311. Agriculture Metal Fabrication. (2 Credits)**

A. Principles and techniques of arc and oxyacetylene welding and soldering as it pertains to fabrication and repair of agriculture machinery and equipment. 1 Lec/2 Lab.

**AGR 312. Ecology and Management of Grasslands and Pastures. (4 Credits)**

II. Prerequisites: AGR 130 and 131, and Junior standing. Examination of grasslands and pastures from an ecological perspective with an emphasis on wildlife and livestock management. 3 Lec/2 Lab.

**AGR 318. Soil/Water Conservation Technology. (3 Credits)**

A, I. Principles and procedures for basic surveying and soil-water conservation systems. This will include how rainfall, run-off, erosion, contours, ponds, lagoons, drainage, and irrigation interact with the desired conservation system. 2 Lec/2 Lab.

**AGR 319. Renewable and Sustainable Energy Systems. (3 Credits)**

(3) II. Crosslisted as ENV 319. Prerequisite: ENG 102 or ENG 105 (B) or HON 102; and MAT 105 or higher. Principles of energy and how those needs can potentially be met in the future will be discussed. Comparisons of existing energy sources (fossil fuels, nuclear power) with renewable sources (biomass, solar, and tidal). Credit will not be awarded for both AGR 319 and ENV 319.

**AGR 321. Feeds and Feeding. (4 Credits)**

I. Feeds used in livestock feeding; including harvesting, storage, feeding characteristics, and ration formulation from these feedstuffs. 3 Lec/2 Lab.

**AGR 326. Light Horse Production and Management. (4 Credits)**

A. Prerequisite: AGR 125 and 126, AGR 250, or Departmental Approval. Size and scope of horse industry, conformation and selection of horses, basics of equine nutrition and reproduction. Signs of health and illness. Routine health care procedures. 3 Lec/2 Lab.

**AGR 327. Beef Production. (4 Credits)**

I. Prerequisites: AGR 125 and 126. History, importance, and trends associated with the beef cattle industry; systems of selecting, breeding, feeding, marketing, and management of beef cattle. 3 Lec/2 Lab.

**AGR 328. Swine Production. (4 Credits)**

A. Prerequisites: AGR 125 and 126. History, importance, and trends associated with the swine industry; systems of selecting, breeding, feeding, marketing, and management of swine. 3 Lec/2 Lab.

**AGR 329. Small Ruminant Production. (4 Credits)**

(4). A. Prerequisite: AGR 125 and 126. An overview of the small ruminant industry. Topics include: selection, breeding, reproduction, health, nutrition, management, and marketing of small ruminant and their products. 3 Lec/2 Lab.

**AGR 330. Animal Products. (3 Credits)**

A. Prerequisites: AGR 125 and 126. Principles of grading, cutting, identifying, pricing, and consumer evaluation of poultry, beef, pork, and lamb cuts, and related products. 2 Lec/2 Lab.

**AGR 332. Poultry Production and Management. (3 Credits)**

A. Prerequisites: AGR 125 & 126. An overview of the poultry industry focused on industry trends, breeds, management, environmental impacts, bird welfare, food safety, and product quality. Students will acquire practical experience in poultry production and product evaluation. 2 Lec/2 Lab.

**AGR 340. Conservation of Agricultural Resources. (3 Credits)**

(3) A. Crosslisted as ENV 341. Prerequisite: any ENV or OHO course. Conservation of soils and their fertility, erosion and control, soil conservation methods for individual farms, water supply and distribution, problems of water and air pollution, problems resulting from the population explosion. Credit will not be awarded for both AGR 340 and ENV 341.

**AGR 345. Sustainable Agroecosystems. (3 Credits)**

A, I. Prerequisites: any course in chemistry, AGR 130, and 131; or OHO 131 and 132 or BIO 131. A comprehensive study of new technology related to crop, and pest management practices which could enhance economic returns, environmental quality, and the resource base for the short and long term.

**AGR 349. Applied Learning in Agriculture. (0.5-8 Credits)**

A. Work under faculty and field supervisors in placements related to academic studies. One to eight hours credit per semester or summer. Total hours: eight, associate; sixteen, baccalaureate. A minimum of 80 hours work required for each academic credit.

**AGR 350. Agricultural Marketing. (3 Credits)**

A. A study of concepts, principles and practices of marketing as related to the agribusiness system. Emphasis on agricultural input, production and processing/manufacturing sectors. Includes agriculture futures commodity market theory, mechanics and practical applications.

**AGR 362. Hydraulic Systems. (2 Credits)**

A. A study of basic principles of hydraulic systems and their application to agricultural and turf equipment. Lab experiences will provide familiarity and practice with equipment. 1 Lec/2 Lab.

**AGR 372. Topics and Laboratories in Animal Sciences. (2-6 Credits)**

A. May be taken to a maximum of six hours, provided the topics are different. Lec/Lab hours will vary depending on topic.

**AGR 373. Animal Diseases. (4 Credits)**

I. Prerequisite: six hours of animal science. Lecture topics include common diseases infecting domestic animals focusing on their treatment, prevention, and eradication. Laboratory content will focus on basic lab techniques and diagnostic methods. Prior completion of AGR 376 is recommended. 3 Lec/2 Lab.

**AGR 374. Genetics of Livestock Improvement. (3 Credits)**

II. Prerequisite: AGR 125 and AGR 126. An introduction to Mendelian, molecular, quantitative, and population genetics. Applied genetic principles of improving farm animals including crossbreeding, inbreeding, and other mating plans. Study and practice modern genetic laboratory techniques. 2 Lec/2 Lab.

**AGR 375. Reproduction and Artificial Insemination of Domestic Animals. (4 Credits)**

A. Prerequisite: AGR 125 and AGR 126. The study of anatomical structures and physiological processes that control reproduction across species. This will include reproductive system development, spermatogenesis, female cycles, reproductive behavior, fertility, pregnancy, parturition, and lactation. Practice in artificial insemination and experience with pregnancy diagnosis in domestic animals. 3 Lec/2 Lab.

**AGR 376. Domestic Animal Anatomy. (4 Credits)**

A. Prerequisites: AGR 125 and 126. Fundamental anatomy of bones, muscles and organs of domestic animals, with a focus on comparative anatomy and how form dictates function. Practical experience with a whole-systems approach utilizing anatomical models and specimen dissections. 3 Lec/2 Lab.

**AGR 377. Livestock Behavior and Welfare. (3 Credits)**

A. Prerequisite: AGR 125 and 126. An introduction to animal behavior and its implications for animal welfare in modern animal husbandry. History of the animal welfare movement, current standards and applications in production settings will also be discussed. Students will engage in field trips and/or hands-on experiences to support learning outcomes and learn proper animal handling techniques. 2 Lec/2 Lab.

**AGR 380. Technical Management of Dairy Cattle. (4 Credits)**

I. Prerequisites: AGR 125 and 126. History, economics and nutritional importance and trends associated with the dairy industry including systems of selecting, breeding, feeding, sanitation, housing, marketing and management for financial success emphasizing both the cow and herd management. 3 Lec/2 Lab.

**AGR 381. Agriculture Structures. (3 Credits)**

I. Study the principles of planning, drawing, locating, and constructing farm livestock and materials handling facilities. Also, develop an understanding of closely related structure aspects: such as, environmental control, waste management, ventilation, and structure design. 2 Lec/2 Lab.

**AGR 383. Diesel Power Systems. (3 Credits)**

I. Study of the operation, maintenance, and repair of agricultural diesel powered systems; includes electrical systems, fuels, injection pumps, and nozzles laboratory practice. 2 Lec/2 Lab.

**AGR 404. Advanced Pest Management. (3 Credits)**

(3) II. Prerequisite: AGR 304 or OHO 304. Physical, biological, chemical, cultural, and genetic control of insects, weeds, and diseases. Specific emphasis on the science behind pest controls and use of organic and/or sustainable control methods.

**AGR 409. Agriculture Business Records and Analysis. (3 Credits)**

I. Management and analysis of record systems for decision support involving organization, enterprise selection, and operation of agricultural and horticultural businesses.

**AGR 410. Independent Study in Agriculture: \_\_\_\_\_. (1-3 Credits)**

I, II. Prerequisite: Departmental approval. Cross listed as OHO 410. Students choose a problem and work under the supervision of the instructor in the field of the problem. Student must have the independent study proposal form approved by faculty supervisor and department chair prior to enrollment. May be retaken for a maximum of 6 credit hours, providing additional study projects differ. Credit will not be awarded to students who have credit for OHO 410.

**AGR 411. Senior Seminar. (1 Credit)**

I, II. Prerequisite: senior standing. Preparation of graduates to enter the job market. Students complete oral presentations, resumes, job applications, cover letters, job interviews and register with CD and P. Includes overall assessment of the graduate and department curriculum.

**AGR 416. Soil Fertility and Management. (3 Credits)**

(3) A. Prerequisite: AGR 215. Management of soils in turgrass, vegetable and crop production. Topics include soil fertility and various soil amendments such as lime, organic and inorganic fertilizers, soil fertility programs, problem soils, and soil conservation.

**AGR 421. Animal Nutrient Metabolism. (3 Credits)**

II. Prerequisite: AGR 321 or instructor approval. Principles of nutrient utilization and feeding; structure, organization, synthesis, and catabolism of carbohydrates, proteins, and lipids; symptoms of nutrient deficiencies, nutritional disorders, and mechanisms of metabolic control.

**AGR 430. Field Crop Production. (3 Credits)**

(3). A. Prerequisite: AGR 130 and 131 or OHO 131 and 132. Advanced study of crop production theories and practices for agronomic crops. Topics include ecological, physiological and economic aspects of production of currently relevant crops.

**AGR 440. Agricultural Financing. (3 Credits)**

II. Uses and types of agricultural credit, credit institutions, and relating credit needs to farm enterprises.

**AGR 499. Agricultural Advocacy and Issues Capstone. (3 Credits)**

(3). A. Prerequisite: Junior or Senior standing. Development of critical thinking skills, debates of current issues facing agriculture, and training to become agriculture advocates.

**AGR 501. Independent Study in Agriculture:\_\_\_\_\_. (3 Credits)**

A. A course for exceptional seniors involving independent study and research related to problems of a theoretical and/or practical nature. May be retaken to a maximum of six hours. Student must have the independent study proposal form approved by faculty supervisor and department chair prior to enrollment.

**AGR 509. Agriculture Research Methods and Interpretation. (3 Credits)**

I. Prerequisite: Junior or Senior standing. Explores the scientific underpinnings of modern agriculture and adaptive management, including: the scientific method, observation, experimentation, and data interpretation with an examination of fallacies that masquerade as science.

**AGR 520. Global Food Systems. (3 Credits)**

A. Prerequisite: AGR 308. A wide-ranging examination of various domestic and international food systems. The supply chain will be analyzed from field to farm gate through marketing and transportation to the consumer. Emphasis on the economics of the food supply chain.

**AGR 570. Advanced Technical Agriculture:\_\_\_\_\_. (3 Credits)**

A. Advanced study of agriculture with emphasis on updating, understanding, and developing competency in recent technology. May be retaken to a maximum of nine hours provided the topic varies.

**AGR 577. Workshop in the Conservation on Natural Resources. (3 Credits)**

A. For teachers returning for graduate work. Instruction is given in the areas of soil, water, fish and wildlife, forest conservation, and methods of teaching related units at the elementary and junior high level.

**Ornamental Horticulture****OHO 115. Operation of Horticultural Equipment. (2 Credits)**

(2) I. Lecture, laboratory and field experiences related to horticultural power equipment, and their safe operation, including hydraulics, electricity chemical and maintenance facilities. 1 Lec/2 Lab.

**OHO 131. Plant Science. (3 Credits)**

A. Corequisite: OHO 132. Principles of plant growth, reproduction and plant-soil relationships. Provides foundations of information for further study in agricultural and horticultural crop production and soil management. Credit will not be awarded to students who have credit for AGR 130.

**OHO 132. Plant Science Laboratory. (1 Credit)**

I. Corequisite: OHO 131. Laboratory and field experiences related to plant growth, development, and management of crops. Credit will not be awarded to students who have credit for AGR 131.

**OHO 301. Directed Work Experience. (1-4 Credits)**

I, II. A minimum of three hours per week per hour of credit using university or other approved facilities. May be retaken for a maximum of 4 credit hours.

**OHO 304. Horticulture Pest Management. (4 Credits)**

(4). II. Identification of the principle horticulture insect, disease, and weed pests in the transition zone. Control measures are identified with special emphasis on the safe use of chemicals and equipment calibration. Credit will not be awarded for both OHO 304 and AGR 304. 3 Lec/2 Lab.

**OHO 349. Applied Learning in Horticulture. (1-8 Credits)**

A. Work under faculty and field supervisors in placements related to academic studies. One to eight hours credit per semester or summer. Total hours: eight, associate; sixteen, baccalaureate. A minimum of 80 hours work required for each academic credit.

**OHO 351. Turf Grass Management. (4 Credits)**

I. Prerequisite: AGR 215. The establishment and maintenance of greenspaces utilizing turfgrass species and cultivars adapted to variable intensities of culture. Relationships of environmental factors and cultural practices are emphasized. 3 Lec/2 Lab.

**OHO 353. Sports Turf Management. (3 Credits)**

(3) A. Management techniques for today's specialized athletic fields. The agronomic aspects of football, soccer, baseball, and some specialty fields are presented. Field trips and classroom exercises develop a practical understanding of field construction and management.

**OHO 354. Irrigation Systems and Horticultural Equipment. (3 Credits)**

I. An introduction to irrigation systems, their design and installation for efficient water utilization. Lecture and field experiences related to horticultural power equipment and their safe operation. 2 Lec/ 2 Lab.

**OHO 362. Topics in Landscape Gardening. (1 Credit)**

A. Students may enroll once in each topic for a total of seven hours. OHO 362A Home Landscape Option. OHO 362D Disease and Insect Control Option. OHO 362E Floral Design Option. (2 credit hours: 1 Lec/2 Lab) OHO 362F Lawn Establishment and Maintenance Option. OHO 362G Problems of Golf Course Operation Option. OHO 362K Interior Landscaping Option.

**OHO 362E. Floral Design Option. (2 Credits)**

A. An Option in Landscape Gardening.

**OHO 362G. Problems of Golf Course Operation Option. (1 Credit)****OHO 364. Advanced Floral Design. (2 Credits)**

A. The study and practice of advanced floral design techniques; includes construction of conventional and contemporary floral designs. 1 Lec/2 Lab.

**OHO 365. Plant Identification. (3 Credits)**

I. Study of plants used in horticulture (including landscape and specialty crops) including their biological identification, ornamental features, environmental adaptation, utilization, and management. 2Lec/2Lab.

**OHO 366. Plant Identification. (2 Credits)**

A. Study of plants used in landscaping and nursery production including their biological identification, ornamental features, environmental adaptation, utilization, and management 1 Lec/2 Lab.

**OHO 368. Landscape Design Using CAD. (2 Credits)**

(2) I. Introduces computer aided design (CAD) for landscape design. The course also provides experience in the use of commercially available programs for landscape design, project management, pricing, and bid preparation. 4 Lab.

**OHO 370. Landscape Operations Management. (3 Credits)**

II. Management of labor, estimating and bidding along with basic maintenance of trees, shrubs, and herbaceous plants in the landscape operation. 2 Lec/2 Lab.

**OHO 372. Horticulture Retail and Wholesale Management. (2 Credits)**

A. The design, development, and management of a retail/wholesale outlet for horticultural products. Students will develop a model retail/wholesale business including all phases of applied sciences such as business record keeping. 1 Lec/2 Lab.

**OHO 373. Fruit Production. (3 Credits)**

(3) a. Study of domestic and commercial production practices of fruits including identification, agricultural and environmental characteristics, horticulture, and marketing. Fruits include tree fruits, vines, brambles, and soft fruits. 2 Lec/2 Lab.

**OHO 374. Vegetable Production. (3 Credits)**

(3) A. Study of domestic and commercial production of vegetables including identification, agricultural and environmental characteristics, horticulture, and marketing. 2 Lec/2 Lab.

**OHO 375. Post Harvest Technology of Horticultural Crops. (3 Credits)**

(3) A. The science and procedures for handling, packaging, storing and transporting fresh fruits, vegetables and ornamentals.

**OHO 388. Greenhouse Operation and Management. (3 Credits)**

II. Plant propagation and growing techniques in a greenhouse. The student learns operation procedures and the economics of operating a greenhouse and using cold and hot frames. 2 Lec/2 Lab.

**OHO 391. Landscape Design and Methods. (3 Credits)**

A. Prerequisite: OHO 365. Elements of design and the execution of the landscape architect plan, introduction to CAD and project management. 1 Lec/4 Lab.

**OHO 392. Landscape Construction Techniques. (3 Credits)**

II. Comprehensive study of common landscape construction materials and their use in current landscape applications. Class will include laboratory exercises involving the construction of such components as retaining walls, water features, decks, and patios.

**OHO 410. Independent Study in Horticulture: \_\_\_. (1-3 Credits)**

I, II. Prerequisite: Departmental approval. Cross listed as AGR 410. Students choose a problem and work under the supervision of the instructor in the field of the problem. Student must have the independent study proposal form approved by faculty supervisor and department chair prior to enrollment. May be retaken for a maximum of 6 credit hours provided topics are different. Credit will not be awarded to students who have credit for AGR 410.

**OHO 498. Turf Grass Capstone. (3 Credits)**

(3) A. Prerequisites: OHO351 or 353, and Junior or Senior standing. A comprehensive review of information pertinent to managing turfgrass areas that will enhance graduate's ability to stay within budget, stay on task with seasonal work, and prepare for industry offered certification exams.

**OHO 499. Horticultural Issues Capstone. (3 Credits)**

(3) A. Prerequisite: OHO 349 and Junior or Senior standing. This course provides students with an in-depth examination of the issues facing contemporary horticultural managers including management principles, ethical considerations, and delivery of a quality product or service.