of five examinations per curriculum area is required. Prerequisites: All applicable curriculum subjects must have been completed. *Fall, Spring*

AVMT237 **Alt (4)**
Aircraft Hydraulic, Pneumatic, and Landing Gear Systems
Operation and maintenance of aircraft hydraulic systems, pneumatic systems, landing-gear systems, and the inspection, checking, servicing, trouble-shooting, and repair of these systems and system components. *Spring*

AVMT304 **Alt (4)**
Aircraft Metal Structures
A study and application of the processes used in the fabrication and repair of aircraft metal structures. Welding theory and practice with emphasis on weld-quality identification. Riveted, aircraft, aluminum, sheet-metal structures including the fabrication and repair of such structures. *Fall*

AVMT306 **Alt (2)**
Aircraft Non-metal Structures
A study of wood and fabric as used in the construction of aircraft and a study of the methods, tooling, inspection, processes, and repair of composite aircraft structures. Includes the application, identification, and functions of aircraft protective finishes. *Spring*

AVMT308 **Alt (2)**
Aircraft Assembly, Rigging and Inspections
Study of the nomenclature and design features of both fixed-wing and rotor-wing aircraft and the assembly, alignment of aircraft structures, and rigging and balancing of control system. A detailed inspection of the entire aircraft or rotorcraft is covered as it applies to the airframe 100-hour and other required inspection. *Spring*

AVMT310 **Alt (4)**
Gas Turbine Engines
Principles and theory of jet-engine propulsion, design, types of, and associated systems. Maintenance, overhaul, installation-removal, repair, trimming, and troubleshooting of turbine engines. *Fall*

AVMT314 **Alt (3)**
Aircraft Propellers and Engine Inspections
Theory and limited work on propellers, both wood and metal. Encompasses fixed, adjustable, controllable, feathering, reversible, and the control of the latter by mechanical, hydromatic, or electrical control systems. Including the concept of the unducted fan, and the inspection practice of performing the 100-hour inspection on aircraft engines and propellers. *Spring*

AVMT316 **Alt (7)**
Reciprocating Engine Systems and Overhaul
A study of reciprocating engine theory, overhaul methods, and practices and the installation of reciprocating engines. Also includes a study of the following engine systems: exhaust, cooling, induction, and lubrication. *Spring*

AGRICULTURE

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(616) 471-6006
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Faculty
Thomas N. Chittick, *Chair*
Stanley Beikmann
Dale Birney
Katherine Koudele-Joslin
Ralph C. Wood

Academic Programs	Credits
BS: Agriculture	40
BS: Animal Science	40
Pre-Veterinary Medicine	
Management	
BS: Horticulture	40
Landscape Design	
Landscape/Turf Management	
BT: Agriculture	60
BT: Horticulture	60
Landscape Design	
Landscape/Turf Management	
AT: Agriculture	36
AT: Horticulture	35
Landscape Design	
Landscape/Turf Management	
Minors in Agriculture, Animal Science or Horticulture	20
Pre-Professional Program in Veterinary Medicine	

Programs

Bachelor of Science. The BS degree prepares individuals to pursue advanced degrees for careers in teaching or research. Students may major in agriculture, animal science or horticulture with a minor to complement their intended purpose.

Bachelor of Technology. The BT degree is a career specialist's degree. Graduates are prepared for supervisory and management positions in production agriculture, horticulture, or the ornamental horticulture industry.

Associate of Technology. The two-year AT degree programs provide students with adequate skills and working knowledge to apply for entry-level positions in their area of specialization.

BS: Agriculture

Major requirements—40
AGRI100, 118, 206, 300, 304, 308, 405; ANSI114; HORT105, plus 13 major elective credits chosen in consultation with advisor.
Cognate requirements—18
BIOL165,166; CHEM131, 132

BS: Animal Science

Major requirements—40
AGRI100, 405; ANSI14, 305, 425, plus 24-25 credits in a special area of emphasis and 4-5 major electives chosen in consultation with an advisor.
Cognate requirements—18
BIOL165, 166; CHEM131, 132

Animal Science Areas of Emphasis

Students may choose an area of emphasis from the following or develop a personalized program in consultation with their advisor to meet specific career goals.

Pre-Veterinary Medicine—24
AGRI137 (2); ANSI340 (3 species), 379, 420, 440, 445. Recommended electives for entry into veterinary college: *BCHM421, 422; CHEM231, 232; MATH165; PHYS141, 142. *Courses may vary depending on entrance requirements of the veterinary college of choice.

Management—25
AGRI137 (2), 395; ANSI340 (4 species); ACCT111; ECON226. Electives can be tailored to meet a specific student's interest, such as animal behavior, business management or marketing, journalism, or communication.

BS: Horticulture

Major requirements—40
AGRI100, 118, 240, 308, 405; HORT105, 378, plus 18 credits in a special area of emphasis.
Cognate requirements—18
Select 8-10 credits from BIOL165, 166; BOT430, 475; ZOOL459; CHEM131, 132.

Horticulture Program Emphases in BS Degree Programs

Students may choose an area of emphasis from the following or develop a personalized program in consultation with their advisor to meet specific career goals.

Landscape Design—18
Select from the following: HORT135, 226, 228, 239, 350, 355, 365, 429, 448

Landscape/Turf Management—18
Select from the following: HORT135, 208, 211, 212, 217, 226, 228, 239, 346, 350, 359, 360, 367, 417

BT: Agriculture

Major requirements—60
AGRI100, 118, 206, 240, 300, 304, 308, 405; HORT105, 378; ANSI114, plus 26 major elective credits chosen in consultation with advisor.
Cognate requirements—4
CHEM110

BT: Horticulture

Major requirements—60
AGRI100, 118, 240, 308, 405; HORT105, 135, 226, 228, 239, 346, 378, plus 16-17 credits in a special area of emphasis, and 7-8 credits major elective credits chosen in consultation with advisor.
Cognate requirements—4
CHEM110

Horticulture Areas of Emphasis in BT Degree Programs

Students may choose an area of emphasis from the following or develop a personalized program in consultation with their advisor to meet specific career goals.

Landscape Design—16
HORT350, 355, 365, 429, 448. The landscape design program emphasizes the development of technical drawing skills, an understanding of the principles of design, and a knowledge of plant material.

Landscape/Turf Management—17
HORT208, 211, 217. Select 9 credits from the following: HORT212, 346, 350, 359, 360, 367, 417. The landscape management emphasis features proper horticultural practice, identification of landscape plants, selection of appropriate equipment, and the concept of total maintenance.

AT: Agriculture

Major Requirements—36
AGRI100, 118, 206, 240, 300; HORT105; ANSI114, plus 13 major elective credits chosen in consultation with advisor.
Cognate requirements—4
CHEM110

AT: Horticulture

Major requirements—35
AGRI100, 118, 405; HORT105, plus 13-16 credits in a special area of emphasis (see below) and 7-10 major elective credits chosen in consultation with advisor.
Cognate requirements—4
CHEM110

Horticulture Program Emphases in Associate Degree Programs

Students may choose an area of emphasis from the following or develop a personalized program in consultation with their advisor to meet specific career goals.

Landscape Design—13
HORT135, 226, 228, 350

Landscape/Turf Management—16
HORT208, 211, 217, 226, 228, 239

Minors in Agriculture, Animal Science or Horticulture—20

Selected from AGRI, ANSI or HORT courses in consultation with advisor.

Pre-Professional Program in Veterinary Medicine

Katherine Koudele-Joslin, *Director*
(616) 471-6299

Entrance requirements vary among the colleges of veterinary medicine. Therefore, interested students must write to the schools

of choice for the most current and detailed information. A list of accredited colleges of veterinary medicine may be obtained from the American Veterinary Medical Association, 930 North Meacham Road, Schaumburg, IL 60196; http://www.avma.org.

Students in consultation with their advisors in the Agriculture Department can design individualized programs of study to meet the entrance requirements of the veterinary school of choice. The required prerequisite pre-veterinary courses are usually general biology, general and organic chemistry, physics, biochemistry, mathematics, courses in animal science, and general education.

Courses

(Credits)

See inside front cover for symbol code.

AGRICULTURE

AGRI100 **(1)**
College Success Seminar
A survey of the history of agriculture in the U.S. and career opportunities in production agriculture, animal science, landscaping and related areas. Students also learn how to improve their study skills and become familiar with the academic resources available to them on campus. *Fall*

AGRI118 **$ (5)**
Soil Science
Factors affecting soil formation, soil texture, particle size, pore space and their impact on soil air/water relations, and chemical characteristics of soils, including pH, ion exchange, and maintenance of soil fertility. Weekly: 4 lectures and a 3-hour lab. *Spring*

AGRI137 **(1-3)**
Practicum in_____
Fifty hours per credit of supervised practical experience in one area of concentration. May be repeated in different areas for a maximum of 6 credits. Topics to be chosen in consultation with an advisor. *Fall, Spring*

AGRI206 **$ Alt (3)**
Farm Machinery
Selection and operation of farm equipment, based on the initial cost and economic performance, including factors governing the site and type of farm machines, their capacity, efficient use, adjustment and repair. Weekly: 2 lectures and a 3-hour lab. *Fall*

AGRI240 **Alt (3)**
Fundamentals of Irrigation
Design, installation, drawing, interpretation and maintenance of plastic or metal irrigation systems and control devices for proper sprinkler coverage. *Fall*

AGRI300 **Alt (3)**
Field Crop Production
Importance, distribution, economic adaptation, and botany of leading farm crops, emphasizing rotation, seedbed preparation, and economic production. *Spring*

AGRI304 **Alt (3)**
Forage Crop Production
Basic principles of forage crop production, emphasizing choice of crop, establishment, growth, maintenance, harvesting, storage, feeding, and other management decision. *Spring*

AGRI308 **$ Alt (3)**
Principles of Weed Control
Control of weeds in horticultural and field crops, utilizing biological, cultural, mechanical, and chemical practices. Class study also involves preparation and testing for pesticide applicator's license. Weekly: 2 lectures and a 3-hour lab. *Fall*

AGRI345 **(1-4)**
Topics in _____
A class based on selected topics of current interest in agriculture. Repeatable in different areas.
Management of Agriculture Enterprises
Concepts of International Agriculture
Lactation Physiology
International Ag Implementation
Horse Judging
Livestock Judging
Viticulture
Solanaceous and Vine Crops
Tree Fruit Production
Landscape Estimating

AGRI395 **(1-4)**
Internship in _____
Supervised internship of on-the-job work experience in some field of agriculture under the direction of the employer and evaluated by a departmental faculty member. Students submit report of their experience and must complete a minimum of 120 hours of work experience for each credit earned.

AGRI405 **(1)**
Research Seminar
Research work in agriculture; reports given by students, staff, and visiting lecturers.

AGRI499 **(1-5)**
Project in _____
Individual research in some field of agriculture under the direction of the staff. Repeatable to 10 credits.

ANIMAL SCIENCE

ANSI114 **(3)**
Introduction to Animal Science
Basic farm animal anatomy, reproductive and digestive physiology, housing, health management with information on how animal products are processed and marketed. Efficient, effective management is emphasized throughout course. *Fall*

ANSI305 **$ Alt (3)**
Animal Nutrition
Principles of digestion, absorption, metabolism of feeds by farm species are examined for practical, profitable feeding. Common and non-traditional feedstuffs, feed-related diseases and ration formulation are included. Weekly: 2 lectures and a 3-hour lab. Recommended: CHEM110 or 131. *Fall*

ANSI340 **(3)**
Production/Management of _____
Production methods and management practices of domesticated livestock species including nutrition, reproduction, housing, health and specialized care of a particular species. Course is repeatable for study of avian, beef cattle, dairy cattle (includes a lab), equine (includes a lab), porcine, and wool and lamb production. *Fall, Spring*

ANSI379 **Alt (2)**
Small Animal Health and Disease
A survey of proper handling and care, nutritional needs, and common health problems of companion animals such as dogs, cats, and birds. *Fall*

ANSI420 **$ Alt (4)**
Canine Gross Anatomy
Study of macroscopic skeleton, muscles, internal organs, blood vessels and nerves using preserved, latex-injected specimens. Comparisons made with the live dog through palpation. Weekly: 2 lectures and 2 three-hour labs. Prerequisite: BIOL166. *Fall*

ANSI425 **Alt (3)**
Issues in Animal Agriculture, Research and Medicine
Study of the ethical issues that challenge animal researchers, producers, caretakers, and veterinarians to treat animals humanely yet effectively in society today. *Spring*

ANSI440 **$ Alt (3)**
Animal Reproduction
Study of anatomy and physiology of farm animal reproduction including lactation, which explores the cellular component as well as the management aspects. Weekly: 2 lectures and a 3-hour lab. Prerequisite: BIOL166. *Spring*

ANSI445 **Alt (3)**
Physiology of Farm Animals
Physiology of digestive, reproductive, lactation, cardiovascular, pulmonary, excretory, nervous, and skeletomuscular systems in domesticated ruminants and monogastrics. Prerequisite: BIOL166. *Fall*

HORTICULTURE

HORT105 **$ (5)**
Plant Science
Intended to acquaint students with the requirements of plant growth and development. Understanding of these processes is gained by studying topics such as plant cells, tissue, and organ structure; photosynthesis, cellular respiration, plant reproduction, including flowering, fruit development, seed set, the role of hormones, and plant nutrition. Weekly: 4 lectures and a 3-hour lab. *Fall*

HORT135 **$ (4)**
Landscape Drafting and Design
Develops proficiency in technical drafting for landscape design including symbols, title blocks, plant legends and plan organization. Principles of design, site analysis, functional diagraming, circulation, spatial planes, design schematics and plant selection are explored. Laboratory puts the design process to work in drawing plans for residential design. Weekly: 3 lectures and a 3-hour lab. *Fall*

HORT208 **$ Alt (3)**
Propagation of Horticultural Plants
Intended to acquaint students with the processes of asexual reproduction, especially as it applies to the horticultural industry. Asexual reproduction investigates methods of clonal reproduction utilizing non-flowering plant parts such as cutting, grafting, layering, and micropropagation (tissue culture). Weekly: 2 lectures and a 3-hour lab. Recommended: HORT105. *Spring*

HORT211 **$ Alt (2)**
Landscape Equipment
Assessment of and exposure to current equipment needed to run a landscape installation and maintenance business. Experience in physical operation of equipment, preventative maintenance and minor repair is practiced. Weekly: 4 hours of lecture/lab. *Fall*

HORT212 **$ Alt (3)**
Floriculture Production
Intended to acquaint students with the production and uses of bedding and potted plants. Topics covered include seed physiology and propagation, germination, production and post-production growing techniques, growing media and containers. Weekly: 2 lectures and a 3-hour lab. *Spring*

HORT217 **Alt (3)**
Turfgrass Management
Principles of turfgrass management for parks, grounds, golf courses, and athletic fields. Topics include cool and warm season genera, growth and adaptation criteria, cultural considerations including irrigation, mowing, soil fertility, compaction and drainage; thatch, plant protection (weeds, insects, diseases) establishment and renovation. *Spring*

HORT226 **Alt (3)**
Woody Plant Identification
Introduction to the identification and recognition of shape, size, color, texture, environmental requirements and landscape value of common deciduous and evergreen trees, shrubs and vines. *Fall*

HORT228 **Alt (3)**
Herbaceous Plant ID
Identification and recognition of shape, size, color, texture, and environmental requirements of the nonwoody plants providing color and ground cover in the landscape. *Fall*

HORT239 **$ Alt (2)**
Landscape Construction
Hands-on construction experience in supervising and installing softscapes and hardscapes. Weekly: 2 three-hour labs with structured theory and practice combined. *Fall*

HORT346 **$ Alt (2)**
Landscape Administration and Maintenance
Administration of a landscape business, employment and supervision of employees and record-keeping practices explored. Managing maintenance of hardscapes and softscapes in residential landscapes, parks, golf courses and corporate environments. Focuses on training in pruning, planting, cultivation and pest management. Weekly: 4 hours of lecture/lab. *Spring*

HORT350 **Alt (3)**
History of Landscape Design
A study of landscape history throughout civilization and its impact upon society and the environment. The origin of landscape architectural styles and their characteristics will be explored. An introspective look at personalities of landscape designers through the ages and their influence upon the American landscape. *Spring*

HORT355 **$ Alt (3)**
Landscape Site Design
Concentrates on landscape accessories and hardscapes (curbing, sidewalks, driveways, terraces, pools, walls, fences). Lab includes practice in creating specification plans for hardscapes. Weekly: 2 lectures and a 3-hour lab. Recommended: HORT135. *Spring*

HORT359 **$ Alt (3)**
Greenhouse Environment and Construction
Controlling the plant environment to enhance plant growth and

optimal development through temperature, humidity, light, nutrients, sanitation and carbon dioxide levels. Structures, coverings and mechanical systems used are explored to produce the most cost-effective horticultural crops. Weekly: 2 hours lecture and a 3-hour lab. *Fall*

HORT360 **$ Alt (3)**
Arboriculture
Care of shade and ornamental trees living under environmental stress of urbanization, their legal protection and value. Includes tree anatomy and physiology, soils nutrition and water relations, transplanting, diseases and insect control, mechanical injury and pruning to develop a healthy tree. Weekly: 2 lectures and a 3-hour lab. *Fall*

HORT365 **$ Alt (3)**
Urban Landscape Design
Designing landscapes to meet the environmental challenges and conditions of urban settings. Circulation patterns for conducting business, aesthetic and functional aspects of design for corporate/institutional, governmental agencies and municipal areas. Weekly: 2 lectures and a 3-hour lab. Recommended: HORT135. *Spring*

HORT367 **Alt (3)**
Golf Course Supervision
Management and culture for modern golf courses and country clubs. Topics include integration of turfgrass agronomics with the administrative components of budgeting, supervision and personnel management, country club organizational structures, and design of construction and environmental issues. Golf course history, U.S. golf association rules and U.S. Golf Course Superintendents' Association certification program will be covered. *Spring*

HORT378 **Alt (4)**
Integrated Pest/Disease Management
Study of significant diseases and pests of agricultural and horticultural plant materials, including life cycles and influence of environmental conditions; determination of effective control methods for crop, ornamental and turfgrass production. *Spring*

HORT417 **Alt (3)**
Advanced Turfgrass Management
Principles of advanced turfgrass management based on turf genera, cultivar, vegetative seed identification and optimal use criteria; detailed analysis of soil fertility management and research results; development of comprehensive management plan incorporating principles of integrated pest management into a cultural program to optimize the performance based on use systems. Use systems studied include golf courses, parks, lawns, athletic fields, bowling greens, cricket fields, and grass tennis courts. *Spring*

HORT429 **$ (3)**
Computer Landscape Design
Principles and practices of computer-aided landscape design, including creating scale perimeter plot plans, using drawing tools, plant/site relationships, plant selection and use leading to a computer-generated landscape drawing. Laboratory emphasizes skill development and proficiency in integrating software and hardware to create CAD-generated landscape designs. Prior landscape drawing course work is recommended. *Spring*

HORT448 **$ Alt (4)**
Advanced Landscape Design and Graphics
Landscape design concepts relating to the more challenging problems of residential design. Field application of grading relating to contours, specifications, exploring deck design, planting combinations, and exercises in graphics and rendering for presentations. Weekly: 3 lectures and a 3-hour lab. Recommended: HORT135. *Spring*