# AGRICULTURE

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**Faculty**
Thomas N. Chittick, *Chair*
Stanley Beikmann
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| Academic Programs | Credits |
|---|---|
| BS: Agriculture | 40 |
| BS: Animal Science | 40 |
| Emphasis Areas | |
| Pre-Veterinary Medicine | |
| Management | |
| Equine Science | |
| BS: Horticulture | 40 |
| Emphasis Areas | |
| Landscape Design | |
| Landscape Management | |
| BT: Agribusiness | 60 |
| Emphasis Areas | |
| Crop Production | |
| Animal Science | |
| BT: Horticulture | 60 |
| Emphasis Areas | |
| Horticulture Crop Production | |
| Landscape Design | |
| Landscape Management | |
| AT: Agriculture | 36 |
| Emphasis Areas | |
| Crop Production | |
| Dairy Herd Management | |
| AT: Horticulture | 35 |
| Emphasis Areas | |
| Landscape Design | |
| Landscape 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**
AGRI118, 206, 300, 304, 308, 405; ANSI114; HORT105, plus 15 major elective credits chosen in consultation with advisor.
**Cognate requirements—18**
BIOL165,166; CHEM131, 132

## BS: Animal Science

**Major requirements—40**
AGRI405; ANSI114, 305, 425, plus 19–21 credits in a special area of emphasis and 6–10 major electives chosen in consultation with an advisor.
**Cognate requirements—18**
BIOL165, 166; CHEM131, 132

**Animal Science Emphases in BS Program**
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—21**
AGRI137(2); ANSI340 (1 species), ANSI379, 420, 435, 440 and 445
Recommended electives for entry into veterinary college:
* BCHM421; CHEM231, 232; MATH166 & 167 or 168; PHYS141, 142.
* Courses may vary depending on entrance requirements of the veterinary college of choice.

**Management—19**
AGRI137 (2), 395; ANSI340 (2 species); ACCT121; AGRI270. Major electives can be tailored to meet a specific student's interest.

**Equine Science—21**
ANSI340 (Equine Management), 440, 445, 450, 455, 460; AGRI137 (1–2), 395 (1–2)

## BS: Horticulture

**Major requirements—40**
AGRI118, 240, 308, 405; HORT105, 378, plus 18 credits in a special area of emphasis and 2 credits major elective.
**Cognate requirements—18**
Select credits from BIOL165, 166; BIOL208, 475; ZOOL459; CHEM131, 132; FDNT230/240.

**Horticulture Emphases in BS Program**
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, 315, 350, 365, 375, 429, 448

**Landscape Management—18**
Select from the following: HORT135, 208, 211, 226, 228, 315, 350, 360, AGRI308, 240

**General Education Requirements for Agriculture BT**
See professional program requirements, p. 43, and note the following **specific** requirements:

**Religion:** professional degree requirements
**Language/Communication:** professional degree requirements
**History:** professional degree requirements
**Fine Arts/Humanities:** professional degree requirements
**Life/Physical Sciences:** professional degree requirements
**Mathematics:** professional degree requirements
**Computer Literacy:** INFS120
**Service:** BHSC100. 40 hours of service or alternative field service for majors in: HORT365, ANSI425
**Social Sciences:** professional degree requirements
**Fitness Education:** professional degree requirements

## BT: Agribusiness

**Major requirements—60**
AGRI118, 270, 395, 405, ANSI114, HORT105 plus 7–10 major elective credits chosen in consultation with advisor
**Cognate requirement—22**
CHEM100 or 110, ACCT121, 122, BSAD341, 355, ECON226, FNCE317

**Agribusiness Emphases in BT Degree Program**
Students may choose an area of emphasis from the following or develop a personalized program in consultation with their advisor to meet specific goals.

**Crop Production—34**
AGRI206, 240, 308, HORT378, 208
Plus 18 credits chosen from the following: AGRI300, 304, 345, 390, HORT211, 226, 228, 360, 369

**Animal Science—31**
ANSI305, 340 (2 species), ANSI425, plus 19 major elective credits chosen in consultation with advisor.

## BT: Horticulture

**Major requirements—60**
AGRI118, 240, 308, 395, 405, HORT105, 150, 378, plus 4–10 major elective credits chosen in consultation with advisor.
**Cognate requirement—4**
CHEM100 or 110

**Horticulture Emphases in BT Program**
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—30**
HORT135, 226, 228, 315, 350, 365, 375, 429, 448. The landscape design program emphasizes the development of technical drawing skills, CAD application, an understanding of the principles of design and a knowledge of plants.

**Landscape Management—14**
HORT208, 211. Select 9 credits from the following: AGRI308, HORT350, 360, 375, 378. The landscape management emphasis features proper horticultural practice, identification of landscape plants, selection of appropriate equipment, and the concept of total maintenance.

**Horticultural Crop Production—24**
Credits will be chosen in consultation with advisor from the following: AGRI206, 240, 300, 304, 308, 345, HORT211, 226, 228, 360, 369. The horticultural crop production emphasis prepares students for careers in the greenhouse/nursery industry or vegetable/fruit production industry.

## AT: Agriculture

**Major Requirements—25–36**
ANSI114, 305, 340, plus 15–24 credits in a special area of emphasis (see below) and 2–4 major elective credits chosen in consultation with advisor.
**Cognate requirement—4**
CHEM100 or 110

**Agriculture Emphases in AT Program**
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.

**Crop Production—24**
AGRI118, 206, 240, 300, 395; HORT105

**Dairy Herd Management—22**
AGRI270, 304, 395; ANSI250, 278, 430

## AT: Horticulture

**Major requirements—35**
AGRI118, 395(3) 405; HORT105, plus 11–13 credits in a special area of emphasis (see below) and 9–11 major elective credits chosen in consultation with advisor.
**Cognate requirement—4**
CHEM100 or 110

**Horticulture Emphases in AT Program**
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 Management—11**
HORT208, 211, 226, 228

## 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, *Director*
269-471-6299

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; 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

**AGRI118** **$ Alt (4)**
***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: 3 lectures and a 3-hour lab.

**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.

**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*

**AGRI270** **Alt (3)**
***Management of Agriculture Enterprises***
An introduction to acquiring and analysis of management information for decision making; an understanding of basic economic principles that impact biological production systems and implementation of the principles for total quality management for increased productivity.

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

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

**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.

**AGRI345** **(1-4)**
***Topics in _____***
A class based on selected topics of current interest in agriculture. Repeatable in different areas including, but not limited to:
- Concepts of International Agriculture
- Mittleider Method
- Horse Judging
- Livestock Judging
- Viticulture
- Solanaceous and Vine Crops
- Tree Fruit Production
- Equine Dentistry
- Equine Hoof Care and Basic Shoeing
- Hippotherapy/Therapeutic Riding
- Riding Instruction—English
- Riding Instruction—Western
- Equine Massage Therapy

**AGRI390** **$ (1–4)**
***Agriculture Study Tour***
Agriculture study tours are designed to enhance and broaden the on-campus learning experience by visiting areas of horticultural and agricultural interest and their impact on the local culture and society. Students will be expected to conduct pre-tour research on a specific topic related to the purpose of the tour and a post-tour analysis and synopsis of the tour experience.

**AGRI395** **(1–6)**
***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 a report of their experience and must complete a minimum of 120 hours of work experience for each credit earned. Repeatable up to 6 credits.

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

**AGRI499** **(1–5)**
***Project in _____***
Individual research in some field of agriculture under the direction of the faculty. Repeatable to 10 credits. Prerequisite: AGRI405 or permission of the instructor.

### 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*

**ANSI150** **$ Alt (3)**
***Companion Animal Care***
Covered is how to choose the right pet for your life situation, how to travel with your pet on all kinds of transportation, how to keep your pet healthy, grooming, training and correcting behavioral problems. Animal species covered are dogs, cats, small caged pets/rodents, birds, fish, reptiles and amphibians.

**ANSI250** **$ Alt (3)**
***Dairy Facilities***
A study of various types of milking systems, housing and manure handling systems of dairy cattle of all ages and production levels. Ventilation, stall and barn dimensions, and bedding will be some of the topics covered. Weekly: 2 lectures and one 3-hour lab.

**ANSI278** **$ Alt (3)**
***Dairy Health and Disease***
A study of the cause, prevention and treatment of infectious and metabolic diseases of dairy cattle. Also included is dairy cattle breeding and genetics. Weekly: 2 lectures and one 3-hour laboratory.

**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: 3 lectures. Recommended: CHEM 100 or higher. *Fall*

**ANSI325** **$ Alt (3)**
***Domestic Animal Behavior***
A study of the ways domestic animals communicate and interact with conspecific and other animals, and humans. Included are: physiological basis and development for each type of behavior; normal and aberrant behavior manifestations in each domestic animal species; treatments for problem situations; consideration of the effects of domestication on each species. Two lectures and one lab per week. *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 dairy cattle, equine, poultry and small livestock. Two lectures and one lab per week. *Fall, Spring*

**ANSI379** **Alt (3)**
***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. Recommended: 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*

**ANSI430** **$ Alt (3)**
***Lactation Physiology***
Anatomy and physiology of the udder, milk secretion, disease prevention and treatment, milking management and milking systems. Weekly: 2 lectures and 1 lab. *Spring*

**ANSI435** **Alt (3)**
***Animal Genetics***
A study of basic genetics, cytogenetics, immunogenetics, population genetics and quantitative genetics, biotechnology, gene mapping and the use of molecular tools to research inherited disorders. Included are descriptions of how veterinary genetics can be applied to artificial selection in animal production, information on the control of inherited disorders and the conservation of genetic diversity in both domesticated and wild animal species. *Spring*

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

**ANSI450** **Alt (3)**
***Equine Exercise Anatomy & Physiology***
The anatomy and physiology of the limbs (shoulder and pelvic girdles, legs, feet) as well as the respiratory tract, all of which are vital to a horse's usefulness.

**ANSI455** **Alt (3)**
***Equine Health and Disease***
Topics covered in depth are: the causes of infectious (e.g. tetanus, strangles) and non-infectious (e.g. laminitis, colic, injury), diseases of horses, their prevention, diagnosis and treatment.

**ANSI460** **$ Alt (3)**
***Advanced Equine Management***
Covers horse behavior and safety, conformation and way-of-going analysis, stall and pasture management, tack selection and fitting (saddles, bridles, bits, harnesses), grooming, financial management and business planning. Weekly: 2 hours lecture and 3 hours lab.

## Horticulture

**HORT105** **$ (5)**
***Plant Science***
Introduces students to 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*

**HORT150** **(3)**
***Home Horticulture***
An introduction to the horticultural and landscape field for majors and homeowners alike, this class offers basic care of the home landscape. Landscaping with ornamental trees and shrubs, perennials and annuals or growing fruits and vegetables for the garden are included. Become skilled at pruning and training plants, diagnosing and treating insect and disease problems, fertilizing techniques, and more. Course prepares you for home ownership and teaches life skills for creating a productive and beautiful home environment.

**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: 1-hour lecture and a 3-hour lab. *Fall*

**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 Identification***
Identification and recognition of shape, size, color, texture, and environmental requirements of the nonwoody plants providing color and ground cover in the landscape. *Fall*

**HORT310** **(3)**
***Commercial Vegetable Production***
Production and management of commercial vegetable crops; includes planting, cultural care, harvesting and post-harvesting procedures and marketing.

**HORT315** **$ Alt (4)**
***Landscape Construction***
Course combines both drawing and hands-on construction of installing softscapes and hardscapes, plus understanding of the vast array of hardscape materials available in the form of pavements, edgings, fencing, retaining walls, decks, pools, shelters, etc. Weekly: 3 hours lecture and 3 hours lab. *Spring*

**HORT350** **AH 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 landscape design personalities through the ages and their influence upon the American landscape. *Spring*

**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 relationships, transplanting, disease 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 spaces. 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*

**HORT369** **$ Alt (3)**
***Greenhouse Environment and Production***
Concepts and principles of commercial plant production in the greenhouse environment. Topics include structure and environment of the greenhouse, production of bedding and potting plants and cut flowers. Weekly: 2 lectures and a 3-hour laboratory.

**HORT375** **Alt (3)**
***Landscape Estimating***
An introduction to the estimating process for landscape design, construction and maintenance work. Various schedules and forms are used to assign costs of equipment, plants, hardscape materials, labor and overhead. The many variables from project to project are explored and then formulas are applied to arrive at making landscape installations an efficient and profitable business. *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*

**HORT429** **$ Alt (3)**
***Computer Landscape Design***
Principles and practices of computer-aided landscape design, including creating scale perimeter plot plans, using drawing tools, plant/site relationships, and graphic imaging 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*

# DIGITAL MEDIA & PHOTOGRAPHY

Harrigan Hall 227
269-471-3450
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www.610g.blogspot.com

**Art & Design and Digital Media & Photography Faculty**
Rhonda G. Root, *Chair*
Stefanie P. Elkins
Steven L. Hansen
Brian D. Manley
Thomas J. Michaud
Diane J. Myers
Sharon J. Prest
David B. Sherwin
Douglas Taylor
Marc G. Ullom

**Emeritus**
Gregory J. Constantine (gregcons@andrews.edu)

| Academic Programs | Credits |
|---|---|
| BFA in Visual Art | |
| Emphasis Areas | |
| Fine Art | 75–78 |
| Illustration | 75–78 |
| Pre-Art Therapy | 75–78 |
| BFA in Visual Communication | |
| Emphasis Areas | |
| Art Direction/Advertising | 75–78 |
| Graphic Design | 75–78 |
| Web Design | 75–78 |
| BFA in Photography | |
| Emphasis Areas | |
| Commercial Photography | 75–78 |
| Documentary Video | 75–78 |
| Fine Art Photography | 75–78 |
| BA: Art | |
| Emphasis Areas | |
| Art History | 42 |
| Pre-Art Therapy | 43 |
| Visual Art | 40 |
| BS: Visual Arts Education | 53 |
| Minor in Art History | 21 |
| Minor in Graphic Design | 22 |
| Minor in Visual Art | 22 |
| Minor in Digital Media | 21 |
| Minor in Photography | 20 |
| Minor in Web Design | 24 |

## Mission

We, the Andrews University Departments of Art & Design and Digital Media & Photography, mentor students to be Christ-centered, socially responsible creative individuals by developing their artistic gifts in a nurturing spiritual environment.