AGRICULTURE

Smith Hall, Room 109
269-471-6006
Fax: 269-471-3009
agri@andrews.edu
www.andrews.edu/cot/

Faculty
Thomas N. Chittick, Chair
Stanley Beikmann
Katherine Koudele
Ralph C. Wood

Academic Programs

<table>
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<tr>
<th>Program</th>
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<td>BS: Agriculture</td>
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<td>BS: Animal Science</td>
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<td>Management</td>
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<td>Equine Science</td>
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<td>Crop Production</td>
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<td>Dairy Herd Management</td>
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<td>Landscape Design</td>
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<td>Landscape Management</td>
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<tr>
<td>Minors in Agriculture, Animal Science or Horticulture</td>
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<tr>
<td>Pre-Professional Program in Veterinary Medicine</td>
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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, 290
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: BHSCI100, 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 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

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.
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, cytotgenetics, 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 skeletal muscular 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
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
www.andrews.edu/cot/media/
www.andrews.edu/a/ma
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)

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<tr>
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<td>BFA in Visual Art</td>
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<td>Fine Art</td>
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<td>Illustration</td>
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<td>Pre-Art Therapy</td>
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<tr>
<td>BFA in Visual Communication</td>
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<td>Art Direction/Advertising</td>
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<td>Graphic Design</td>
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<td>Web Design</td>
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<tr>
<td>BFA in Photography</td>
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<td>Commercial Photography</td>
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<td>Documentary Video</td>
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<td>Visual Art</td>
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<td>Minor in Graphic Design</td>
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<td>Minor in Web Design</td>
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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.