*193H. Honors Work in American Experience*

*Spring. 3(3-0) Satisfactory grade in the second term of any ATL sequence numbered ATL 121 or above.*

Students read and write on selected topics to improve their knowledge of the American heritage and their ability at reading and writing.

*205. Reading for University-Level Understanding*

*Fall, Winter, Spring. 2(0-4) May reenroll for a maximum of 4 credits.*

Individualized instruction in techniques for improving vocabulary, comprehension, rate, study skills and test taking skills in order to achieve a better understanding of university-level materials.

*232. American Humor*

*Winter. 4(4-0) Sophomores.*

An interdisciplinary study of the relationship between American humor and the developing American experience, especially of the nineteenth and twentieth centuries.

*292. Selected Topics*

*(U C 292.) Fall, Winter, Spring. 3 to 5 credits. May reenroll for a maximum of 8 credits if different topic is taken.*

Interdisciplinary study of topics in American culture.

*300. Supervised Individual Study*

*Fall, Winter, Spring, Summer. 2 to 4 credits. May reenroll for a maximum of 12 credits. 9 credits in a composition course; approval of department.*

Selected students requesting individual study of interdisciplinary problems will work under supervision of University College professors. Variable elective credit will be determined when the student secures instructor, adviser, and department approval.

*350. American Film*

*Fall, Winter, Spring. 4(2-4) May reenroll for a maximum of 8 credits if different topic is taken. Sophomores.*

American films as they reflect and influence society.

## ANATOMY ANT

### College of Human Medicine
### College of Osteopathic Medicine
### College of Veterinary Medicine

*216. Applied Human Anatomy*

*Fall, Spring. 5(4-3) HPR major or minor.*

Structural anatomy of the various systems of the human body. Concepts of kinesiological applications.

*316. General Anatomy*

*Fall, Spring. 5(5-0) B S 211 or B S 212 or approval of department.*

Designed to impart the basic concepts of the broad field of anatomy. Special requirements of the various disciplines will be met in their respective laboratories.

*420. Microscopic Anatomy*

*Winter. 5(2-8) Medical Technology students or approval of department.*

Microscopic study of the structure of cells, tissues and organs.

*480. Special Problems*

*Fall, Winter, Spring, Summer. 1 to 5 credits. May reenroll for a maximum of 15 credits. Approval of department.*

Individual study or project under the direction of a faculty member in biomedical research, gross anatomy, histology, neurology, or embryology.

*505A. Anatomy in Physical Diagnosis*

*Fall. 1 to 3 credits. H M 505 concurrently.*

Exercises in which students study systemic anatomy in a physical diagnosis context. Preparatory self-instruction precedes exercises.

*510. Veterinary Gross Anatomy*

*Fall. 6(3-9) First-term Veterinary Medicine students.*

Gross anatomy of a representative animal, the dog, is studied. Lecture, dissection of embalmed specimen, study of prosections, slides, models and living animals.

*511. Veterinary Histology*

*Fall. 5(3-6) First-term Veterinary Medicine students.*

A general histology course for veterinary students which includes a survey of the tissue of the animal body.

*512. Veterinary Neuro Anatomy*

*Winter. 2(2-0) Second-term Veterinary Medicine students.*

Gross anatomy of the central nervous system in animals emphasizing functional and dysfunctional aspects of pathways and nuclei in dogs as a foundation for clinical neurology.

*513. Veterinary Microscopic Anatomy*

*Winter. 4(2-4) Second-term Veterinary Medicine students.*

Microscopic anatomy of the digestive, urinary, respiratory, male and female reproductive systems, integumentary system, central nervous system and special sense organs of domesticated animals.

*514. Veterinary Comparative Anatomy*

*(523.) Winter. 5(4-4) Second-term Veterinary Medicine students.*

Lecture, dissection of embalmed specimens and the study of prosections, models and live animals related to the anatomy of the domestic animals.

*540. Gross Biomedical Structure*

*Winter. 1 to 15 credits. May reenroll for a maximum of 15 credits. Admission to a college of medicine; graduate students with approval of department.*

Regional gross anatomy of the back, thorax, abdomen, pelvis and perineum.

*541. Gross Biomedical Structure*

*Spring. 1 to 15 credits. Admission to a college of medicine; graduate students with approval of department.*

Regional gross anatomy of the head and neck.

*542. Gross Biomedical Structure*

*Fall. 1 to 15 credits. Admission to a college of medicine; graduate students with approval of department.*

Regional gross anatomy of the limbs.

*543. Microscopic Anatomy*

*Fall. 3(1-3) Human Medicine students; approval of department for graduate students.*

The principles of microscopic anatomy, utilizing self-instructional units and laboratory experience with organ sections viewed through the light microscope.

*544. Human Ontogenesis*

*Fall. 3(3-0) Admission to a college of medicine; graduate students with approval of department.*

Formal lectures, class conferences and student reports on the normal and abnormal organogenesis of the human embryo and fetus with emphasis on clinical correlations.

*545. Neuroanatomy*

*Winter. 3(4-0) Admission to medical school or approval of Neuroscience Committee.*

Introduction to gross and microscopic anatomy of the human nervous system, to related basic neurophysiologic concepts and to a problem-solving approach to the diagnosis of nervous system disease.

*560. Medical Histology*

*Fall. 4(3-4) Admission to a college of medicine or approval of department.*

Structural and functional characteristics of basic cells, tissues and organ systems. Emphasis on core concepts and visual discrimination.

*563. Osteopathic Medical Neuroanatomy*

*Fall. 4(3-4) Admission to a college of medicine; graduate students with approval of department.*

Medically oriented problem-solving neuroanatomy with laboratory. Structure of the human nervous system is correlated with normal function, clinical testing and classical lesions encountered in medical practice.

*565. Introduction to Human Gross Anatomy*

*Fall. 6(4-6) Admission to a college of medicine or approval of department.*

Core concepts in regional, systemic and topographical human gross anatomy: Prosection, discussion and lecture methods using audiovisual aids and frequent review.

*580. Special Problems*

*Fall, Winter, Spring, Summer. 1 to 5 credits. May reenroll for a maximum of 15 credits. Admission to professional program in the College of Human Medicine, College of Osteopathic Medicine or the College of Veterinary Medicine, and approval of department.*

Biomedical research, gross anatomy, histology, neurology, immunology or embryology.

*813. Problems in Anatomy*

*Fall, Winter, Spring, Summer. Variable credit. May reenroll for a maximum of 15 credits. Basic disciplines in various areas and approval of department.*

Various anatomical fields such as gross anatomy, histology, hematology, tissue culture, cytology, neurology and embryology will be studied.

*815. Anatomy of the Nervous System*

*Fall. 5(3-5) Approval of department.*

Developmental, gross and microscopic anatomy of the nervous system. Organizational and functional aspects of the peripheral and central nervous system are stressed. Gross demonstrations include brain and dog dissections.

**820. *Advanced Neuroanatomy: Structure and Function of Cells of CNS***

*Spring. 3 credits. ANT 815 and approval of instructor.*

Correlated anatomy and physiology of CNS cells and their processes including current concepts and principles of cytology, ultrastructure, development and plasticity, axonal transport mechanisms, electrical properties and functional connections.

**865. *Advanced Neurobiology***

*(BIM 865.) Spring. 4(4-0) BPY 827. Interdepartmental with Biophysics and the departments of Physiology, Psychology, and Zoology.*

Basic organization, structure and function of neural networks comprisisng sensory, motor, and autonomic systems including examples from invertebrates and vertebrates. Attendance at neuroscience seminar is required.

**891. *Concepts in Tumorigenesis***

*Winter of even-numbered years. 2(2-0) Approval of instructor.*

In depth evaluation of the current concepts in tumorigenesis emphasizing the experimental results from which these concepts evolved.

**899. *Master's Thesis Research***

*Fall, Winter, Spring, Summer. Variable credits. Majors.*

**999. *Doctoral Dissertation Research***

*Fall, Winter, Spring, Summer. Variable credit. Majors.*

## ANIMAL HUSBANDRY

See Animal Science.

## ANIMAL SCIENCE ANS

### College of Agriculture and Natural Resources

**111. *Animal Industries Colloquium***

*(213.) Fall. 1(2-0)*

History of animal agriculture. Current activites, goals and limitations of animal industries and agribusiness. Professional responsibilities and utilization of academic and non-academic experiences.

**211. *Principles of Animal Science***

*Spring. 5(5-0) B S 211.*

Animal industries and species. Principles of genetics, reproduction, lactation, nutrition and management. Systems of production and marketing for farm animals.

**217. *Evaluation of Animal and Carcass***

*(A H 235.) Fall. 3(1-4) ANS 211 or concurrently.*

Evaluation of breeding stock, market animals, and carcasses. Emphasis on production records and soundness of breeding animals, quality grading, yield grading and pricing market animals and carcasses.

**232. *Dairy Production Laboratory***

*Fall, Spring. 1(0-3)*

Physical characteristics of cows and facilities. Anatomy. Experience in estrous detection, milking equipment, feeds and rations and records. Normal cow behavior.

**242. *Introduction to Horse Management***

*(A H 214.) Fall. 3(3-1)*

The horse industry in today's society. Relationship of form to function. Selection, breeding, feeding, foot care, health, and management of the pleasure horse.

**252. *Livestock Production Laboratory***

*Fall, Spring. 1(0-3)*

Species and classification of livestock. Anatomy. Feeds and rations. Determining market value. Managerial skills.

**256. *Meats, Poultry and Fishery Products I***

*(A H 242.) Fall. 3(2-2) Interdepartmental with and administered by Food Science.*

Principles of evaluation and nutritive value. Identification of grades and cuts of beef, pork, lamb and poultry products.

**257A. *Meat Evaluation and Grading***

*(A H 245.) Winter. 1(0-3) ANS 217. Students may not earn more than 10 credits from the following courses: ANS 257A, ANS 257B, ANS 337, ANS 347A, ANS 347B, ANS 357A, ANS 357B, ANS 357C.*

Evaluation of beef, pork and lamb carcasses and wholesale cuts according to industry and consumer demands. Federal grading standards. Field trips to meat packing operations required.

**257B. *Meat Evaluation and Grading***

*(A H 245.) Fall. 1 to 3 credits. ANS 257A. Students may not earn more than 10 credits from the following courses: ANS 257A, ANS 257B, ANS 337, ANS 347A, ANS 347B, ANS 357A, ANS 357B, ANS 357C.*

Evaluation of beef, pork and lamb carcasses and wholesale cuts according to industry and consumer demands. Federal grading standards. Field trips to meat packing operations required.

**261. *Introduction to Poultry Production***

*(P S 224.) Winter, Spring. 3(3-0)*

Poultry in the agricultural economy. Fundamental principles of anatomy and physiology. Management practices. Prevention and control of disease.

**262. *Poultry Production Laboratory***

*Winter, Spring. 1(0-3)*

Breeds of poultry. Processing poultry and products. Anatomy and physiology. Facilities, feeds and rations. Evaluation and incubation of eggs. Managerial skills.

**313. *Principles of Animal Nutrition***

*(325.) Spring. 5(5-0) PSL 241, CEM 132; BCH 200 recommended.*

Livestock feeds and nutrients. Functions of and requirements for nutrients. Evaluation of feeds. Feeding practices. Formulation of rations for beef and dairy cattle, horses, poultry, sheep and swine.

**314. *Principles of Animal Breeding***

*(461., 361.) Winter. 3(3-0) B S 211 or a course in Mendelian genetics.*

Quantitative inheritance. Gene frequency. Statistical tools used in animal breeding. Effect of selection and mating systems on animal population.

**337. *Judging Dairy Cattle***

*(DRY 323.) Spring. 3(0-6) Students may not earn more than 10 credits from the following courses: ANS 257A, ANS 257B, ANS 337, ANS 347A, ANS 347B, ANS 357A, ANS 357B, ANS 357C.*

Desired type in dairy cattle. Judging and show ring procedures. Competitive judging. Teams selected to represent Michigan State University in national competition.

**347A. *Judging Horses***

*(A H 335.) Spring. 2(0-6) ANS 217. Students may not earn more than 10 credits from the following courses: ANS 257A, ANS 257B, ANS 337, ANS 347A, ANS 347B, ANS 357A, ANS 357B, ANS 357C.*

Evaluation of conformation. Productive and functional merits of individual horses. Field trips to prominent equine establishments and events required.

**347B. *Judging Horses***

*(A H 335.) Fall. 1(0-6) ANS 347A. Students may not earn more than 10 credits from the following courses: ANS 257A, ANS 257B, ANS 337, ANS 347A, ANS 347B, ANS 357A, ANS 357B, ANS 357C.*

Course is completed in the first half of the quarter. Evaluation of conformation. Productive and functional merits of individual horses. Field trips to prominent equine establishments and events required.

**357A. *Judging Livestock***

*(A H 335.) Winter. 1 to 3 credits. ANS 217 or approval of department. Students may not earn more than 10 credits from the following courses: ANS 257A, ANS 257B, ANS 337, ANS 347A, ANS 347B, ANS 357A, ANS 357B, ANS 357C.*

Evaluation of conformation of cattle, pigs and sheep. Productive and functional merits of individual food animals. Field trips to prominent livestock establishments required.

**357B. *Judging Livestock***

*(A H 335.) Spring. 1 to 3 credits. ANS 357A. Students may not earn more than 10 credits from the following courses: ANS 257A, ANS 257B, ANS 337, ANS 347A, ANS 347B, ANS 357A, ANS 357B, ANS 357C.*

Evaluation of conformation of cattle, pigs and sheep. Productive and functional merits of individual food animals. Field trips to prominent livestock establishments and to major livestock events required.

**357C. *Judging Livestock***

*(A H 335.) Fall. 1 to 3 credits. ANS 357B. Students may not earn more than 10 credits from the following courses: ANS 257A, ANS 257B, ANS 337, ANS 347A, ANS 347B, ANS 357A, ANS 357B, ANS 357C.*

Evaluation of conformation of cattle, pigs and sheep. Productive and functional merits of individual food animals. Field trips to prominent livestock establishments and to major livestock events required.

**400. *Independent Study***

*(A H 415.) Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 10 credits. Approval of department.*

Independent study in genetics, nutrition, physiology, toxicology, meat science, or management of poultry or livestock.

**413. *Toxicology of Food Producing Animals***

*(450.) Spring. 4(4-0) PSL 240, BCH 200.*

Fate and effects of toxic chemicals in food-producing animals: impact on animal production, residues in food products, safety assessment and control methods.