

**Description — American Thought and Language of Courses**

**182. Writing: Women in America**  
*Winter. 3(3-0) Three credits in the first term of any ATL sequence numbered 121 or higher or approval of department.*

Writing course to improve composition and critical reading abilities. Writings based on American women from pre-Colonial times through First Wave Feminism. Emphasis on style and development of essays.

**183. Writing: Women in America**  
*Spring. 3(3-0) Three credits in the second term of any ATL sequence numbered 121 or higher or approval of department.*

Writing course to improve composition and critical reading abilities. Writings based on women in American life and literature from 1920 to the present. Research project required.

**191H. Honors Writing: The American Experience**  
*Fall. 3(3-0) Satisfactory performance on the placement test.*

Writing course to improve composition and critical reading abilities. Writings based on analysis of selected material from Colonial to early nineteenth century topics.

**192H. Honors Writing: The American Experience**  
*Winter. 3(3-0) Satisfactory grade in the first term of any ATL sequence numbered ATL 121 or above.*

Writing course to improve composition and critical reading abilities. Writings based on analysis of selections from the late nineteenth and early twentieth centuries.

**193H. Honors Writing: The American Experience**  
*Spring. 3(3-0) Satisfactory grade in the second term of any ATL sequence numbered ATL 121 or above.*

Writing course to improve composition and research abilities. Writings based on analysis of twentieth century materials reflecting American issues.

**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. Variable elective credit will be determined when the student secures instructor, adviser, and department approval.

**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.) Spring. 5(4-4) Third-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.

**543. Human Histology**  
*Fall. 4(2-4) Human Medicine students; approval of department for graduate students.*  
 The structure and function of human cells, tissues, and organs.

**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**  
*Spring. 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. 1 to 5 credits. 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.

**814. Graduate Student Seminar**  
*Spring. 1 to 3 credits. May reenroll for a maximum of 6 credits. Admittance to Ph.D. program in Department of Anatomy.*

Supervised practice in delivering and evaluating written abstracts and public oral presentations of anatomical science; techniques of organization, timing, and effective illustrations.

**ANATOMY**

**ANT**

**College of Human Medicine  
 College of Osteopathic Medicine  
 College of Veterinary Medicine**

**216. Applied Human Anatomy**  
*Fall. 5(4-3) HCP major or coaching minor, approval of department. Interdepartmental with the School of Health Education, Counseling Psychology and Human Performance.*

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

**Animal Science — Description  
of  
Courses**

**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**

*Summer. 1 to 5 credits. May reenroll for a maximum of 15 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.

**839. Systems Neuroscience**

*(PSL 839.) Winter of odd-numbered years. 5(4-2) Approval of department. Interdepartmental with the departments of Pharmacology and Toxicology, and Physiology.*

Physiology, anatomy and pharmacology of sensory, somatomotor and autonomic neural systems.

**865. Advanced Neurobiology**

*Spring. 4(4-0) ZOL 827. Interdepartmental with the departments of Physiology, Psychology, and Zoology.*

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

**885. Vertebrate Neural Systems I**

*(PSY 885.) Winter of odd-numbered years. 5(3-4) ANT 815, ANT 865 recommended. Interdepartmental with the departments of Physiology, Psychology, and Zoology.*

Structure and function of major component systems of vertebrate brains, their evolution, ontogeny and comparative analysis in mammals, birds, reptiles, amphibians and fish. Interrelation of behavioral, anatomical and physiological studies.

**886. Vertebrate Neural Systems II**

*(ZOL 886.) Spring of odd-numbered years. 5(3-4) ANT 885. Interdepartmental with the departments of Physiology, Psychology, and Zoology.*

Continuation of ANT 885. Major component systems of vertebrate brains, their evolution, ontogeny, and comparative analysis in mammals, birds, reptiles, amphibians and fish. Interrelation of behavioral, anatomical, and physiological studies.

**899. Master's Thesis Research**

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

**999. Doctoral Dissertation Research**

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

**ANIMAL SCIENCE                      ANS**

**College of Agriculture and Natural Resources**

**110. Introductory Animal Science**

*Fall. 3(3-0)*

History of breeds and their use, production techniques, marketing. Current goals and limitations affecting U.S. animal production.

**132. Dairy Production Laboratory**

*(ANS 232.) Spring. 1(0-3) ANS 110.*

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

**142. Horse Production Laboratory**

*Spring. 1(0-3) ANS 110.*

Handling and care of horses. Structural anatomy, reproduction, nutrition and management practices.

**152. Livestock Production Laboratory**

*(ANS 252.) Fall. 1(0-3) ANS 110 or concurrently.*

Anatomy, care, feeding, management, handling and slaughter of commercial livestock species. Evaluation of livestock relating skeletal structure to animal performance.

**162. Poultry Production Laboratory**

*(ANS 262.) Winter. 1(0-3) ANS 110.*

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

**211. Principles of Animal Science**

*Spring. 3(3-0) ANS 110, B S 211.*

Principles of nutrition, reproduction, lactation, genetics and meat science. Comparative anatomy and physiology of food animals.

**217. Evaluation of Animal and Carcass**

*Fall. 3(1-4) ANS 110, ANS 152.*

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.

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

*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**

*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**

*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.

**310. Animal Science Seminar**

*Fall. 1(2-0) Juniors, ANS 110 or concurrently.*

Current production and policy issues in animal science.

**313A. Principles of Animal Nutrition**

*(ANS 313.) Fall. 4(4-0) BCH 200 or BCH 401, MPH 200, PSL 241.*

Requirements for and metabolism of nutrients. Feeding practices and diets for beef and dairy cattle, horses, poultry, sheep and swine.

**313B. Feeds and Diet Formulation**

*Winter. 2(1-2) ANS 313A.*

Feed processing, premixes and feed additives. Feed manufacture. Net energy system. Diet and least cost formulation for cattle, sheep, horses, poultry and swine. Field trips required.

**314. Principles of Animal Breeding**

*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.

**315. Principles of Farm Animal Physiology**

*Spring. 4(3-2) ANS 211, PSL 241.*

Anatomy and physiology emphasizing endocrine integration for homeostasis and homeorhesis. Regulatory interaction among growth, lactation and reproduction during different productive states of farm animals.

**318. Merchandising Purebred Livestock**

*Spring of odd-numbered years. 2(1-2) ANS 132, ANS 142, or ANS 152; or approval of department.*

Purebred livestock industry structure. Methods of merchandising breeding livestock including private treaty and auction sales. Advertising, sale selection, and budgeting of a purebred livestock sale.

**337. Judging Dairy Cattle**

*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 showing procedures. Competitive judging. Teams selected to represent Michigan State University in national competition.

**347A. Judging Horses**

*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**

*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 to be 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**

*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.