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 enroll 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 enroll for a maximum of 15 credits. Core concepts 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 product functions including current concepts and principles of cytology, ultrastructure, development and plasticity, axonal transport mechanisms, electrical properties and functional connections.

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 even-numbered years. 5(3-4) ANT 885, ANT 886 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 even-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.

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 SCIENCE

111. Animal Industries Colloquium
(213.) Fall. 1(2-0) History of animal agriculture. Current activities, goals and limitations of animal industries and agricultures. Professional responsibilities and utilization of academic and non-academic experiences.

211. Principles of Animal Science
Spring. 5(5-0) S 8 211. 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 225.) 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
Spring. 1(0-3) ANS 211 or concurrently. Physical characteristics of cows and facilities. Anatomy. Experience in estrus detection, milking equipment, foods and rations and records. Normal cow behavior.

242. Introduction to Horse Management
(A H 231.) 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

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

262. Poultry Production Laboratory

313. Principles of Animal Nutrition
314. Principles of Animal Breeding
(3 credits) Winter. 3(0-0) B S 211 or a course in Mendelian genetics.

337. Judging Dairy Cattle
(DRY 325) Spring. 3(0-0) 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 Livestock
(A H 335) Fall. 2(0-0) 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.

400. Independent Study
(A H 415) Fall, Winter, Spring, Summer. 1 to 4 credits. May receive 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
(405) 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.

415. Animal Reproduction Laboratory
Winter. 1(0-0) ANS 455 or concurrently.

416. Growth Biology of Meat Animals
Spring of even-numbered years. 3(0-0) B S 211, PSL 241, BCH 200.
Fetal and postnatal growth and development in meat animals. Bioenergetics, hormonal, nutritional, and metabolic aspects of growth. Criteria for measuring growth of meat animals.

422. Beef Production and Management
(A H 453) Fall. Spring. 4(3-2) ANS 211, ANS 313 or approval of department.
Feeding, breeding management, marketing. Emphasis on growth and development; costs and returns. Feed requirements; reproduction; crossbreeding; performance testing; housing; diseases. Practice in management skills.

432. Dairy Production and Management
(DRY 315) Spring. 4(3-3) ANS 332, ANS 313, ANS 415, ANS 455.
Management practices and systems for dairy herds. Systems for records, housing, milking, reproduction, nutrition, and health. Economic and efficient use of inputs.

433. Ruminant Nutrition
Winter. 4(3-2) ANS 333.
Principles of ruminant nutrition and application to actual feeding practices in commercial dairy and beef operations. Rumen fermentation as related to feed utilization, growth, milk production, and milk composition.

434. Dairy Cattle Breeding
(DRY 424) Spring. 4(2-2) ANS 314.
Applications of population genetics to improving dairy cattle. Use of selection, aids to selection, and systems of mating to formulate breeding plans. Inheritance of economic traits. Breed improvement programs.

435. Mammary Physiology
(A H 413) Fall. 4(3-2) PSL 241, BCH 200 or BCH 401. Interdepartmental with the Department of Physiology.

452. Meat Science Laboratory
(A H 344) Winter. 2(0-5) ANS 456 or concurrently.
Exercises in meat animal slaughter, meat cutting, wholesale and retail cut identification, processing, inspection, quality control and merchandising.

454. Meat Animal Breeding
(A H 462) Spring. 3(2-2) ANS 314.
Uses and effects of different breeding systems with beef cattle, sheep, and swine. Formulating breeding plans.

455. Principles of Animal Reproduction
(DRY 445) Winter. 4(5-0) PSL 241, BCH 200 or BCH 401. Interdepartmental with the Department of Physiology.
Processes of reproduction and endocrinology with special emphasis on anatomy of reproductive systems, folliculogenesis, gametogenesis, reproductive cycles, fertilization, sex determination, gestation, and artificial regulation of these reproductive events for economic benefit.

456. Meat Science and Muscle Biology
(A H 341) Winter. 4(4-0) BCH 200, PSL 240.
Structure, composition and function of muscle, its conversion to meat, animal growth and fattening. Properties of fresh and processed meat, microbiology, preservation, palatability, inspection and sanitation, by-products, nutritive value.

462. Poultry Production and Management
(P S 435) Spring of even-numbered years. 5(4-2) ANS 211 or ANS 261 or approval of department.
Practical application of economic and management principles to commercial poultry enterprises. Field trips required.

463. Poultry Nutrition
(P S 413) Fall. 4(3-3) ANS 313.

464. Poultry Breeding and Incubation
(P S 424) Winter of even-numbered years. 4(3-2) ANS 314.
Genetic and biological factors affecting economic characteristics including egg production, egg size, hatchability, growth and viability and factors involved in the hatching of eggs.

465. Avian Physiology
(P S 440) Spring. 4(3-2) Approval of department. Interdepartmental with the Department of Physiology.
Systemic physiology of birds emphasizing respiration, circulation, temperature regulation, endocrinology, and reproduction.

469. Avian Diseases and Health
(P S 454) Winter of even-numbered years. 4(3-2) MPH 200 or B S 212 or approval of department.
Microbiological concepts, causes, preventive and therapeutic methods for poultry diseases, laboratory diagnosis and experiments.
or unequal subclass numbers.

482. Swine Production and Management
(A H 451.) Fall. 4(3-2) ANS 211, ANS 313 or approval of department.

Designs for reduction of experimental error.

483. Swine Nutrition
(A H 436.) Spring of odd-numbered years. 3(3-0) ANS 313 or ANS 525; ANS 452.

Digestive and metabolic development and nutrient requirements of swine. Interactions of genetics, disease, endocrinology and environment with nutrition. Critical evaluation of swine feeds and feed formulation. Recent swine nutrition research.

488. Animal Systems in International Development
Winter. 4(4-0) ANS 211 or IDC 200 or PAM 280 or approval of department.


525. Animal Nutrition
Fall. 5(2-2) BCH 401.


500. Advanced Independent Study
(A H 890.) Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 8 credits. Approval of department.

Investigation of areas within animal science of special interest to graduate students.

582. Research Methods in Nutrition
(A H 875.) Fall. 3(3-0) Approval of department.

Experimental techniques in nutrition: data analysis, statistical methods, sampling procedures, balance trials, bioassays, tracer methodology, distribution of nutrient requirements.

871. Design of Animal Experiments
(654.) Spring. 4(4-0) STT 423.

Choice, implementation and statistical analysis of experimental plans for research with animals. Designs for reduction of experimental error. Analysis of experiments with complex structure or unequal subclass numbers.

872. Analysis of Unbalanced Multifactor Data
(855.) Spring. 4(4-0) STT 423.

Applied analysis techniques of field or survey data in biological sciences with unbalanced subclass numbers. Building models to fit data and research goals. Interpretation of analysis.

873. Statistical Packages for Analysis of Experiments
Fall. 3(2-2) STT 423 or approval of instructor.

Recording data for computer analysis. Computer files and the EDITOR. Methods include SPSS, SAS, BMDP and GENSTAT.

890. Master's Thesis Research
(A H 889.) Fall, Winter, Spring, Summer. Variable credit. Approval of department.

891. Advanced Ruminant Nutrition
(DRY 925.) Fall of even-numbered years. 4(4-0) BCH 452, PSL 801 or approval of department.

Microbiology, physiology and biochemistry of ruminal digestion. Absorption and metabolism of rumen fermentation products.

895. Biometrical Genetics
(955.) Fall. 4(4-0) ANS 872.


999. Doctoral Dissertation Research
(A H 999.) Fall, Winter, Spring, Summer. Variable credit. Approval of department.

999. Doctoral Dissertation Research
(A H 999.) Fall, Winter, Spring, Summer. Variable credit. Approval of department.

Approved through Summer 1985.

100. Human Evolution
Fall, Winter, Spring, Summer. 4(4-0) ANS 872.

Comparison of ways of life among primitive, peasant and civilized peoples. Implications of these styles of life for understanding of human behavior in general and exotic cultures in particular.

ANTHROPOLOGY

College of Human Medicine
College of Social Science

100. Human Evolution
Fall, Winter, Spring, Summer. 4(4-0) ANS 872.

Scientific fossil and archaeological evidence on human cultural and biological origins; anticipation of culture in other animals; place of humans among the primates; processes of organic evolution; modern human genetic variability; culture as an adaptive mechanism; cultural development to the dawn of civilization.

171. Introduction to Sociocultural Anthropology (S)
Fall, Winter, Spring, Summer. 4(4-0) ANS 872.

Comparison of ways of life among primitive, peasant and civilized peoples. Implications of these styles of life for understanding of human behavior in general and exotic cultures in particular.

221. Introduction to Social and Cultural Analysis
Fall, Spring, 4(4-0)

Basic theoretical framework of socio-cultural analysis: structural functionalism, evolutionism, and cultural ecology.

250. Culture, Environment and Adaptation (S)
Fall. 4(4-0)

Culture as an adaptive process—as developed in the million years of human history and still influencing environmental quality, population control, and allocation of resources in primitive and modern societies.