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) ANS 885. 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) ANS 885. Interdepartmental with the departments of Physiology, Psychology, and Zoology.
Continuation of ANS 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 credit. Majors.

999. Doctoral Dissertation Research
Fall, Winter, Spring, Summer. Variable credit. Majors.

ANIMAL SCIENCE

College of Agriculture and Natural Resources

111. Animal Industries Colloquium
(213.) Fall. 1(0-0)
History of animal agriculture. Current activities, 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 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 Carcasses
(AH 217.) Fall. 3(4-0) 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.

242. Introduction to Horse Management
(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(0-0) 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
(PS 224.) Winter, Spring. 3(3-0)

262. Poultry Production Laboratory
Winter, Spring. 1(0-3) ANS 261 or concurrently or approval of department.

312A. Intensive Livestock Systems
Fall. 3(1-4) Juniors, FSM 309 recommended.

312B. Intensive Livestock Systems
Winter. 3(1-4) ANS 312A.
Continuation of ANS 312A. Computer based surveillances and evaluations of livestock project. Marketing concepts and practices. Students manage livestock. Field trips required.

313. Principles of Animal Nutrition
(325.) Fall. 5(5-0) PSL 241, CEM 143;
BCH 200 recommended.

314. Principles of Animal Breeding
(361.) Winter. 3(3-0) B 8 211 or a course in Mendelian genetics.

337. Judging Dairy Cattle
(DRY 335.) 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
(AH 335.) Winter. 1(0-0) 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
(AH 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 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
(AH 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
(AH 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.
Descriptions — Animal Science of Courses

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 317, ANS 347A, ANS 347B, ANS 357A, ANS 357B, and 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 (500.) Spring. (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.


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


434. Dairy Cattle Breeding (DRY 424.) Spring. (4-3-4) ANS 314. Applications of population genetics to improving dairy cattle. Use of selection, aid to selection, and systems of mating to formulate breeding plans. Inheritance of economic traits. Breed improvement programs.


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 merchandizing.


455. Principles of Animal Reproduction (DRY 445.) Winter. (4-0) 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 cycle, fertilization, sex determination, gestation and artificial regulation of these reproductive events for economic benefit.


462. Poultry Production and Management (P S 435.) Spring of even-numbered years. (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.


464. Poultry Breeding and Incubation (P S 424.) Winter of even-numbered years. (4-3) 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.

482. Animal Nutrition (A H 451.) Fall. 4(3-2) ANS 211, ANS 313 or approval of department. Emphasizes species efficiency in human food production and resource use in Africa, Latin America and Asia.


580. 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 857.) Fall. 2(2-0) Approval of department. Experimental techniques in nutrition: ration formulation, animal management, sampling procedures, balance trials, bioassays, tracer methodology, determination of nutrient requirements.

872. Analysis of Unbalanced Multifactor Data
(SPS, 4(4-0) STT 423.)
Applied analysis techniques of field or survey data in biological sciences with unbalanced sub- classes. 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.

899. Master's Thesis Research
(AH 869.) Fall, Winter, Spring, Summer. Variable credit. Approval of department.

931. 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 ruminant digestion. Absorption and metabolism of rumen fermentation products.

935. Comparative Nutrition-Lipids and Carbohydrates
(HNF 928.) Winter of odd-numbered years. 4(4-0) BCH 453, PSL 801 or approval of department.
Interdepartmental with Human Nutrition and Foods.

936. Comparative Nutrition-Protein Metabolism and Developmental Biology
(HNF 927.) Winter of even-numbered years. 4(4-0) BCH 453, PSL 801 or approval of department. Interdepartmental with Human Nutrition and Foods.
Protein quality assessment, protein status, protein calorie malnutrition, amino acid metabolism, protein turnover, digestion and absorption, hormonal control of protein metabolism, developmental aspects of protein metabolism and growth.

937. Comparative Nutrition-Minerals
(AH 928.) Spring of even-numbered years. 3 credits, BCH 452, PSL 801, Interdepartmental with Human Nutrition and Foods.
Forms and location in body, metabolic roles, deficiency and toxicity signs, interrelationships, requirements and biological availability of sources.

938. Comparative Nutrition-Vitamins
(AH 929.) Spring of odd-numbered years. 3(3-0) BCH 452 and a previous course on principles of nutrition. Interdepartmental with and administered by Human Nutrition and Foods.
Chemical and physical properties, standards of activity, occurrence, metabolic roles, anti­ tamics, deficiency and toxicity signs, requirements and factors affecting requirements.

941. Genetics of Breed Improvement
(AH 983.) Winter of odd-numbered years. 3(3-0) ANS 2(2-0) STT 421.

942. Breeding Systems and Plans
(AH 964.) Spring of odd-numbered years. 3(3-0) ANS 941.
Biometric relations between related animals. Role of selection in changing populations. The effects of different mating systems.

943. Biometrical Genetics
(965.) Fall. 4(4-0) ANS 872.

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

Anthropology — Descriptions of Courses

262. Status of Women in Culture and Society: A Comparative View
Fall. 3(3-0)
Comparative analysis of the status of women emphasizing non-Western cultures and societies. Economic and domestic division of labor between the sexes as a factor underlying division of status, power and authority.

263. Introduction to Archaeology
Winter. 3(3-0)
Archaeologists, work in the field and laboratory: dating the past; analysis of finds; interpretation of sites from Stone Age caves to ceremonial sites.

264. Great Discoveries in Archaeology
Winter. 4(4-0)
Great discoveries in archaeology that have captured the public's imagination and shaped the discipline, from Olduvai Gorge to King Tut's tomb.

265. Vanished Peoples and Lost Civilizations
Fall. 4(4-0)
Concepts of cultural evolution and origins of civilization as found in popular literature ranging from Atlantis to Charlots of the Gods.

266. War and Aggression
Fall. Spring. 3(3-0)
The question 'What makes friends and what makes enemies?' is examined from the standpoint of cultural anthropology. Violence-prone cultures and peaceful ones are compared for factors influencing human aggression.

275. The Anthropology of Asia
Fall. 4(4-0)
Several cultural complexes and culture types—from hunting and gathering through complex civilization—of East, Southeast, and South Asia. The cultures and nature of their development will be examined. Past and present significance of cultural stability and change will be seen in a comparative framework.

281. The Africans and Their Cultures
Spring. 4(4-0)
Racial and cultural problems confronting the African peoples.

285. Anthropological Perspectives on Global Interdependence
Spring. 4(4-0)
Interwoven nature of cultural traditions in the modern world. Consideration of how people of developing nations respond to the dominant cultural forces of industrialized nations.

IDC. Contemporary South Asia
For course description, see Interdisciplinary Courses.

343. Introduction to Physical Anthropology
Fall. 4(3-3)
Problems, data and techniques associated with the main topical areas of physical anthropology: human geneties, hominid evolution, primate behavior, human osteology and human diversity. Field trips may be required.

350. Peasant Society
Fall. 4(4-0) ANP 171
Anthropological study of peasantry. Comparative examination of the rural societies and cultures of Asia, Europe, and Latin America.