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*

Spring. 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*

Summer. 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*

Summer. 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.

816. *Developmental Anatomy*

Fall. 4(3-3) Graduate students or approval of department.

Study of the normal and abnormal organogenesis of the human embryo and fetus.

865. *Advanced Neurobiology*

Spring. 4(4-0) BPY 827. Interdepartmental with the departments of Biophysics, 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 A H

College of Agriculture and Natural Resources

111. *Livestock and Meat Industry*

Fall, Spring. 4(3-4)

Livestock utilization of renewable resources in producing products for man. Adaptation, economics of production and management systems of beef cattle, swine, sheep and horse enterprises. Evaluation of market livestock.

214. *Introduction to Horses and Horsemanship*

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. Proper horsemanship methods.

235. *Live Animal and Carcass Evaluation and Selection*

Fall. 3(1-4) A H 111 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.

242. *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.

245. *Meat Evaluation and Grading*

Fall, Winter. 1 to 3 credits. May reenroll for a maximum of 4 credits subject to a maximum of 10 credits in A H 245 and A H 335 combined. A H 235.

Evaluation of beef, pork, and lamb carcasses and wholesale cuts according to industry and consumer demands and federal grading regulations. Numerous field trips to meat packing operations.

335. *Livestock Selection*

Fall, Winter, Spring. 1 to 3 credits. May reenroll for a maximum of 9 credits subject to a maximum of 10 credits in A H 245 and A H 335 combined. A H 235.

Evaluation of productive merit of individual animals. Comparison of type with a standard. Relationship of form to function. Field trips to prominent livestock breeding establishments and to major livestock events.

341. *Principles of Meat Science*

(241.) Winter. 3(3-0) 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.

344. *Meat Science Laboratory*

(244.) Winter. 2(0-5) A H 341 or concurrently.

Exercises in meat animal slaughter, meat cutting, wholesale and retail cut identification, processing, inspection, guality control and merchandizing.

415. *Special Problems*

Fall, Winter, Spring, Summer. 1 to 3 credits. May reenroll for a maximum of 8 credits. Approval of department.

Special problems in: animal breeding, ruminant nutrition, nonruminant nutrition, management, meat science, or reproduction.

426. *Swine Nutrition*

Spring of odd-numbered years. 3(3-0) A H 451; ANS 325 or ANS 525.

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.

451. *Swine Production*

Fall. 4(3-2) ANS 325 or approval of department.

Historical aspects with emphasis on current trends. Breeds, breeding, selection, nutrition requirements, management practices, marketing, housing and environmental needs, disease and parasite problems. Visits to representative farms.

452. *Sheep Production*

Winter. 4(3-2) ANS 325 or approval of department.

Management of sheep enterprises. Using the tools of selection, reproduction, nutrition, flock health, housing and marketing to increase returns. Practice in trimming, showing, and management skills.

453. *Beef Production*

Fall, Spring. 4(3-2) ANS 325 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.

462. *Meat Animal Breeding*

Spring. 3(2-2) ANS 361.

Uses and effects of different breeding systems with beef cattle, sheep, and swine. Formulating breeding plans.

IDC. The Impact of Animal Resource Management Upon the World's Developing Nations

For course description, see Interdisciplinary Courses.

827. Research Methods in Nutrition

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.

890. Advanced Special Problems

Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 8 credits. Approval of department.

Investigation of animal husbandry areas of special interest to individual graduate students.

899. Master's Thesis Research

Fall, Winter, Spring, Summer. Variable credit. Approval of department.

912. Seminar

Fall, Winter, Spring. 1 credit.

921. Pathology of Nutritional and Metabolic Diseases

Summer of even-numbered years. 4(3-2) Approval of department; PTH 404 or ANT 420. ANS 525, BCH 452, HNF 462 recommended. Interdepartmental with the departments of Large Animal Surgery and Medicine and Pathology and Human Nutrition and Foods. Administered by Human Nutrition and Foods.

Development, physiopathology and morphologic pathology of nutritional and metabolic diesases including carbohydrate, protein, fatty acid, vitamin and mineral deficiences, their experimental induction and their medical or economic significance.

926. Comparative Nutrition-Lipids and Carbohydrates

Winter of odd-numbered years. 4(4-0) BCH 452 and a previous course on principles of nutrition. Interdepartmental with and administered by Human Nutrition and Foods.

Regulatory aspects of carbohydrate and lipid metabolism as influenced by nutrition in mammals. Emphasis on normal and abnormal physiological states such as obesity, ketosis and diabetes.

927. Comparative Nutrition-Protein Metabolism and Developmental Biology

Winter of even-numbered years. 4(4-0) BCH 452, PSL 802 or concurrently. Interdepartmental with and administered by 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.

928. Comparative Nutrition-Minerals

Spring of even-numbered years. 3 credits. BCH 452, PSL 802. Interdepartmental with Human Nutrition and Foods.

Forms and location in body, metabolic roles, deficiency and toxicity signs, interrelationships, requirements and biological availability of sources.

929. Comparative Nutrition-Vitamins

Spring of odd-numbered years. 3(3-0) BCH 452 and a previous course on principles of nutrition. Interdepartmental with Human Nutrition and Foods.

Chemical and physical properties, standards of activity, occurrence, metabolic roles, antivitamins, deficiency and toxicity signs, requirements and factors affecting requirements.

963. Genetics of Breed Improvement

Winter of odd-numbered years. 3(3-0) ANS 361, STT 421.

Breed improvement. Changing gene frequency. Genetic and environmental subdivision of phenotypic variance.

964. Breeding Systems and Plans

Spring of odd-numbered years. 3(3-0) A H 963.

Biometric relations between related animals. Role of selection in changing populations. The effects of different mating systems.

999. Doctoral Dissertation Research

Fall, Winter, Spring, Summer. Variable credit. Approval of department.

ANIMAL SCIENCE ANS

College of Agriculture and Natural Resources

101. Animal Science

Fall. 5(4-2)

Survey of the animal industries including history, economic geography, anatomy and physiology, nutrition and feed usage, and systems of commercial livestock and poultry production.

213. Animal Science Seminar

Fall. 1(2-0)

Animal science industries. Industry representatives will be utilized to discuss particular areas.

325. Principles of Animal Nutrition

Spring. 5(5-0) CEM 132; BCH 200 recommended.

Livestock feeds and their 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.

361. Principles of Animal Breeding

(461.) 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.

433. Ruminant Nutrition

(DRY 433.) Winter. 4(3-2) ANS 325. Interdepartmental with and administered by the Department of Dairy Science.

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.

525. Animal Nutrition

Fall. 5(4-2) BCH 401.

Principles of nutrition. Nutrients and their metabolism. Nutritive requirements for maintenance, gowth, reproduction, lactation and work. Nutrient sources and their use in preparing diets for domestic animals.

826. Animal Nutrition

Spring. 4(4-0) One course each: biochemistry, physiology; and approval of department.

Nutrition basic to animal feeding. Application of chemistry and physiology to nutrition. Nutrient requirements for normal body functions. Techniques involved in nutrition research; readings in current literature.

854. Design of Animal Experiments

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.

855. Analysis of Unbalanced Multifactor Data

Spring. 4(4-0) STT 423.

Applied analysis techniques of field or survey data with unbalanced subclass numbers in field of biological sciences: predictions utilizing several variables; estimation of effects of factors and their interactions.

965. Biometrical Genetics

Fall of odd-numbered years. 4(4-0) ANS 855 and one course in quantitative genetics.

Genetics models for quantitative traits: estimation of components of variance; correlation of relatives; Selection Index theory; multi-factor and multivariate responses in designed experiments.

ANTHROPOLOGY ANP

College of Human Medicine
College of Osteopathic Medicine
College of Social Science

100. The Origin of Man and Culture

Fall, Winter, Spring, Summer. 4(3-1)

Introduction to physical anthropology: the position of man in the animal kingdom, the genetic mechanisms of evolution, human beginnings and the fossil record, racial evolution and racial types among modern man, the anticipation of culture among other animals and the development of human culture, and culture as an adaptive mechanism.

171. Introduction to Sociocultural Anthropology (S)

Fall, Winter, Spring, Summer. 4(3-1)

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.

IDC. Resource Ecology and Man

For course description, see Interdisciplinary Courses.