

**415. Special Problems**  
Fall, Winter, Spring. 1 to 3 credits.  
May re-enroll for a maximum of 5 credits.  
Seniors and approval of department.  
Special studies in fields not covered by other animal husbandry courses.

**451. Swine Production**  
Spring. 4(3-3) 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 of even-numbered years.  
4(3-3) ANS 325 or approval of department.

History, modern breeds, breeding, selection, nutrition and feeding, management, marketing, housing, diseases and parasites, wool. Visits to farm flocks. Practice in management skills.

**453. Beef Production**  
Spring. 4(3-3) ANS 325 or approval of department.

History, breeds, breeding, selection, nutrition and feeding, commercial systems of production, diseases and parasites. Visits to purebred herds and to feed lots. Practice in management skills.

**454. Horse Production**  
Fall of even-numbered years. 3(2-2)  
ANS 325 or approval of department.

Selection, breeding, feeding, management, marketing, diseases and parasites. Relationship of body structure to performance.

**462. Meat Animal Breeding**  
Spring. 3(2-2) ANS 461.

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

**488. The Impact of Animal Resource Management Upon the World's Developing Nations**  
Winter. 3(4-0)

For course description, see *Interdisciplinary Courses*.

**825. Techniques in Nutrition Research**  
Winter of odd-numbered years. 1 to 3 credits. CEM 333; approval of department. Interdepartmental with Human Nutrition and Foods.

Use of specialized instruments and techniques. Laboratory safety. Management of laboratory animals. Development of abilities in areas of particular interest to individual students.

**890. Advanced Special Problems**  
Fall, Winter, Spring, Summer. 1 to 4 credits. May re-enroll for a maximum of 8 credits. Approval of department.

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

**899. Research**  
Fall, Winter, Spring, Summer. Variable credit. Approval of department.

**912. Seminar**  
Fall, Winter, Spring. 1 credit.

**927. Comparative Nutrition I**  
Winter. 2 or 4 credits. BCH 452, PSL 502 or concurrently. Interdepartmental with and administered by Human Nutrition and Foods.

Mammalian nutrition based on biochemical and physiological phenomena. Proteins are studied in the first half of the term; carbohydrates, fats and macro-minerals in the last half.

**928. Comparative Nutrition II**  
Spring. 2 or 4 credits. BCH 452, PSL 502. Interdepartmental with Human Nutrition and Foods.

Mammalian nutrition based on biochemical and physiological phenomena. Micro-minerals are studied in the first half of the term; vitamins in the last half.

**963. Genetics of Breed Improvement**  
Winter. 3(3-0) ANS 461, STT 421.

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

**964. Breeding Systems and Plans**  
Spring. 3(3-0) 963.

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

**999. 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.

**461. Principles of Animal Breeding**  
Winter. 3(3-0) CSC 250.

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

**525. Animal Nutrition**  
Winter, Summer. 5(4-2) BCH 401.

Principles of nutrition. Nutrients and their metabolism. Nutritive requirements for maintenance, growth, 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.

**965. Biometrical Genetics**  
Fall. 4(4-0) One course in quantitative or population genetics.

Genetic expectations in random mating and inbred populations. Estimation of genetic parameters. Relation of gene frequency to population mean and variance. Components of genetic variance. Correlation of relatives. Selection theory.

## 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 Anthropology**  
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.

**200. Resource Ecology and Man**  
For course description, see *Interdisciplinary Courses*.

**221. Introduction to Social and Cultural Analysis**  
Fall, Spring. 4(3-1) 171.

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

**250. Culture, Environment and Adaptation**  
Fall. 4(3-1) 100.

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.

**263. Origin of Civilization: Archaeology**  
Spring. 4(3-0) 100 or 171.

The rise, development and spread of culture in the period before written history. Archaeological evidence is used to trace the evolution of culture as it has been reconstructed from the excavation of pre-historic sites in the Old and New World.

**275. The Anthropology of Asia**  
Fall. 4(3-0) Sophomores or approval of department.

Several cultural complexes and cultures 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**  
Fall, Spring. 4(3-0) Sophomores or approval of department.

Racial and cultural problems confronting the African peoples.