Animal Science

Department of Animal Science
College of Agriculture and Natural Resources

110. Introductory Animal Agriculture
Fall. 3(2-3)

112. Introductory Animal Management
Spring. 3(2-2)
Principles of managing beef and dairy cattle, horses, poultry, sheep and swine throughout their life cycles. Topics include genetics, nutrition, reproduction, health, care, and economically efficient production.

200A. Introductory Judging of Livestock or Carcasses
Spring. 1 to 2 credits. A student may earn a maximum of 3 credits in all enrollments for this course. P: ANS 211. R: A student may earn a maximum of 8 credits from ANS 200A, ANS 200B, ANS 300A, ANS 300B, ANS 300C and ANS 300D.
Evaluation of functional conformation of beef cattle, swine and sheep. Preparation for intercollegiate competition. Field trips required.

200B. Introductory Judging of Dairy Cattle or Horses
Spring. 1 to 2 credits. A student may earn a maximum of 3 credits in all enrollments for this course. R: A student may earn a maximum of 8 credits from ANS 200A, ANS 200B, ANS 300A, ANS 300B, ANS 300C and ANS 300D.
Evaluation of functional conformation of dairy cattle or horses. Preparation for intercollegiate competition. Field trips required.

210. Animal Products
Fall. 4(3-3)
P: ANS 112. R: Not open to freshmen.
Edible animal products. Processing, preservation, storage and distribution of dairy, meat, and egg products.

211. Animal and Product Evaluation
Fall. 3(1-4)
Evaluation of breeding stock, market animals and carcasses. Production records and soundness of breeding animals. Quality grading; yield grading and pricing of market animals and carcasses.

212. Merchandising Purebred Livestock
Spring of odd-numbered years. 2(1-2)
R: Open only to sophomores, juniors, and seniors.
Purebred livestock industry. Private treaty and auction sales. Advertising, animal selection and budgeting of purebred livestock sales. Field trips required.

242. Introductory Horse Management
Fall. 3(2-2)
Principles of horse management. Reproduction, nutrition, herd health, genetics, economics, marketing. Field trips required.

262. Sheep Management
Spring. 3(2-2)
R: Open only to sophomores, juniors, and seniors.
Principles of sheep management: genetics, reproduction, nutrition, marketing, and economics. Field trips required.

276. Seafood Systems Management
Spring. 3(3-0) Interdepartmental with Food Science and Fisheries and Wildlife. Administered by Fisheries and Wildlife.
Domestic and international perspectives on major aquatic foods. Cultural and nutritional value; wild harvest; aquaculture; processing technology; food handling and food safety.

300A. Advanced Livestock Judging
Fall of even-numbered years. 2 credits.
P: ANS 200A. R: Not open to freshmen. A student may earn a maximum of 8 credits from ANS 200A, ANS 200B, ANS 300A, ANS 300B, ANS 300C and ANS 300D.
Evaluation of conformation and performance records of beef cattle, swine and sheep. Represent MSU in intercollegiate competition. Field trips required.

300B. Advanced Meat Evaluation and Grading
Fall of odd-numbered years. 2 credits.
P: ANS 200A. R: Not open to freshmen. A student may earn a maximum of 8 credits from ANS 200A, ANS 200B, ANS 300A, ANS 300B, ANS 300C and ANS 300D.
Evaluation of beef, pork, and lamb carcasses and wholesale cuts according to industry standards. Federal grading standards. Field trips to meat packing operations required. Represent MSU in intercollegiate competition.

300C. Advanced Dairy Cattle Judging
Fall. 2 credits.
P: ANS 200B. R: Not open to freshmen. A student may earn a maximum of 8 credits from ANS 200A, ANS 200B, ANS 300A, ANS 300B, ANS 300C and ANS 300D.
Evaluation of conformation of various breeds of dairy cattle. Represent MSU in intercollegiate competition. Field trips required.

300D. Advanced Horse Judging
Fall. 2 credits.
P: ANS 200B. R: Not open to freshmen. A student may earn a maximum of 8 credits from ANS 200A, ANS 200B, ANS 300A, ANS 300B, ANS 300C and ANS 300D.
Evaluation of functional characteristics of horses. Represent MSU in intercollegiate competition. Field trips required.

310. Livestock and Product Marketing
Fall. 3(2-2) Interdepartmental with Food Systems Economics and Management.

315. Principles of Animal Feeding and Nutrition
Fall. 4(0-2)
P: CEM 143, BS 111. R: Completion of Tier I writing requirement.

314. Genetic Improvement of Farm Animals
Fall. 4(3-2)
P: BS 111 and MET 110 or MTH 116. R: Completion of Tier I writing requirement.
Qualitative and quantitative inheritance in domestic farm animals. Statistical concepts and probability related to animal breeding. Improvement of dairy cattle, livestock, and horses through genetics and mating systems.

315. Anatomy and Physiology of Farm Animals
Spring. 4(3-2)

401. Issues in Animal Agriculture
Spring. 12(0)
P: ANS 315 or ANS 314 or ANS 315. R: Open only to juniors and seniors.
Survey of issues related to local, national and international animal agriculture.

405. Endocrinology of Reproduction
Fall. 3(0-0)
P: ANS 315. R: Not open to freshmen and sophomores.
Endocrine regulation of reproduction. Cellular and molecular aspects of gametogenesis, folliculogenesis, sexual cycles, fertilization, sex differentiation, gestation, and parturition. Technology to regulate reproduction.

407. Toxicology Methods Laboratory
Fall. 2 credits. Interdepartmental with Food Science.
P: ANS 407 or concurrently. R: Not open to freshmen and sophomores.
Laboratory techniques for evaluating potential toxicity of chemicals to living systems. Field trip to industrial toxicology laboratory required.

413. Non-Ruminant Nutrition
Spring. 4(3-2)
P: ANS 315. R: Not open to freshmen and sophomores.
Nutrition of horses, swine and poultry. Digestive and metabolic development and nutrient requirements. Relationships of genetics, endocrinology, immunology, and environment to nutrition.

414. Advanced Animal Breeding and Genetics
Spring. 3(0-0)
P: ANS 314. R: Not open to freshmen and sophomores.
Application of genetics to animal breeding. Current and potential selection programs and crossbreeding systems of dairy cattle, horse and livestock populations. Expected response to selection methods.

415. Biology of Growth and Lactation
Spring. 3(3-0)
P: ANS 315. R: Not open to freshmen and sophomores.
Principles of growth and lactation in food-producing species. Endocrine regulation of bone, muscle, fat, and mammary tissue. Bioenergetic, nutritional, and metabolic aspects of growth and lactation.
416. Meat Science and Muscle Biology
Fall. (3-2-0)
P: ANS 315. R: Not open to freshmen and sophomores.
Structure, composition, development and function of muscle and its conversion to meat. Properties of fresh and processed meat. Microbiology, preservation, palatability, inspection and sanitation, nutritive value, and by-products.

417. Topics in Toxicology
Spring. (1-1-0) Interdepartmental with Food Science.
P: ANS 407. R: Not open to freshmen and sophomores. Selected topics including regulatory toxicology, risk assessment, environmental toxicology, food safety, and safe handling of food substances.

422. Beef Cattle Management
Fall. (3-2-0)
Management practices and systems for beef herds. Feed requirements, reproduction, breeding, performance testing, housing, and diseases. Costs and returns. Field trips required.

425. Principles of Animal Biotechnology
Fall. (3-3-0)
P: BS 111; CEM 143 or 251. Application of molecular biology concepts to the improvement of domestic and companion animals. Transgenic animal production, molecular genetics and marker assisted selection.

426. Dairy Cattle Management
Fall. (3-2-0)
P: ANS 313, ANS 311, ANS 316. R: Not open to freshmen and sophomores.
Management techniques for operating a dairy herd. Mastitis control, reproductive and nutrition management, records, waste management, and facilities. Field trips required.

428. principles of Animal Biotechnology
Fall. (3-3-0)
P: BS 111; CEM 143 or 251. Application of molecular biology concepts to the improvement of domestic and companion animals. Transgenic animal production, molecular genetics and marker assisted selection.

432. Dairy Cattle Management
Fall. (3-2-0)
P: ANS 313, ANS 311, ANS 316. R: Not open to freshmen and sophomores.
Management techniques for operating a dairy herd. Mastitis control, reproductive and nutrition management, records, waste management, and facilities. Field trips required.

441. Animal Exercise Physiology
Fall. (3-2-0)

444. Equine Physiology
Spring. (4-3-0)
P: ANS 315. R: Open only to juniors, seniors and graduate students.
Systemic and comparative physiology of birds: respiration, reproduction, endocrinology, digestion, urination, and the senses.

461. Meate Science and Muscle Biology
Fall. (3-2-0)

466. Statistical Methods for Biologists II
P: STT 464.
Concepts of reducing experimental error: covariance, complete and incomplete block designs, Latin squares, split plots, repeated-measures designs, regression applications, and response surface designs.

472. Soil Management
Fall. (3-2-0)
P: ANS 313, ANS 314, ANS 315. R: Not open to freshmen and sophomores.
Integrated management practices of swine enterprises. Facilities and environmental needs, genetics, nutrition, reproduction, disease control, economics and marketing. Field trips required.

480. Animal Systems in International Development
Spring. (3-2-0)
P: ANS 310, ANS 314, ANS 315 or approval of department. R: Not open to freshmen and sophomores.
Animal systems in various global regions. Output, land and resource conservation, and socio-economic factors.

482. Agricultural Research Systems in Developing Countries
Summer. (3-2-0) Interdepartmental with Agriculture and Natural Resources, Agricultural Economics, and Crop and Soil Sciences. Administered by Agriculture and Natural Resources.
P: ANS 310, ANS 314, ANS 315 or approval of department. R: Open only to seniors and graduate students in the College of Agriculture and Natural Resources.
Planning, organizing and managing agricultural research systems. Problems and alternative reforms to improve research productivity. Adapting new agricultural technology in developing countries.

483. Ruminant Nutrition
Spring. (3-0-3)
P: ANS 313, ANS 315. R: Not open to freshmen and sophomores.
Physiology and metabolism in ruminants. Prehension, digestion, metabolism, absorption, and distribution of nutrients for productive functions. Feeding management strategies and diet formulation. Field trip may be required.

491. Independent Study
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course.
P: ANS 210; ANS 313 or ANS 314 or ANS 315. R: Open only to juniors and seniors. Approval of department. Application required.

499. Senior Thesis in Animal Science
Fall, Spring, Summer. 3 to 9 credits. A student may earn a maximum of 8 credits in all enrollments for this course.
P: ANS 313, ANS 314, ANS 315. R: Open only to seniors. Approval of department; application required. Maximum of 10 credits may be earned in ANS 499 and ANS 499."
841. **Advanced Endocrine Physiology and Pharmacology**

Fall, 4(4-0) Interdepartmental with Physiology, Pharmacology and Toxicology, and Psychology. Administered by Physiology.

P: BCH 461, PSY 452. R: Open only to graduate students in the Colleges of Human Medicine, Osteopathic Medicine, Veterinary Medicine, Natural Science, and Agriculture and Natural Resources.

Basic and advanced concepts of endocrine and reproductive physiology and pharmacology.

890. **Advanced Independent Study**

Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 8 credits in all enrollments for this course.

R: Approval of department; application required. Investigation of topics of special interest.

898. **Master's Research**

Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 10 credits in all enrollments for this course.

R: Open only to master's students in Animal Science. Approval of department. Application required. Scholarly project for non-thesis (Plan B) master's degree.

899. **Master's Thesis Research**

Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 99 credits in all enrollments for this course.

R: Open only to master's students in Animal Science. Approval of department.

935. **Nutrition: Lipid and Carbohydrate Metabolism**

Fall of even-numbered years. 3(3-0) Interdepartmental with Human Nutrition and Foods. Administered by Human Nutrition and Foods.

R: Open only to graduate students in Food Science, Human Nutrition, Animal Science, and Nursing, and to graduate-professional students.

Regulatory aspects of lipid and carbohydrate metabolism as influenced by nutritional status.

936. **Protein Nutrition and Metabolism**

Spring of even-numbered years. 3(3-0) Interdepartmental with Human Nutrition and Foods. Nutritional and endocrine regulation of protein synthesis and degradation, protein status, protein-energy malnutrition. Protein metabolism during exercise. Metabolism, digestion, and absorption of amino acids and proteins.

937. **Mineral Nutrition and Metabolism**

Fall of even-numbered years. 3(3-0) Interdepartmental with Human Nutrition and Foods.

Forms and locations of mineral elements in the body, metabolic functions, deficiencies, and toxicities, interrelationships and quantitative requirements.

938. **Nutrition: Metabolism and Function of Vitamins**

Spring of odd-numbered years. 3(3-0) Interdepartmental with Human Nutrition and Foods. Administered by Human Nutrition and Foods.

R: Open only to graduate students in Food Science, Human Nutrition, Animal Science, and Nursing, and to graduate-professional students.

Regulatory roles of vitamins at cellular and molecular levels.

943. **Techniques of Analyzing Unbalanced Research Data**

Spring, 4(4-0) Interdepartmental with Forestry, Crop and Soil Sciences, Horticulture, and Fisheries and Wildlife.

P: STT 484. R: Open only to graduate students in the College of Agriculture and Natural Resources.

Linear model techniques to analyze research data characterized by missing and unequal number of observations in classes. Simultaneous consideration of multiple factors. Estimable comparisons. Hypothesis testing. Computational strategies. Variance and covariance components. Brooding values.

976. **Multivariate Methods in Agriculture and Natural Resources**

Spring, 4(4-0) Interdepartmental with Forestry, and Fisheries and Wildlife. Administered by Forestry.

P: STT 482, MTH 314. R: Open only to graduate students in the College of Agriculture and Natural Resources and in the Interdepartmental Graduate Specialization in Ecology and Evolutionary Biology.

Application of multivariate methods to research problems. Hotelling's T-test, profile analysis, discriminant analysis, canonical correlation, principal components, principal coordinates, correspondence analysis, and cluster analysis.

999. **Doctoral Dissertation Research**

Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 99 credits in all enrollments for this course.

R: Open only to doctoral students in Animal Science. Approval of department.

**ANTHROPOLOGY**

Department of Anthropology
College of Social Science

101. **Introduction to Anthropology**

Fall, Spring, Summer. 3(3-0)


201. **Sociocultural Diversity**

Fall, Spring, Summer. 3(3-0)

Origins and diversity of cultural systems. Theories of culture. Patterns of kinship. Religious, economic, and political institutions.

202. **Biocultural Evolution**

Fall, Spring, Summer. 3(3-0)


220. **Gender Relations in Comparative Perspective**

Fall. 3(3-0)

Gender relations in different cultures. Economic and domestic division of labor between the sexes as a factor underlying power differentials.

264. **Great Discoveries in Archaeology**

Spring. 3(3-0)

Great discoveries in archaeology that have captured the public's imagination and shaped Western thought. From Olduvai Gorge and Stonehenge to Machu Picchu.

270. **Women and Health: Anthropological and International Perspectives**

Fall. 3(3-0)


280. **The Anthropological Film**

Spring. 4(3-2)

Ethnographic film as a record of vanishing cultures, as a tool for ethnological analysis, and as a source of perspectives on different cultures and variability within cultures.

320. **Social and Cultural Analysis**

Fall, Spring. 3(4-0)

P: ANP 101 or ANP 201. R: Completion of Tier I writing requirement.

Major theoretical traditions of cultural anthropology. Functionalist, symbolic, structuralist, and contemporary developments.

331. **Anthropology of Social Movements**

Fall. 3(3-0)

P: ANP 101 or ANP 201.

How social movements within different cultures around the world organize, create or impede change on the basis of class, religion, race, ethnicity, language, and territory.

332. **Peasants and Social Change in the Developing World**

Spring. 3(3-0)

P: ANP 101 or ANP 201.

Cross-cultural perspective on patterns and variations in peasant systems worldwide. Social mechanisms with which they respond to change.

333. **Race, Ethnicity, and Nation: Anthropological Approaches to Collective Identity**

Spring. 3(3-0)

P: ANP 101 or ANP 201 or ANP 202. R: Not open to freshmen. Not open to students with credit in SOC 215.

Understanding race and ethnicity. Models analyzing racial, ethnic, and national identities; boundaries; and collective identities and differentiation. Case studies from cultures worldwide.

340. **Introduction to Physical Anthropology**

Spring. 4(3-2)

P: ANP 101 or ANP 202.

Problems, data, and methods of physical anthropology. Human genetics, hominid evolution, primate studies, human osteology, and human diversity. Field trips at the student's expense may be required.

360. **Introduction to Archaeology**

Fall. 3(3-0)

Theory, methodology, and techniques of archaeology. Applications to questions about past human behavior. History and concepts of archaeology as an anthropological subdiscipline.

361. **Paleolithic Archaeology**

Fall. 3(3-0)

P: ANP 101 or ANP 264 or ANP 360.

Stone Age archaeology from the dawn of tool making to the specialized hunters and cave artists of the late Ice Age.

362. **Rise of Civilization**

Spring. 3(3-0)

P: ANP 101 or ANP 360.

Archaeological evidence for the appearance and development of the world's earliest prehistoric civilizations. The nature of complex societies and the comparative evolution of states.

370. **Culture, Health, and Illness**

Spring. 3(3-0)

P: ANP 101 or ANP 201 or ANP 202 or ANP 270. R: Completion of Tier I writing requirement.

Cross-cultural perspectives on the definition and treatment of illness.