101 Professional Development in Animal Science
Fall. Spring. 1(0-2) R: Open to students in the Animal Science major.
Careers in animal science. Job application, portfolio development, interviewing, and resume development.

110 Introductory Animal Agriculture
Fall. Spring. 4(3-2) R: Open to undergraduates or animal technology students. SA: ANS 112
History of animal agriculture and its relationship to human needs, production systems, marketing, and environmental considerations. Current goals of and limitations affecting U.S. farm animal production. Field trips required.

122A Feedlot Clerkship
Fall. 2(0-4) R: Open to students in the Institute of Agricultural Technology. SA: ANS 024
Clerkship to gain hands-on skills in the management of a working feedlot. Feeding cattle, feed storage, manure management, health programs, evaluation and selection of cattle, facilities maintenance, marketing fed cattle.

122B Beef Cow Calf Clerkship
Spring. 2(0-4) R: Open to students in the Institute of Agricultural Technology. SA: ANS 023
Clerkship to gain hands-on skills in the management of a working cow-calf farm. Feeding, reproduction, genetics, and selection, facilities maintenance, exhibiting cattle for sale and daily management skills.

124 Introduction to Sustainable Agriculture and Food Systems
Fall. Spring. 2(2-0) Interdepartmental with Crop and Soil Sciences and Community Sustainability and Horticulture. Administered by Crop and Soil Sciences. R: Open to undergraduate students or animal technology students.
Contemporary research and movements involving agricultural and food system sustainability. Socio-cultural factors influencing food and agriculture.

132 Dairy Farm Management Seminar
Fall. 1(1-0) R: Open to students in the Institute of Agricultural Technology. SA: ANS 054
Challenges and opportunities in the dairy industry.

140 Fundamentals of Horsemanship
Fall. Spring. 2(0-4) A student may earn a maximum of 4 credits in all enrollments for this course. R: Approval of department.
Safe horse handling skills. Riding skills. Riding aids and working with the horse at the beginner, intermediate or advanced level.

141L Draft Horse Basics
Fall. 2(0-4) SA: ANS 141
Safe handling, hitching and driving of draft horses. Care and maintenance of harness and horse drawn equipment.

142 Horse Training for Competition
Summer. 2(0-4) RB: ANS 140 R: Approval of department.
Training techniques to prepare horses for competition. Exhibiting horses.

143 Principles of Trail Riding
Summer. 1(1-0) R: Open to agricultural technology students.
Selection, nutrition and conditioning of horses for recreational or competitive trail riding.

144 Introduction to Horse Breeding and Foal Management
Spring. 1(1-0) R: Open to agricultural technology students.
Strategic development for horse breeding based on conformation and genetics, breeding the mare, prenatal and postpartum care.

146 Fundamentals of Horse Training
Fall. Spring. 3(0-6) A student may earn a maximum of 6 credits in all enrollments for this course. P: ANS 140 or approval of department R: Open to undergraduate students in the Institute of Agricultural Technology. Approval of department. SA: ANS 063a
Training and preparing an untrained horse for handling, riding and showing. Sale preparation.

147 Horse Management Placement Seminar
Spring. 1(1-0) R: Open to students in the Institute of Agricultural Technology. SA: ANS 064
Securing a placement training experience. Writing a resume.

148 Methods of Instructing Safe Horsemanship
Spring. 2(2-0) R: Open to students in the Institute of Agricultural Technology. SA: ANS 041
Lesson planning and communication skills for riding instructors. Safety and legal issues. Riding instructor certification. Organizations.

149 Horse Management Clerkship
Spring. 2(0-4) R: Open to students in the Institute of Agricultural Technology. SA: ANS 025
Management of a working horse farm. Feeding, reproduction, genetics, selection, facilities maintenance, and daily management skills.

171 Swine Clerkship
Fall. 2(0-4) R: Open to students in the Institute of Agricultural Technology.

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. A student may earn a maximum of 8 credits from the following courses: ANS 200A, ANS 200C, ANS 200D, ANS 200E, ANS 200F, ANS 300A, ANS 300C, ANS 300D, ANS 300E, and ANS 300F. RB: ANS 305 or ZOL 313 and ANS 110

200B Introductory Judging of Horses
Spring. 1 to 2 credits. A student may earn a maximum of 3 credits in all enrollments for this course. A student may earn a maximum of 8 credits from the following courses: ANS 200A, ANS 200C, ANS 200D, ANS 200E, ANS 200F, ANS 300A, ANS 300C, ANS 300D, ANS 300E, and ANS 300F. RB: ANS 305 or ZOL 313 and ANS 110

200D Introductory Animal Welfare Assessment
Fall. 1(0-2) A student may earn a maximum of 8 credits from the following courses: ANS 200A, ANS 200C, ANS 200D, ANS 200E, ANS 200F, ANS 300A, ANS 300C, ANS 300D, ANS 300E, and ANS 300F. RB: ANS 305 or ZOL 313 and ANS 110
Physiological and behavioral indicators of animal welfare. Quantitative measures and ethical issues. Written and oral assessments of animal welfare.

200F Dairy Farm Evaluation
Fall. 1(0-2) A student may earn a maximum of 8 credits from the following courses: ANS 200A, ANS 200C, ANS 200D, ANS 200E, ANS 200F, ANS 300A, ANS 300C, ANS 300D, ANS 300E, and ANS 300F. P: ANS 232 or concurrently
Evaluation of dairy farm management. Preparation for collegiate competition. Field trip required.

201 Animal Products
Fall. 3(3-0) RB: ANS 110 R: Not open to freshmen.

201L Animal Products Laboratory
Fall. (10-3) P: ANS 201 or concurrently
Processing and evaluation of meat, milk and egg products.

203 Principles of Livestock Feeding
Spring. 2(0-2) RB: ANS 110 or ANS 222 or ANS 232 or ANS 242 or ANS 272 R: Open to students in the Institute of Agricultural Technology. SA: ANS 059
Feed nutrients, digestion and metabolism. Classification of feeds. Nutrient requirements for dairy and beef cattle, sheep, swine and horses.

211 Animal and Product Evaluation
Fall. 3(1-4) P: ANS 110
Evaluation of breeding stock, market animals and carcasses. Performance records and structural correctness of breeding animals. Quality grading, yield grading and pricing of market animals and carcasses.

215 Growth, Health and Lactation in Dairy Cattle
Fall. 2(2-0) RB: ANS 295 and ANS 232 R: Open to students in the Institute of Agricultural Technology. SA: ANS 059

222 Introductory Beef Cattle Management
Spring. 3(2-2) RB: ANS 110 Not open to students with credit in ANS 422
Management practices and systems for beef herds. Feed requirements, reproduction, breeding, performance testing, housing, and diseases. Costs and returns.
Animal Science—ANS

224 Sustainable Farm and Food Systems Field Studies
Fall. 1(0-4) Interdepartmental with Crop and Soil Sciences and Community Sustainability and Horticulture. Administered by Crop and Soil Sciences. P: CSS 124 R: Not open to freshmen or agricultural technology students. Field visits to farm and food system operations that utilize sustainable practices in Michigan. Offered first half of semester.

225 Horse Behavior and Welfare
Summer. 2(2-0) R: Open to undergraduate students or agricultural technology students. Natural behavior, senses, training psychology, and common behavioral problems of horses. Equine welfare issues.

230 Dairy Herd Management

232 Introductory Dairy Cattle Management
Fall. 3(2-2) Not open to students with credit in ANS 432. Principles and techniques of dairy herd management including calf and heifer care plus lactating and dry cow management.

233 Dairy Feed Management

235 Dairy Herd Reproduction
Spring. 2(2-0) P: ANS 295 RB: ANS 232 or concurrently R: Open to students in the Institute of Agricultural Technology. Application of reproductive principles to dairy production. Field trip required.

238 Dairy Health Management
Spring. 3(2-0) P: ANS 232 or concurrently R: Open to students in the Institute of Agricultural Technology. Detection of dairy cattle disease. Infections and metabolic problems.

240 Horse Farm Management
Fall. 3(2-2) RB: ANS 203 and ANS 295 and ANS 242 and ABM 130 R: Open to students in the Institute of Agricultural Technology. SA: ANS 066 Integration of principles and skills into a farm management system. Managerial qualities, goal setting, facilities management. Health programs.

242 Introductory Horse Management
Fall. 3(2-2) Not open to students with credit in ANS 442. Principles of horse management. Reproduction, nutrition, herd health, genetics, economics, marketing.

243 Horse Nutrition and Feeding
Fall. 2(2-0) P: ANS 203 R: Open to students in the Institute of Agricultural Technology. SA: ANS 078 Nutrient requirements of the horse, selection and evaluation of feeds, balancing diets by hand and by computer. Pasture management.

244 Horse Facility Design and Management
Spring. 2(2-0) Equine facility design and management. Manure, pasture, and biosecurity management.

245 Horse Exercise Physiology
Fall. 2(2-0) RB: ANS 242 R: Open to students in the Institute of Agricultural Technology. SA: ANS 068 Horse body systems, physiology of exercise and conditioning programs. Goals of various conditioning programs. Common ailments of sport horses.

247 Horse Health
Spring. 2(2-0) R: Open to agricultural technology students. Health risks for horses, emergency care, preventive health care.

248 Horse Reproductive Technology and Breeding Techniques
Spring. 2(2-0) RB: Biology R: Open to agricultural technology students. Horse reproductive anatomy, physiology, breeding and foaling management.

252 Introduction to Management of Avian Species
Fall of odd years. 3(2-2) Management of commercial poultry flocks and avian diseases. Feed requirements, reproduction, breeding, housing and disease.

262 Introductory Sheep Management
Spring. 3(2-2) Principles of sheep management: genetics, reproduction, nutrition, marketing, and economics.

272 Introductory Swine Management
Fall. 3(2-2) Not open to students with credit in ANS 472. Swine production principles, practices, technologies, and systems. Field trip required.

282 Companion Animal Biology and Management
Fall. Spring. 3(3-0) Principles of companion animal management. Breeds, reproduction, feeding, housing, health, and diseases.

290 Independent Study in Agricultural Technology
Fall, Spring. Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open to students in the Institute of Agricultural Technology. SA: ANS 057 Independent study in agricultural technology.

295 Structure and Function of Livestock
Spring. 2(2-0) RB: ANS 110 or ANS 222 or ANS 232 or ANS 242 or ANS 272 R: Open to students in the Institute of Agricultural Technology. SA: ANS 205 Gross anatomy of livestock. Functions of tissues and organs. Regulation of growth, lactation, reproduction, seasonality, and temperature.

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

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

300D Advanced Horse Judging

300E Animal Welfare Judging
Fall. 1(0-2) A student may earn a maximum of 8 credits from the following courses: ANS 200A, ANS 200C, ANS 200D, ANS 200E, ANS 200F, ANS 300A, ANS 300C, ANS 300D, ANS 300E, and ANS 300F. P: ANS 200E RB: ANS 110 and (ANS 305 or ZOL 313) R: Not open to freshmen. Enhanced understanding of the physiological and behavioral indicators of animal welfare. Ethical values in the assessment of welfare status. Intercollegiate competition. Field trip required.

300F Advanced Dairy Farm Evaluation
Spring. 2(0-4) A student may earn a maximum of 8 credits from the following courses: ANS 200A, ANS 200C, ANS 200D, ANS 200E, ANS 200F, ANS 300A, ANS 300C, ANS 300D, ANS 300E, and ANS 300F. P: (ANS 200F and ANS 432) and (ANS 430 or concurrently) RB: ANS 315 R: Not open to freshmen or sophomores. Approval of department. Evaluation of factors important in successful management of a dairy farm business. Represent Michigan State University in intercollegiate competition. Field trips required.

301 Professional Development in Animal Science II
Fall. 2(1-2) P: (ANS 101 and ANS 110) and completion of Tier I writing requirement R: Open to juniors or seniors in the Department of Animal Science. Career preparation in animal science. Job interview skills. Oral presentation, written communication, and critical evaluation of science literature.

305 Applied Animal Behavior
Spring. 3(2-2) P: BS 161 or LB 145 or BS 181H Techniques for assessing health and welfare of domestic animals based on their behavior.
Animal Health and Disease Management  Fall. 3(3-0) P: ANS 110 and (BS 161 or LB 145 or BS 181H)


Principles of Animal Feeding and Nutrition  Fall. 4(3-2) P: (BS 161 or LB 145 or BS 181H) and completion of Tier I writing requirement

Comparative nutrition and metabolism for production, health, and stewardship of cattle, horses, swine, poultry, dogs and cats. Diet evaluation and formulation. Feeding management.

Genetic Improvement of Domestic Animals  Fall, Spring. 4(4-0) P: (BS 161 or BS 181H or LB 145) and completion of Tier I writing requirement

Molecular, Mendelian, population, and quantitative genetics of domestic animals.

Anatomy and Physiology of Farm Animals  Spring. 4(3-2) P: (BS 161 or LB 145 or BS 181H) and completion of Tier I writing requirement


Ethical Issues in Animal Agriculture  Spring. 1(0-2) RB: ANS 313 or ANS 314 or ANS 315 R: Open to juniors or seniors.

Ethical issues related to local, national, and international animal agriculture.

Endocrinology of Reproduction  Fall. 4(3-2) P: ANS 315 R: Not open to freshmen or sophomores.

Endocrine regulation of reproduction. Cellular and molecular aspects of gametogenesis, folliculogenesis, sexual cycles, fertilization, sex differentiation, gestation, and parturition. Technology to regulate reproduction.

Food and Animal Toxicology  Fall. 3(3-0) P: BS 161 or LB 145 or BS 181H R: Not open to freshmen or sophomores.


Problems, Controversies and Advancements in Reproduction  Fall. 3(3-0) P: BS 161 or PSL 250

Selected topics in endocrine, cellular, molecular and genetic aspects of sex differentiation, gametogenesis, folliculogenesis, sexual cycles, behavior, fertilization, early embryo development, pregnancy, parturition, infertility, reproductive disorders, assisted reproductive technologies in humans, livestock and animal models.

Non-Ruminant Nutrition  Fall. 4(3-2) P: (ANS 110 and ANS 313) and (STT 200 or STT 201 or STT 464) RB: BMB 200 or BMB 401 R: Not open to freshmen or sophomores.

Digestive processes and nutrient metabolism in non-ruminant animals. Metabolic basis for nutrient requirements.

Growth and Musculoskeletal Biology  Spring. 3(3-0) RB: ANS 315 R: Not open to freshmen or sophomores.


Animal Agriculture and the Environment  Fall. 3(2-2) Interdepartmental with Biosystems Engineering, Administered by Animal Science. P: (BS 161 or LB 145 or BS 181H) and (CEM 143 or CEM 251) RB: CSS 210 Comprehensive nutrient management plans (CNMP) for animal feeding operations. Trends in animal production, environmental issues, and diet formulation and their impact on manure production. Development of CNMP for a specific animal feeding operation.

Advanced Beef Cattle Feedlot Management  Fall. 3(2-2) P: ANS 222 RB: ANS 313 R: Not open to freshmen or sophomores.

Feedlot management systems and issues. Feed systems, manure management, health maintenance, and cattle marketing. Field trips required.

Sustainable Agriculture and Food Systems: Integration and Synthesis  Fall. 3(3-0) Interdepartmental with Crop and Soil Sciences and Community Sustainability and Horticulture. Administered by Crop and Soil Sciences. P: CSS 124 and (CSS 224 or concurrently) R: Open to juniors or seniors or graduate students.


Animal Biotechnology  Spring. 3(3-0) P: (BS 161 or BS 181H or LB 145) and (CEM 143 or CEM 251)

Application of molecular biology concepts to the improvement of domestic animals. Transgenic animal production, molecular genetics and marker assisted selection, animal cloning, Epigenetics, Assisted Reproductive Technologies (ART).

Environmental Toxicology and Society  Spring of odd years. 3(3-0) Interdepartmental with Sociology. Administered by Animal Science. RB: ISB 200 or ISB 202 or ISB 204 or BMB 200 or BS 161 or BS 181H or LB 145 or BS 162 or BS 182H or LB 144

Impact of environmental chemicals on health and modern society. Cellular and organ functions and their interface with the environment. Limitations of scientific investigation and environmental regulations.

Dairy Systems Management  Spring. 3(2-3) P: ANS 313 and ANS 432 R: Not open to freshmen or sophomores.

Decision-making strategies for dairy farms. Emphasis on herd replacements, personnel, health, facilities, nutrient management and other issues associated with dynamic markets and business environments. Field trips required.

Advanced Dairy Cattle Management  Fall. 3(2-2) P: ANS 232 RB: ANS 313 R: Not open to freshmen or sophomores.

Management techniques for operating a dairy herd. Mastitis control, reproductive and nutrition management, records, and general herd health. Field trips required.

Food Processing: Muscle Foods  Fall. 3(2-3) Interdepartmental with Food Science. Administered by Food Science. P: FSC 211 or ANS 201 R: Open to freshmen or sophomores. SA: FSC 223


Mammary Physiology  Spring. 4(3-2) P: (BS 161 or LB 145 or BS 181H) and (ANS 313 and ANS 315) R: Not open to freshmen and not open to sophomores.


Advanced Horse Management  Spring. 3(3-2) P: ANS 242 RB: ANS 313 R: Not open to freshmen or sophomores. SA: ANS 498


Equine Exercise Physiology  Fall. 3(3-2) RB: ANS 313 and ANS 315

Research in equine exercise science. Physiological, metabolic and mental adaptation to athletic training. Nutrition and bioenergetics of muscle metabolism.

Avian Physiology  Spring. 3(3-2) RB: ANS 315 R: Open to juniors or seniors or graduate students.

Systematic and comparative physiology of birds: respiration, reproduction, endocrinology, digestion, urination, and the senses.

Seminar in Plant, Animal and Microbial Biotechnology  Spring. 1(1-0) Interdepartmental with Biosystems Engineering and Crop and Soil Sciences and Horticulture. Administered by Horticulture. P: (ANS 425 or concurrently) or (BE 360 or concurrently) or (CSS 451 or concurrently) or (MMG 445 or concurrently)

Current applications of plant, animal and microbial biotechnology in agriculture and related industries. Technologies under development and factors associated with moving from laboratory to product development. Field trips required.

Statistics for Biologists  Fall. 3(3-0) Interdepartmental with Crop and Soil Sciences and Statistics and Probability. Administered by Statistics and Probability. P: MTH 103 or MTH 110 or MTH 116 RB: STT 421

Biological random variables. Estimation of population parameters. Testing hypotheses. Linear correlation and regression. Analyses of counts and measured data to compare several biological groups including contingency tables and analysis of variance.

Advanced Swine Management  Spring of even years. 3(2-2) P: ANS 272 RB: ANS 313 R: Not open to freshmen or sophomores. SA: ANS 498

Management techniques for operating a swine herd. Management of reproduction and nutrition, records, and general herd health. Integration of husbandry and business principles for decision making.
**Animal Science—ANS**

**480 Animal Systems in International Development**
Fall, Spring, Summer. 3(3-0) A student may earn a maximum of 6 credits in all enrollments for this course. **R:** Not open to freshmen. Approval of department; application required.

Animal systems in various global regions. Output, land and resource conservation, and socio-economic factors.

**483 Ruminant Nutrition**
Spring. 3(3-0) P: ANS 313 RB: (ANS 315 or concurrently) and (BBM 200 or concurrently) or (BBM 401 or concurrently) R: Not open to freshmen or sophomores.

Nutrition, 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.

**490 Independent Study**
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 6 credits in all enrollments for this course. **R:** ANS 210 and (ANS 313 and ANS 314 and ANS 315) R: Not open to freshmen. Approval of department; application required.

Independent study in genetics, nutrition, physiology, toxicology, meat science, or management of poultry, livestock, or horses.

**492 Undergraduate Research in Animal Science**
Fall, Spring, Summer. 3(0-6) A student may earn a maximum of 6 credits in all enrollments for this course. **P:** (BS 161 or LB 145 or BS 181H) and (CEM 143 or CEM 251) and (ANS 313 or ANS 314 or ANS 315) R: Not open to freshmen or sophomores.

Faculty supervised research in selected areas of animal science.

**493 Professional Internship in Animal Science**
Fall, Spring, Summer. 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. A student may earn a maximum of 6 credits in all enrollments for any or all of these courses: ABM 493, ANR 493, ANS 493, CMP 493, CSS 493, CSUS 493, EE 493, FIM 493, FOR 493, FSC 493, FW 493, HRT 493, RDC 493, PKG 493, PLP 493 or TSM 493. R: Open to juniors or seniors in the Animal Science Major. Approval of department; application required.

Supervised professional experience in the animal industry.

**511 Animal Science for Veterinarians**
Fall, Spring. (2-0) R: Open only to graduate-professional students in the College of Veterinary Medicine.

Husbandry of domestic, laboratory, and zoo animals. Managerial systems in animal agriculture. Production and management goals.

**805 Animal Welfare Assessment**
Fall. 3(3-0) Interdepartmental with Integrative Biology. Administered by Animal Science. **RB:** (ANS 305 or IBIO 313) or background in animal science or zoology including exposure to topics such as animal behavior, physiology, management, and husbandry. Multidisciplinary online computer-based instruction in animal welfare science and related issues including physiology, behavior, human-animal interactions, suffering and pain, ethics, health, assessment and standards, and economics.

**814 Advanced Statistics for Biologists**
Spring. 4(3-2) Interdepartmental with Crop and Soil Sciences and Statistics and Probability. Administered by Statistics and Probability. **RB:** STT 464.


**815 Advanced Topics in Reproduction and Development**
Fall, Spring. 3(3-0) RB: Animal Science, Biology and Biomedical Sciences

Core concepts in animal reproduction and development. Recent advances relevant to animal and human fertility, development, and diseases.

**816 Integrative Toxicology: Mechanisms, Pathology and Regulation**
Fall of odd years. 3(3-0) Interdepartmental with Biochemistry and Molecular Biology and Pathobiology and Diagnostic Investigation and Pharmacology and Toxicology. Administered by Pharmacology and Toxicology. **P:** PHM 819


**823 Grant Writing for Biomedical Research**
Spring. 2(2-0) RB: Minimum 2 years completed in a graduate (doctoral) program. **R:** Approval of department.

Best practices for development, preparation and submission of competitive grant proposals for biomedical research.

**824 Methods of Quantitative and Molecular Genetics for Livestock**
Spring of odd years. 3(2-2) RB: ANS 404 Quantitative and molecular methods for animal geneticists. Identification and evaluation of molecular markers, genome maps, linkage and segregation analyses, optimal mapping designs, and marker-quantitative trait loci associations in livestock species.

**828 Scientific Communication for Reproductive and Developmental Biology**
Fall. 1(1-0) RB: Students specializing in reproductive biology. **R:** Approval of department.

Best practices for preparing and delivering effective scientific seminars in reproductive and developmental biology.

**842 Population Genetics, Genealogy and Genomics**
Fall. 3(3-0) Interdepartmental with Crop and Soil Sciences and Forestry and Fisheries and Wildlife and Genetics and Horticulture. Administered by Forestry. **RB:** Pre-calculus, basic genetics


**849 Applied Bayesian Inference using Monte Carlo Methods for Quantitative Biologists**
Fall of even years. 3(2-2) Interdepartmental with Fisheries and Wildlife and Statistics and Probability. Administered by Fisheries and Wildlife. **RB:** STT 814 and IBIO 851 or equivalent courses. **R:** Not open to undergraduate students.


**890 Advanced Independent Study**
Fall, Spring, Summer. 1 to 4 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.

**892 Food Science and Animal Science Seminar**
Fall, Spring. 1(1-0) A student may earn a maximum of 4 credits in all enrollments for this course. Interdepartmental with Food Science. Administered by Food Science. **R:** Open to graduate students in the Department of Animal Science or in the Department of Food Science and Human Nutrition. Critical review of literature. Organization and communication of scientific data in food science and animal science.

**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 the Department of 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 the Department of Animal Science. Approval of department. Master's thesis research.

**901 Selected Topics in Animal Breeding and Genetics**
Fall, Spring, Summer. 1 to 2 credits. A student may earn a maximum of 6 credits in all enrollments for this course. Selected topics of current interest and importance in animal breeding and genetics.

**936 Protein Nutrition and Metabolism**

**999 Doctoral Dissertation Research**
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 8 credits in all enrollments for this course. **R:** Open to doctoral students in the College of Agriculture and Natural Resources or in the Department of Animal Science. Approval of department. Doctoral dissertation research.