150 Writing: The Evolution of American Thought
Fall, Spring. 4(4-0) P:M: (ATL 1004) or designated score on English placement test. Not open to students with credit in MC 111 or MC 112 or LBS 133 or AL 192 or AL 192H or ATL 110 or ATL 115 or ATL 120 or ATL 125 or ATL 130 or ATL 135 or ATL 140 or ATL 145 or ATL 150. Drafting, revising, and editing compositions derived from American historical, social, and cultural texts to develop skills in narration, persuasion, analysis, and documentation.

195H Writing: Major Topics in American Thought
Fall, Spring. 4(4-0) RB: Designated score on English placement test. Not open to students with credit in MC 111 or MC 112 or LBS 133 or AL 192 or AL 192H or ATL 110 or ATL 115 or ATL 120 or ATL 125 or ATL 130 or ATL 135 or ATL 140 or ATL 145 or ATL 150. Drafting, revising, and editing compositions derived from readings on major topics in American thought to develop advanced skills in narration, persuasion, analysis, and documentation.

200D 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. RB: (ANS 211) R: A student may earn a maximum of 8 credits from the following courses: ANS 200A, ANS 200B, ANS 200C, ANS 200D, ANS 300A, ANS 300B, ANS 300C and ANS 300D. SA: ANS 200D Evaluation of functional conformation of beef cattle, sheep and swine and their carcasses. Preparation for intercollegiate competition. Field trips required.

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. R: (ANS 211) R: A student may earn a maximum of 8 credits from the following courses: ANS 200A, ANS 200B, ANS 200C, ANS 200D, ANS 300A, ANS 300B, ANS 300C and ANS 300D. SA: ANS 200B Evaluation of functional conformation of dairy cattle. Preparation for intercollegiate competition. Field trips required.

200C Introductory Judging of Dairy Cattle
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 the following courses: ANS 200A, ANS 200B, ANS 200C, ANS 200D, ANS 300A, ANS 300B, ANS 300C and ANS 300D. SA: ANS 200B Evaluation of functional conformation of dairy cattle. Preparation for intercollegiate competition. Field trips required.

210 Animal Products
Fall. 4(3-3) 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.

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. Field trips required.

212 Merchandising Purebred Livestock
Spring of odd years. 2(1-2) RB: (ANS 110) Purebred livestock industry. Private treaty and auction sales. Advertising, animal selection and budgeting of purebred livestock sales. Field trips required.

241 Draft Horse Basics
Fall, Spring. 2(0-4) Safe handling, hitching and driving of draft horses. Care and maintenance of harness and horse drawn equipment.

240Q Quantitative Human Biology
Spring, 3(4-0) Interdepartmental with Biomedical Engineering; Materials Science and Engineering; Radiology. Administered by College of Engineering. P:M: (MTH 235 and PHY 184) and (PSL 250 or concurrently or PSL 431 or concurrently) and (CEM 141 or CEM 151) and (ANTR 350 or concurrently) R: (CSE 131 or concurrently or CSE 231 or concurrently or PSL 410) Qualitative description and quantitative engineering analysis of selected, tractable human-biological systems. Multi-disciplinary problem-solving among medical and engineering professionals.

2485 Directed Study in Human Prosection
Fall, Spring, Summer. 1 to 5 credits. A student may earn a maximum of 15 credits in all enrollments for this course. R: Approval of department. SA: ANT 480 Topics from an anatomical field such as gross anatomy, histology, tissue culture, cytology, neurology, or embryology.

249 Special Problems in Anatomy
Fall, Spring, Summer. 1 to 5 credits. A student may earn a maximum of 15 credits in all enrollments for this course. R: Approval of department. SA: ANT 480 Topics from an anatomical field such as gross anatomy, histology, tissue culture, cytology, neurology, or embryology.

2480 Directed Study in Human Prosection
Fall, Spring, Summer. 1 to 5 credits. A student may earn a maximum of 15 credits in all enrollments for this course. R: Approval of department. SA: ANT 480 Topics from an anatomical field such as gross anatomy, histology, tissue culture, cytology, neurology, or embryology.

2485 Directed Study in Human Prosection
Fall, Spring, Summer. 1 to 5 credits. A student may earn a maximum of 15 credits in all enrollments for this course. R: Approval of department. SA: ANT 480 Topics from an anatomical field such as gross anatomy, histology, tissue culture, cytology, neurology, or embryology.

2480 Directed Study in Human Prosection
Fall, Spring, Summer. 1 to 5 credits. A student may earn a maximum of 15 credits in all enrollments for this course. R: Approval of department. SA: ANT 480 Topics from an anatomical field such as gross anatomy, histology, tissue culture, cytology, neurology, or embryology.

2485 Directed Study in Human Prosection
Fall, Spring, Summer. 1 to 5 credits. A student may earn a maximum of 15 credits in all enrollments for this course. R: Approval of department. SA: ANT 480 Topics from an anatomical field such as gross anatomy, histology, tissue culture, cytology, neurology, or embryology.

2480 Directed Study in Human Prosection
Fall, Spring, Summer. 1 to 5 credits. A student may earn a maximum of 15 credits in all enrollments for this course. R: Approval of department. SA: ANT 480 Topics from an anatomical field such as gross anatomy, histology, tissue culture, cytology, neurology, or embryology.

2485 Directed Study in Human Prosection
Fall, Spring, Summer. 1 to 5 credits. A student may earn a maximum of 15 credits in all enrollments for this course. R: Approval of department. SA: ANT 480 Topics from an anatomical field such as gross anatomy, histology, tissue culture, cytology, neurology, or embryology.

2480 Directed Study in Human Prosection
Fall, Spring, Summer. 1 to 5 credits. A student may earn a maximum of 15 credits in all enrollments for this course. R: Approval of department. SA: ANT 480 Topics from an anatomical field such as gross anatomy, histology, tissue culture, cytology, neurology, or embryology.

2485 Directed Study in Human Prosection
Fall, Spring, Summer. 1 to 5 credits. A student may earn a maximum of 15 credits in all enrollments for this course. R: Approval of department. SA: ANT 480 Topics from an anatomical field such as gross anatomy, histology, tissue culture, cytology, neurology, or embryology.

2480 Directed Study in Human Prosection
Fall, Spring, Summer. 1 to 5 credits. A student may earn a maximum of 15 credits in all enrollments for this course. R: Approval of department. SA: ANT 480 Topics from an anatomical field such as gross anatomy, histology, tissue culture, cytology, neurology, or embryology.

2485 Directed Study in Human Prosection
Fall, Spring, Summer. 1 to 5 credits. A student may earn a maximum of 15 credits in all enrollments for this course. R: Approval of department. SA: ANT 480 Topics from an anatomical field such as gross anatomy, histology, tissue culture, cytology, neurology, or embryology.

2480 Directed Study in Human Prosection
Fall, Spring, Summer. 1 to 5 credits. A student may earn a maximum of 15 credits in all enrollments for this course. R: Approval of department. SA: ANT 480 Topics from an anatomical field such as gross anatomy, histology, tissue culture, cytology, neurology, or embryology.

2485 Directed Study in Human Prosection
Fall, Spring, Summer. 1 to 5 credits. A student may earn a maximum of 15 credits in all enrollments for this course. R: Approval of department. SA: ANT 480 Topics from an anatomical field such as gross anatomy, histology, tissue culture, cytology, neurology, or embryology.

2480 Directed Study in Human Prosection
Fall, Spring, Summer. 1 to 5 credits. A student may earn a maximum of 15 credits in all enrollments for this course. R: Approval of department. SA: ANT 480 Topics from an anatomical field such as gross anatomy, histology, tissue culture, cytology, neurology, or embryology.

2485 Directed Study in Human Prosection
Fall, Spring, Summer. 1 to 5 credits. A student may earn a maximum of 15 credits in all enrollments for this course. R: Approval of department. SA: ANT 480 Topics from an anatomical field such as gross anatomy, histology, tissue culture, cytology, neurology, or embryology.

2480 Directed Study in Human Prosection
Fall, Spring, Summer. 1 to 5 credits. A student may earn a maximum of 15 credits in all enrollments for this course. R: Approval of department. SA: ANT 480 Topics from an anatomical field such as gross anatomy, histology, tissue culture, cytology, neurology, or embryology.

2485 Directed Study in Human Prosection
Fall, Spring, Summer. 1 to 5 credits. A student may earn a maximum of 15 credits in all enrollments for this course. R: Approval of department. SA: ANT 480 Topics from an anatomical field such as gross anatomy, histology, tissue culture, cytology, neurology, or embryology.

2480 Directed Study in Human Prosection
Fall, Spring, Summer. 1 to 5 credits. A student may earn a maximum of 15 credits in all enrollments for this course. R: Approval of department. SA: ANT 480 Topics from an anatomical field such as gross anatomy, histology, tissue culture, cytology, neurology, or embryology.
Animal Science—ANS

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.

261 Principles of Animal Environments
Spring. 2(1-2) Interdepartmental with Agricultural Technology and Systems Management. AE 061, ATM 326

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

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 trips required.

275 Seafood Systems Management
Spring. 3(3-0) Interdepartmental with Fisheries and Wildlife; Food Science. Administered by Department of 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 years. 2 credits. RB: (ANS 200A) R: Not open to freshmen. A student may earn a maximum of 8 credits from ANS 200A, ANS 200B, ANS 200C, ANS 200D, 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: 2(0-4) RB: (ANS 200A) R: Not open to freshmen. A student may earn a maximum of 8 credits from ANS 200A, ANS 200B, ANS 200C, ANS 200D, ANS 300A, ANS 300B, ANS 300C and ANS 300D.
Evaluation of carcass 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. RB: (ANS 200C) R: Not open to freshmen. A student may earn a maximum of 8 credits from ANS 200A, ANS 200B, ANS 200C, ANS 200D, 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. RB: (ANS 200D) R: Not open to freshmen. A student may earn a maximum of 8 credits from ANS 200A, ANS 200B, ANS 200C, ANS 200D, ANS 300A, ANS 300B, ANS 300C and ANS 300D.
Evaluation of functional characteristics of horses. Represent MSU in intercollegiate competition. Field trips required.

305 Applied Animal Behavior
Spring. 3(2-2) P:M: (BS 111)
Techniques for assessing health and welfare of domestic animals based on their behavior.

313 Principles of Animal Feeding and Nutrition
Fall. 4(3-2) P:M: (BS 111) and (CEM 143 or concurrently or CEM 251 or concurrently) and completion of Tier I writing requirement.

314 Genetic Improvement of Domestic Animals
Fall. 4(3-2) P:M: (BS 111) and (MTH 110 or concurrently) and completion of Tier I writing requirement.
Molecular, Mendelian, population, and quantitative genetics of domestic animals.

315 Anatomy and Physiology of Farm Animals
Spring. 4(3-2) P:M: (BS 111) and completion of Tier I writing requirement.

320 Muscle Foods
Spring. 3(3-0) Interdepartmental with Food Science. P:M: (ANS 210 or FCS 211 or HNF 150)
Structure of muscle. Meat technology and merchandising concepts.

401 Issues in Animal Agriculture
Spring. 1(2-0) RB: (ANS 313 or ANS 314 or ANS 315) R: Open only to juniors or seniors.
Societal issues related to local, national and international animal agriculture.

404 Advanced Genetics of Farm Animals
Spring. 2(1-2) P:M: (ANS 314)
Application of molecular genetics techniques to animal breeding. Genome maps for domestic species. Incorporation of genotype data into selection programs.

405 Endocrinology of Reproduction
Fall. 4(3-2) RB: (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.

407 Food and Animal Toxicology
Fall. 3(3-0) P:M: (BMB 200 or BMB 401 or BMB 461) and (PSL 250) R: Not open to freshmen or sophomores.

407L Toxicology Methods Laboratory
Fall. 2(0-4) Interdepartmental with Food Science. RB: (ANS 407 or concurrently) R: Not open to freshmen or 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) RB: (ANS 313) R: Not open to freshmen or 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
Spring. 2(0-2) P:M: (ANS 314) R: Not open to freshmen or sophomores.
Application of selection principles and mating systems within and among breeds of livestock. Selection index, expected progeny differences, animal models, crossbreeding systems, multiple ovulation and embryo transfer schemes, multiple trait selection, simulated populations.

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

416 Meat Science and Muscle Biology
Spring. 4(3-2) RB: (ANS 315) R: Not open to freshmen or 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) RB: (ANS 407) R: Not open to freshmen or sophomores.
Selected topics including regulatory toxicology, risk assessment, environmental toxicology, food safety, and safe handling of toxic substances.

418 Comprehensive Nutrient Management Planning
Fall. 3(2-2) Interdepartmental with Biosystems Engineering. P:M: (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.

422 Advanced Beef Feedlot Management
Fall. 3(2-2) P:M: (ANS 222)
Feedlot management systems and issues. Feed systems, manure management, health maintenance, and cattle marketing. Field trips required.