ANATOMY

885*. Systems Neuroscience
Spring of odd-numbered years.
4(0M 3O) Interdisciplinary with the Department(s) of Pharmacology and Tastology, Physiology.
Anatomy, Pharmacology, and physiology of multicellular neural systems, including major sensory, motor, autonomic and chemoregulatory systems in brains of vertebrates.

886*. Vertebrate Neural Systems
Spring of odd-numbered years.
3(0S 02) Interdisciplinary with the Department(s) of Physiology.
Comparative analysis of major component systems of vertebrate brains, their evolution, ontogeny, structure, and function in fish, amphibians, reptiles, birds, and mammals.

899*. Master’s Thesis Research
Fall, Spring, Summer. 1 to 12 credits. P: Admission to M.S. degree program in Anatomy R: Anatomy

999*. Doctoral Dissertation Research
Fall, Spring, Summer. 1 to 12 credits. P: Admission to Ph.D. program in Anatomy R: Anatomy

ANIMAL SCIENCE

ANS 110. Introductory Animal Agriculture
Fall. 3(2-2)
QP: ANS 211

ANS 112. Introductory Animal Management
Spring. 3(2-2)
P: ANS 110
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.

210*. Animal Products
Fall. 4(2-3)
P: ANS 110, ANS 112. R: Not open to freshmen.
Edible animal products. Processing, preservation, storage and distribution of dairy, meat, and egg products.
QP: ANS 110 ANS 211 QA: ANS 156 FSC 300

211. Animal and Product Evaluation
Spring. 3(1-6)

212*. Merchandising Purebred Livestock
Spring of odd-numbered years. 2(2-1)
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.
QP: ANS 110
ANIMAL SCIENCE

415*. Biology of Growth and Lactation
Spring. 3(3-0) P: ANS 315. R: Not open to freshmen and sophomores.

416*. Meat Science and Muscle Biology
Fall. 2(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. QP: ANS 315 QA: ANS 456

417*. Topics in Toxicology
Spring. 1(1-0) Interdepartmental with the Department(s) of Food Science. P: ANS 407 R: Juniors and above
Selected topics including regulatory toxicology, risk assessment, environmental toxicology, food safety, and safe handling of toxic substances. QP: ANS 413A QA: ANS 417

422*. Beef Cattle Management
Fall. 3(2-2) P: ANS 313, ANS 314, ANS 315. R: Not open to freshmen and sophomores.
Management practices and systems for beef herds. Feed requirements, reproduction, breeding, performance testing, housing, and diseases. Costs and returns. Field trips required. QP: ANS 313BANS 314 ANS 315 QA: ANS 452

432*. Dairy Cattle Management
Fall. 3(2-2) P: ANS 313, ANS 314, ANS 315. R: Not open to freshmen and sophomores.
Management practices and systems for dairy herds. Mastitis control, reproductive and nutrition management, records, waste management, and facilities. Field trips required. QP: ANS 313BANS 314 ANS 315 QA: ANS 432

442*. Horse Management
Spring. 3(2-2) P: ANS 313, ANS 314, ANS 315. R: Not open to freshmen and sophomores.

455*. Asian Physiology
Spring. 4(3-3) P: ANS 315. R: Open only to seniors and graduate students.
Systemic and comparative physiology of birds: respiration, reproduction, endocrinology, digestion, urination, and the senses. QP: ANS 315 PSL 241 QA: ANS 465

472*. Swine Management
Fall. 3(2-2) 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. QP: ANS 313BANS 314 ANS 315 QA: ANS 482

480*. Animal Systems in International Development
Spring. 3(3-0) P: ANS 313, ANS 314, ANS 315. R: Not open to freshmen and sophomores.
Animal systems in various global regions. Output, land and resource conservation, and socio-economic factors. QP: ANS 312BANS 314ANS 315 QA: ANS 468

485*. Ruminant Nutrition
Spring. 4(3-3) 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 trips may be required. QP: ANS 313BANDANS 314 ANS 315 QA: ANS 453

490*. Independent Study
Fall, Spring. 1 to 4 credits. May enroll for a maximum of 8 credits.
May enroll for a maximum of 8 credits.
Research, production, or service project under the direction of a faculty member. May enroll for a maximum of 8 credits.
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498*. Advanced Enterprise Management
Spring. 3(2-2) P: ANS 422 or ANS 432 or ANS 442 or ANS 472 or concurrently. R: Open only to seniors. Husbanry and business management skills applied to commercial livestock enterprise management. Goal-directed decisions and actions. Field trip required. QP: ANS 432BORANS 420RANS 420 QA: ANS 498

499*. Senior Thesis in Animal Science
Fall, Spring, Summer. 3 to 9 credits. May enroll for a maximum of 8 credits.
May enroll for a maximum of 8 credits.
Individual studies in an area of choice in conjunction with the major or written final communication. Topic to be determined by student and guidance committee. QP: ANS 313BORSCH 31 ORANS 315 QA: ANS 499

511*. Animal Industries
Fall. 3(2-0) P: Admission to the College of Veterinary Medicine. R: College of Veterinary Medicine Veterinary Medicine none
History of animal agriculture and introduction to animal industries. QP: ANS 511

513*. Veterinary Nutrition
Fall. 3(2-0) P: Admission to the College of Veterinary Medicine. R: College of Veterinary Medicine Veterinary Medicine none

510*. Gastrointestinal Microbiology of Domestic Animals
Fall. 3(3-0) P: MFH 200, BCH 452 or approval of department R: Seniors and Graduate Students
Microbial ecology of the gastrointestinal tract. Microbial role in nutrition, health, productivity. Environmental applications. Livestock species emphasized. QP: MFH 200 BCH 452 QA: ANS 510

512*. Research Techniques in Animal Nutrition and Metabolism
Fall of odd-numbered years. 3(1-4) P: ANS 313, ANS 314, AND ANS 315 OR Equivalent, or approval of Dept. R: Graduate students only (level 6 and above)
Methodology in nutrition/metabolism research of livestock. Nutrient analyses, digesta flow kinetics, digestion balance trials, hormonal assays, tissue culture, enzyme assays, metabolite fluxes, tracer methodology, nucleic acid isolation/analysis. QP: ANS 529

589*. Adanced Independent Study
Fall, Spring, Summer. 1 to 4 credits. May enroll for a maximum of 8 credits.
Graduate students. Approval of department: Application required
Investigation of topics within disciplines or species in animal science of special interest to graduate students. QP: ANS 800

589*. Master's Thesis Research
Fall, Spring, Summer. 1 to 6 credits. May enroll for a maximum of 8 credits.
R: Master's candidate in animal science
Approval of department

533*. Protein Nutrition and Metabolism
Spring of even-numbered years. 3(3-0) Interdepartmental with the Department(s) of Nutrition and Foods.
P: BCH 461, BCH 462, One Physiology course HNF 460 or ANS 313 or dept. approval. R: Graduate students only (level 6 and above)
QP: PSL 511 ORAPPROVAL QA: ANS 936

537*. Mineral Nutrition and Metabolism
Fall of even-numbered years. 3(3-0) Interdepartmental with the Department(s) of Human Nutrition and Foods.
P: One year of BCH (BCH 461, 462), one year of PSL, HNF 460 or ANS 313 or approval. R: Graduate students only (level 6 and above)
Forms and locations of mineral elements in the body, metabolic functions, deficiencies and toxicities, interrelationships, quantitative requirements and means of meeting them.
QP: PSL 511 ORAPPROVAL DEPT QA: ANS 937

943*. Linear Models in Quantitative Genetiees
Spring. 5(5-0) P: ANS 455 R: Graduate Students
Application of linear models to analyze field data. Estimation of fixed and random factors. Components of variance and covariance. Best linear unbiased prediction of breeding values.
QP: STT 423 QA: ANS 872 ANS 843

Courses with an asterisk (*) have not been approved by the University Committee on Curriculum.

E-13
<table>
<thead>
<tr>
<th>Course Code</th>
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<th>Semester</th>
<th>Credits</th>
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<tr>
<td>999*</td>
<td>Doctoral Dissertation Research</td>
<td>Fall, Spring, Summer</td>
<td>1-12</td>
<td>May renew for a maximum of 24 credits.</td>
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<td>ANP</td>
<td><strong>Anthropology</strong></td>
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<td>101*</td>
<td>Introduction to Anthropology</td>
<td>Fall, Spring</td>
<td>3(3-0)</td>
<td>Human culture worldwide and throughout human history.</td>
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<td>201*</td>
<td>Sociocultural Diversity</td>
<td>Fall, Spring</td>
<td>3(3-0)</td>
<td>Origins and diversity of cultural systems.</td>
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<td>264*</td>
<td>Great Discoveries in Archaeology</td>
<td>Spring</td>
<td>3(3-0)</td>
<td>Great discoveries in archaeology that have captured the public's imagination.</td>
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<td>The Anthropological Film</td>
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<td>3(2-2)</td>
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<td>Southeast Asian peoples, cultures, and nations.</td>
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