

**471. History of Landscape Architecture**

Spring. 3(2-2)

Environmental design concepts and projects from 1850 to the present time, with emphasis on the development of the profession and practice of landscape architecture in the United States.

**480. Professional Practice**

Spring. 3(2-2) Senior majors.

Principles and procedures of professional landscape architectural practice, including ethics, client relations, registration, inter-professional collaboration and organization of operations for design implementation. Field trips required.

**483. Landscape Architecture Seminar**

Winter. 3(2-2) Senior majors.

Research presentation and discussion of significant current issues, trends, events and opportunities relating to contemporary theories and practices of landscape architecture.

**490. Special Problems**

Fall, Winter, Spring, Summer. 2 to 5 credits. May re-enroll for a maximum of 12 credits. Approval of school.

Investigation, for advanced undergraduate students in landscape architecture, developed from special interest areas.

**499. Landscape Architecture Design Thesis**

Spring, Summer. 5(1-8) Senior majors.

Demonstration of analytical, creative and technical competencies in the development of methods and/or concepts leading to design solutions for contemporary landscape architecture problems.

**VETERINARY MEDICINE V M  
(COLLEGE OF)**

**500A. Introduction to Veterinary Medicine I**

(SSM 501.) Summer. 2(2-0) Admission to professional veterinary program.

Species and breed identification, predisposition for specific diseases, basic care and feeding, restraint and handling of small domestic animals, unusual pets, and laboratory animals.

**500B. Introduction to Veterinary Medicine II**

Fall. 2(2-0) Second-term Veterinary Medicine students.

Large animal practice present and future. Fundamentals of equine conformation, gaits, shoeing, feeding and routine medical care. Economics and management factors in diseases of food animals.

**500C. Introduction to Veterinary Medicine III**

(LSM 503.) Winter. 4(3-3) Third-term Veterinary Medicine students.

Physical and systemic examination of the various domestic and laboratory species. Common restraint procedures, clinical skills, diagnostics and an approach to clients are included.

**500D. Introduction to Veterinary Medicine IV**

(SSM 502.) Spring. 4(3-3) Fourth-term Veterinary Medicine students.

Anesthetic principles, agents and techniques. Basic surgical principles, including aseptic technic, hemostasis, wound healing, suturing and suturing materials. Fundamentals of radiology.

**500E. Introduction to Veterinary Medicine V**

Spring. 3(3-0) Fourth-term Veterinary Medicine students.

Emphasis on behavior of animals relating to disease prevention and treatment. Lectures, discussions and demonstrations on veterinary ethology including animal communications, reproduction, restraint, handling, housing and feeding habits.

**501. Client Communication**

(500.) Spring. 1(0-2) Fourth-term Veterinary Medicine students.

Communication and interviewing skills as the basis for establishing and maintaining effective client relationships.

**503. Metabolic Diseases and Endocrinology**

Summer. 2(2-0) Fifth-term Veterinary Medicine students.

Biochemical and physiological basis of metabolic and endocrine diseases of animals including diagnosis, treatment and management.

**505. Veterinary Epidemiology**

Summer. 2(2-0) Fifth-term Veterinary Medicine students.

Principles of epidemiology and their application in the study of diseases in animal populations.

**507. Urinary System**

Summer. 4(3-3) Fifth-term Veterinary Medicine students.

Integrative approach to the understanding of the urinary system in health and disease of animals.

**509. Hematopoietic System**

Summer. 2(1-3) Fifth-term Veterinary Medicine students.

Pathogenesis, diagnosis, and clinical management of diseases of the hematopoietic and lymphoid organs and tissues.

**510. Survey of Infectious Agents**

Fall. 4(4-0) Sixth-term Veterinary Medicine students.

Host-microorganism relationship in diseases of animals; laboratory diagnosis, treatment, control, and public health significance will be emphasized.

**512. Nervous System**

Fall. 3(3-0) Sixth-term Veterinary Medicine students.

Normal and abnormal neural structure and function in animals with emphasis on clinical neurology and neuropathology.

**513. Cardiovascular System**

Fall. 4(3-3) Sixth-term Veterinary Medicine students.

Pathogenesis, diagnosis, and management of cardiovascular diseases of animals; anatomical, physiological, pathological and pharmacological principles providing basis for medical and surgical treatment—includes diagnostic and surgical procedures and radiologic interpretation.

**515. Respiratory System**

Fall. 4(3-3) Sixth-term Veterinary Medicine students.

Pathogenesis, diagnosis, and management of respiratory diseases of animals; anatomical, physiological and surgical treatments—includes diagnostic and surgical procedures and radiologic interpretation.

**516. Reproductive System**

Fall. 5(4-3) Sixth-term Veterinary Medicine students.

Reproductive diseases of animals with emphasis on genital structure and function, endocrine interrelationships, methods for examination of mammary gland and reproductive tract, diagnosis, and treatment.

**520. Veterinary Public Health**

Winter. 3(3-0) Seventh-term Veterinary Medicine students.

Public health aspects of veterinary medicine; the nature of laws, ordinances, and regulations; and veterinary medicine's role in the protection of the environment, ecology, and ensurance of food hygiene.

**522. Digestive System and Nutrition**

Winter. 9(6-9) Seventh-term Veterinary Medicine student.

Pathogenesis, diagnosis, and treatment of diseases of the alimentary tract and digestive organs of animals. Recognition and rational therapy of nutritional diseases in animals.

**524. Integumentary System**

Winter. 4(3-3) Seventh-term Veterinary Medicine students.

Diseases of the integumentary system of animals with emphasis on laboratory examinations, interpretations of pathological features, diagnosis, and treatment.

**526. Musculoskeletal System I**

Winter. 4(2-6) Seventh-term Veterinary Medicine students.

Diagnosis and treatment of musculoskeletal diseases of animals with emphasis on pathological changes, radiological technics, and interpretation of radiographs. Surgical procedures applicable to small animals will be demonstrated.

**530. Veterinary Toxicology**

Spring. 4(4-0) Eighth-term Veterinary Medicine students.

Pharmacological basis and pathological features of diseases of animals caused by common toxic chemicals with emphasis on clinical manifestations, diagnosis, prevention, and treatment.

**532. Visual and Auditory Systems**

Spring. 3(2-3) Eighth-term Veterinary Medicine students.

Methods of examination, diagnosis, and treatment of diseases involving the eyes or ears of animals with emphasis on the anatomical, physiological, and pathological features.

**534. Musculoskeletal System II**

Spring. 5(2-9) Eighth-term Veterinary Medicine student.

Diagnosis, prognosis, and management of musculoskeletal diseases of the equine with emphasis on anatomical relationships to normal and abnormal function. Surgical procedures applicable to equine and ruminant will be performed.

**536. Orthopedic Surgery**

Spring. 6(4-6) Eighth-term Veterinary Medicine students.

Principles of orthopedic surgery and anatomical relations of the musculoskeletal systems in the canine and feline.

**538. Veterinary Medical History, Ethics, Jurisprudence, and Epidemiology**

Spring. 2(2-0) Eighth-term Veterinary Medicine students.

Historical background, ethical principles, and legal responsibilities of the veterinary medical profession. Epidemiological problems will be resolved and discussed.

**Descriptions — Veterinary Medicine (College of)**  
**of**  
**Courses**

**602. Veterinary Practice Management**  
 Spring. 2(2-0) Eighth-term Veterinary  
 Medicine students.

Basic skills necessary to establish and effectively manage a practice of veterinary medicine.

**ZOOLOGY**

**ZOL**

College of Human Medicine  
 College of Natural Science  
 College of Osteopathic Medicine

**IDC. Resource Ecology and Man**

For course description, see Interdisciplinary Courses.

**301. Nature and Man**

Spring. 4(2-6) Three terms of natural science; not open to zoology majors.

Relates man to his natural environment. Chief emphasis on identifying characteristic animal life in broad areas of nature and how man fits or misfits into these. Lectures, laboratory and field trips illustrate this relationship.

**302. Vertebrate Life of the Past**

Fall. 3(3-0) One course in physical or biological science or Juniors. Interdepartmental with and administered by the Department of Geology.

Fossil vertebrates from fish to man.

**303. Introductory Animal Systematics**

Fall. 4(4-0) B S 212, LBC 344 concurrently, not open to zoology majors. Students may not receive credit in 303 and 305 or 303 and 381.

A general survey of the animal kingdom. Topics include origin, evolution and diversity of invertebrate and vertebrate groups, their systematic and present status.

**304. Biology, Behavior and Man**

Winter. 3(3-0) Juniors; not open to zoology majors.

Examines philosophical and biological issues which make the study of animal behavior relevant to man. Emphasizes history of animal behavior, current theories, and experiments relating biological and environmental determinants of adaptive and non-adaptive behavior patterns.

**305. Biology of Vertebrates**

Fall. 4(3-3) B S 212. Students may not receive credit in both 305 and 303.

Primarily concerned with natural history of vertebrates. Topics include morphological characteristics, ecology, zoogeography, and taxonomy of vertebrate animal groups. Laboratory involves recognition of representative species within the various classes.

**314. Comparative Anatomy of Vertebrates**

Fall, Winter. 5(3-6) B S 212.

Comparative anatomy and evolution of vertebrates. The dogfish and a mammal dissected in the laboratory.

**317. Principles of Development**

Fall, Spring. 3(3-0) B S 212.

Development of animals, especially vertebrates. Principles are illustrated by modern experimental studies of developmental problems.

**318. Principles of Development Laboratory**

Fall, Spring. 2(0-6) 317 or concurrently; B S 212.

Principles of development illustrated by analysis of the ontogeny of selected organisms.

**341. Human Heredity**

Fall, Winter, Spring, Summer. 4(3-3)

Three terms of Natural Science; Sophomores; not open to zoology majors. Students may not receive credit in more than one of the following: 341, 441.

Inheritance of human, physical, physiological, and psychological traits, and forces that influence human evolution. Foundation is laid on which applications of heredity in fields of education, sociology, anthropology, psychology, dentistry, and medicine must rest. Course includes field trips to state institutions.

**344. Introductory Animal Systematics Laboratory**

Fall. 1(0-3) 303 concurrently. Interdepartmental with and administered by Lyman Briggs College.

Laboratory examination of form and function of representative vertebrate and invertebrate animals.

**381. Fundamentals of Invertebrate Zoology**

Winter. 4(3-3) B S 212. Students may not receive credit in both 381 and 303.

Form and function of representative invertebrates. Meets requirements for a course in Invertebrate Zoology. Students expecting to obtain advanced degrees in Zoology or those more interested in a systematic or ecological approach should elect Zoology 481.

**389. Animal Ecology**

Winter. 4(3-4) B S 212 or concurrently.

Animals in relation to their environment. Factors affecting the distribution and abundance of animals. Interrelationships between climate, soils, vegetation, geologic history and animal life. Population characteristics as related to reproduction and mortality factors.

**391. Zoological Problems**

Fall, Winter, Spring, Summer. 1 to 8 credits. May re-enroll for a maximum of 12 credits. Juniors; B S 212; 6 credits in zoology; approval of department.

Advanced work in morphology, field zoology, genetics, mammalogy, ornithology, or ichthyology.

**400H. Honors Work**

Fall, Winter, Spring. Variable credit. Juniors.

**401. Comparative Physiology I**

Fall. 4(3-4) PSL 240 or B S 212 and CEM 132. Interdepartmental with and administered by the Department of Physiology.

A comparison of osmoregulation, digestion, respiration, and other physiological processes in a wide range of organisms.

**402. Comparative Physiology II**

Winter. 4(4-0) 401 or approval of department. Interdepartmental with the Department of Physiology.

A comparison of sensory, motor, endocrine and other integrative mechanisms in animals.

**404. Biological and Ecological Concepts for Engineers and Mathematicians**

Winter. 3(3-0) Approval of department. Interdepartmental with Systems Science.

Biological and ecological concepts important to formal analysis of living systems, vital properties, processes, and limitations; population dynamics, selection, competition, and predation; ecological community structure and function; industrialized ecosystem.

**405. Experiments in Zoology I**

Fall. 3(0-9) Approval of instructor.

A laboratory for Zoology majors. An integrated series of selected experiments in the topics of behavior, ecology and physiology.

**406. Experiments in Zoology II**

Winter. 3(0-9) 405.

A laboratory for Zoology majors. An integrated series of selected experiments in topics of cell biology, embryology and genetics.

**407. Experiments in Zoology III**

Spring. 3(0-9) 406.

A laboratory for Zoology majors. A continuation of 406 and Special Problems.

**408. Freshwater Ecology**

Summer. 6 credits. B S 212 or approval of department. Given at W. K. Kellogg Biological Station. Interdepartmental with Biological Science and the Department of Botany and Plant Pathology and administered by Biological Science.

The ecology of freshwater ecosystems, their biotic structure, and the functional interrelationships of environmental variables regulating population dynamics, productivity and community structure. Extensive field investigations.

**410. Terrestrial Ecology**

Summer. 6 credits. B S 212 or approval of department. Given at W. K. Kellogg Biological Station. Interdepartmental with Biological Science and the Department of Botany and Plant Pathology and administered by Biological Science.

Factors determining distribution and abundance. Interrelationship of plants, animals, and environment. Extensive field investigations of several types of terrestrial communities in light of current theory.

**412. Principles of Animal Behavior**

Summer. 4(4-0) For teachers of biology. Not applicable toward major in zoology.

Evolutionary, hormonal, and neurological bases of animal behavior.

**413. Animal Behavior**

Spring. 4(4-0) B S 212.

Description of the known behavior of the various vertebrate and invertebrate phyla with emphasis upon adaptive significance. Thus, special attention will be given to mating, defensive, and nutritive behavior. The genetics and ontogeny of behavioral patterns will be presented where known. Behavior will be related to the ecology of various animal populations.

**414. Biological Mechanisms of Animal Behavior**

Winter of odd-numbered years. 3(3-0) or 5(3-6) 413 recommended.

Consideration of neurological and hormonal mechanisms controlling behavior. Emphasis will be upon mammalian systems, and will deal with the assumptions which underlie current concepts in the biology of behavior.

**415. Ecological Aspects of Animal Behavior**

Fall. 4(4-0) 413.

Consideration of orientation, navigation and homing behavior, food preferences, habitat selection, exploration, behavioral periodicity, communication, social organization and the embryology of behavior. In both vertebrates and invertebrates.

**417. Advanced Developmental Biology**

Spring. 3(3-0) or 5(3-6) 317.

Molecular and cellular biology of development. Complementary laboratory exercises with emphasis on experiments.