

# College of Veterinary Medicine

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CALVIN M. JOHNSON, *Dean*

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FRANK F. BARTOL, *Associate Dean for Research and Graduate Studies*

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THE COLLEGE OF VETERINARY MEDICINE offers a Bachelor of Science (BS) in Public and One Health (PAOH), a professional Doctor of Veterinary Medicine (DVM) degree, and graduate (MS and PhD) degrees in Biomedical Sciences (VMBS).

The undergraduate major is administered through the Office of Research and Graduate Studies, under the leadership of Dr. Frank Bartol. Additional information can be found under the Program tab or at <https://www.vetmed.auburn.edu/academics/public-and-one-health/>.

The professional Doctor of Veterinary Medicine (DVM) degree is administered through the Office of Academic Affairs, under the leadership of Dr. Melinda Camus. Additional information can be found under the Program tab or at <https://www.vetmed.auburn.edu/academics/dvm-professional-degree-program/>.

The Master of Science (MS) and Doctor of Philosophy (PhD) degrees in Biomedical Sciences are administered through the Office of Research and Graduate Studies, under the leadership of Dr. Frank Bartol. Additional information can be found under the Program tab or at <https://www.vetmed.auburn.edu/academics/graduate-students/>.

## Undergraduate

- Public and One Health - BS ([http://bulletin.auburn.edu/undergraduate/collegeofveterinarymedicine/public\\_and\\_one\\_health\\_major/](http://bulletin.auburn.edu/undergraduate/collegeofveterinarymedicine/public_and_one_health_major/))

## Graduate

- Biomedical Sciences — MS, PhD ([http://bulletin.auburn.edu/thegraduateschool/graduatedegreesoffered/biomedicalsciencesmsphd\\_major/](http://bulletin.auburn.edu/thegraduateschool/graduatedegreesoffered/biomedicalsciencesmsphd_major/))

## Professional

- Doctor of Veterinary Medicine — DVM ([http://bulletin.auburn.edu/thegraduateschool/graduatedegreesoffered/veterinaryclinicalsciences\\_major/](http://bulletin.auburn.edu/thegraduateschool/graduatedegreesoffered/veterinaryclinicalsciences_major/))

## Minors

- Public Health (<http://bulletin.auburn.edu/undergraduate/collegeofveterinarymedicine/minors/publichealthminor/>)
- Honors Public Health (<http://bulletin.auburn.edu/undergraduate/collegeofveterinarymedicine/minors/honorspublichealthminor/>)

## Public and One Health Courses

**PAOH 2100 INTRODUCTION TO PUBLIC HEALTH (3) LEC. 3.** Public Health is the science of prevention of disease and health problems in populations through research, proposal and application of policies, implementation of educational programs, provision of health services to communities, and detection of and response to disease outbreaks. In this course, guest lecturers with expertise in their respective fields will present on varying public health and One Health topics such as health disparities, public health policy, environmental health, global health security, behavioral health, disease ecology, access to health care, maternal/child health, animal health, and more.

**PAOH 2107 HONORS INTRODUCTION TO PUBLIC HEALTH (3) LEC. 3.** Pr. Honors College. Lecture and discussion of historic advances in public health leading to discussion of diseases affecting the health of people in Alabama today.

**PAOH 3010 INTRODUCTION TO EPIDEMIOLOGY (3) LEC. 3.** Epidemiology is the study of the distribution, determinants, and dynamics of disease or health events in a population. This course introduces the basic principles and methods of epidemiology with an emphasis on prevention and control of diseases of humans and other animals.

**PAOH 3017 HONORS INTRODUCTION TO EPIDEMIOLOGY (3) LEC. 3.** Pr. Honors College. Principles of epidemiology, with emphasis on approaches for prevention/control of diseases of humans and animals. Broad applications of studies of populations will be stressed.

**PAOH 4830 GLOBAL AND COMPARATIVE HEALTH SYSTEMS (3)** LEC. 3. Departmental approval. Different national approaches to providing health care for the population will be compared to the US system.

**PAOH 4837 HONORS GLOBAL AND COMPARATIVE HEALTH SYSTEMS (3)** LEC. 3. Pr. Honors College. Departmental approval. Different national approaches to providing health care for the population will be compared to the US system.

**PAOH 4910 OBSERVING NEEDS IN PUBLIC HEALTH (3)** LEC. 3. Through volunteer service to an agency or organization addressing public health needs, students will develop an understanding of the importance for volunteers to support community needs. Additionally, there will be lectures and class discussions on various topics addressing needs of underserved populations.

**PAOH 5100 ZONOOSES AND INFECTIOUS DISEASES (3)** LEC. 3. Pr. BIOL 3200. This course presents a comparative approach to infectious disease in humans and animals, while specifically highlighting zoonoses (diseases shared between humans and animals). Students will learn infectious disease epidemiologic concepts, as well as delve into foodborne, vaccine-preventable, sexually transmitted, and vector-transmitted pathogens, as well as common systems-associated infections in both animals and humans.

**PAOH 5200 PROGRAM PLANNING AND THEORIES OF HEALTH PROMOTION (3)** LEC. 3. This course provides the fundamentals of health promotion and behavior, including theories of change in health behavior and program implementation (planning, marketing, assessment, evaluation). By the end of the course, students should be equipped to initiate a program implementation aimed at improving health.

**PAOH 5400 ENVIRONMENTAL HEALTH (3)** LEC. 3. Environmental Health serves as an introduction to the effects and regulation of chemical, physical and biological factors in the environment that affect the health of individuals, communities, and ecosystems.

**PAOH 5950 ONE HEALTH SEMINAR (2)** LEC. 2. This course will explore public health topics relevant to populations of humans, animals, and the environment through guest seminars, large and small group discussion, and student presentations.

**PAOH 6100 ZONOOSES AND INFECTIOUS DISEASES (3)** LEC. 3. Pr. BIOL 3200. This course presents a comparative approach to infectious disease in humans and animals, while specifically highlighting zoonoses (diseases shared between humans and animals). Students will learn infectious disease epidemiologic concepts, as well as delve into foodborne, vaccine-preventable, sexually transmitted, and vector-transmitted pathogens, as well as common systems-associated infections in both animals and humans.

**PAOH 6200 PROGRAM PLANNING AND THEORIES OF HEALTH PROMOTION (3)** LEC. 3. This course provides the fundamentals of health promotion and behavior, including theories of change in health behavior and program implementation (planning, marketing, assessment, evaluation). By the end of the course, students should be equipped to initiate a program implementation aimed at improving health.

**PAOH 6400 ENVIRONMENTAL HEALTH (3)** LEC. 3. Environmental Health serves as an introduction to the effects and regulation of chemical, physical and biological factors in the environment that affect the health of individuals, communities, and ecosystems.

**PAOH 6950 ONE HEALTH SEMINAR (2)** LEC. 2. This course will explore public health topics relevant to populations of humans, animals, and the environment through guest seminars, large and small group discussion, and student presentations.

## **VM-Biomedical Sciences Courses**

**VBMS 3050 STEWARDSHIP IN THE FACE OF CLIMATE CHANGE: LESSONS FROM THE GREAT BARRIER REEF AND BEYOND (2)** AAB/FLD. 30. This 2.5 week course is intended to introduce students to the impact of global warming on the flora and fauna of a unique environment through familiarity with the challenges of maintaining health in domestic, wild and commercial land and marine animals of Australia's diverse ecological land and marine park environments. Activities will include implementation of research methods that assess health, service and outreach efforts that will maintain or improve health, and educational trips that will increase understanding of the fragility and strength of integrated yet every changing flora and fauna. A consistent focus will be the past, present and future impact of humans, and efforts intended to minimize or resolve that impact.

**VBMS 3250 INTRODUCTION TO CLINICAL RESEARCH (1)** LEC. 1. This introductory course is designed to be a primer for students (veterinary, medical, pharmacy, nursing) interested in biological research with an emphasis on clinical veterinary and human medical research.

**VBMS 3900 REPRODUCTIVE SCIENCE AND HEALTH (3)** LEC. 3. P/C, One basic organismal biology, physiology or similar life science course. Sophomore level or higher. Foundational physiologic concepts in reproductive science linked to important animal and human reproductive health issues. May count either ANSC 3600 or VBMS 3600.

**VBMS 4980 UNDERGRADUATE RESEARCH (1-3) RES.** Directed, supervised undergraduate research in veterinary biomedical sciences (VBMS). Course may be repeated for a maximum of 9 credit hours.

**VBMS 4987 HONORS RESEARCH (1-3) RES.** Pr. Honors College. Supervised undergraduate research in veterinary biomedical science. May count either VBMS 4987 or VBMS 4997. Course may be repeated for a maximum of 9 credit hours.

**VBMS 4997 HONORS THESIS (1-3) RES.** Pr. Honors College. Undergraduate honors thesis development in veterinary biomedical science. May Count either VBMS 4987 or VBMS 4997. Course may be repeated for a maximum of 9 credit hours.

**VBMS 5100 CANCER BIOLOGY & GENETICS (3) LEC.** 3. Coreq. BIOL 5220. Biological and genetic mechanisms underlying the development of cancer with a focus on eukaryotic cell mechanisms regulating cell division and communication as well as genetic and phenotype instability. State-of-the-art genomic approaches to personalized medicine and immunotherapy will be discussed. Current literature will be used extensively. Undergraduate courses in genetics and molecular genetics are required or corequisite.

**VBMS 6100 CANCER BIOLOGY & GENETICS (3) LEC.** 3. Pr. BIOL 3003 and BIOL 5220. Biological and genetic mechanisms underlying the development of cancer with a focus on eukaryotic cell mechanisms regulating cell division and communication as well as genetic and phenotype instability. State-of-the-art genomic approaches to personalized medicine and immunotherapy will be discussed. Current literature will be used extensively. Undergraduate courses in genetics and molecular genetics are required. Additionally, completion of VBMS 7520 Eukaryotic Molecular Biology is encouraged.

**VBMS 6111 VETERINARY ANATOMY I (4) LAB.** 12. Departmental approval. Gross anatomy of the dog and cat including skeletal and muscular systems, neck, thorax, limbs, abdomen, pelvis, head, and nervous system. Credit will not be given for VMED 5111 and VBMS 6111.

**VBMS 6121 VETERINARY ANATOMY II (3) LAB.** 9. Pr. VBMS 6111 or VMED 9111. In-depth study of the gross anatomy of the ox, horse, and minor species (chicken) with inclusion of clinical relevance. In-depth presentation of a specific anatomy topics related to course material. May count either VMED 5121 or VBMS 6120.

**VBMS 7000 NEUROANATOMY (5) LEC.** 3. LAB. 4. Departmental approval. Functional morphology of nervous system from input/output through the long systems; limbic relations to endocrine and autonomic nervous system. Comparative among mammals.

**VBMS 7010 PATHWAYS TO SUCCESSFUL RESEARCH (1) LEC.** 1. An introduction to topics pertinent to performance of a successful graduate program and in the conduction of responsible research.

**VBMS 7020 MICROSCOPIC ANATOMY I (3) LEC.** 1. LAB. 4. Departmental approval. A detailed study of microscopic anatomy of basic tissues from multiple animal species. Light microscopy and electron micrograph preparations are used to describe and interpret morphology. Coursework will emphasize the dependence of morphological form on the functional demands of cells and tissue. The lectures characterize the structure and function of the four basic tissues (epithelium, connective tissue, muscle, and nerve) and organ systems. In the lab, students will examine the same structures and learn to identify tissues and organs.

**VBMS 7030 MICROSCOPIC ANATOMY II (3) LEC.** 1. LAB. 4. Departmental approval. Light microscopy and electron microscopy detailed study of the cardiovascular, hemopoietic, digestive, urinary and respiratory systems of domestic animals.

**VBMS 7040 ADVANCED PHYSIOLOGY OF REPRODUCTION (3) LEC.** 3. Pr. ANSC 3600 and BIOL 6240 or VBMS 7150. Departmental approval. Developmental, physiological, endocrinological, cellular and molecular mechanisms regulating reproduction, with emphasis on mammalian systems.

**VBMS 7070 ENDOCRINOLOGY (4) LEC.** 4. Pr. BCHE 7200 and BCHE 7260 and BIOL 6600. Molecular and cellular endocrinology and physiological regulation of hormone synthesis, secretion, and action in mammalian species. Emphasis will be placed on the methodology and key concepts used for endocrine research.

**VBMS 7080 MOLECULAR ENDOCRINOLOGY (2) LEC.** 2. Pr. VBMS 7070. Departmental approval. Examination of the literature of hormonal synthesis, secretion and mechanism of action with emphasis on receptors, second messenger systems, and gene regulation.

**VBMS 7090 CLINICAL PHARMACOLOGY (3) LEC.** 3. Departmental approval. The principles of pharmacology in animals are addressed with a clinical perspective. The determinants of drug movement, pharmacokinetics (modeling) and pharmacodynamics, with a focus on drug-receptor interactions and their detection will be followed by a discussion of adverse drug events and selected drug categories, including cannabinoids, nonsteroidal anti-inflammatory drugs and antimicrobials. Student contributions to discussions through the review of contemporary, relevant literature is emphasized.

**VBMS 7100 ADVANCED CARDIOLOGY I (2)** LEC. 2. Graduate students in Biomedical Sciences, College of Veterinary Medicine and must have a DVM or equivalent. Topics about advanced diagnostics and therapeutics in cardiovascular disease will be discussed.

**VBMS 7130 VETERINARY MEDICINE DIAGNOSTIC ULTRASONOGRAPHY (3)** LEC. 3. Pr. (VMED 9120 or VMED 9121 or VMED 5120) and VMED 5121. The principles and practice of veterinary medical diagnostic ultrasonography as they are utilized in evaluating normal and abnormal anatomy. All animal species are used in this course. DVM degree required.

**VBMS 7140 PHYSIOLOGY I (5)** LEC. 5. Departmental approval. Cellular, Cardiovascular, Renal and Respiratory Physiology.

**VBMS 7150 PHYSIOLOGY II (4)** LEC. 4. Pr. VBMS 7140. Departmental approval. Gastrointestinal Physiology, Metabolism, Endocrinology, and Reproductive Physiology.

**VBMS 7160 NEUROSCIENCE (4)** LEC. 3. LAB. 2. Departmental approval. An overview of neuroscience on the subcellular, cellular and system levels.

**VBMS 7170 SMALL ANIMAL SOFT TISSUE SURGERY ADVANCED TOPICS (1)** LEC. Advanced topics in small animal soft tissue surgery and current literature are reviewed and discussed.

**VBMS 7180 RECEPTOROLOGY (4)** LEC. 4. Pr. VBMS 7070. Addresses structural and functional aspects of the four classes of receptors, including the mechanism of ligand binding, activation, inactivation, and their relevance to human and animal diseases. Methods used in addressing these questions will also be introduced.

**VBMS 7200 VETERINARY ELECTRODIAGNOSTIC TESTING (1)** LEC. 1. SU. Departmental approval. This course will cover principles of electrophysiology, electrodiagnostic testing, and pertinent electrodiagnostic literature. Modalities covered include: electromyography, nerve conduction velocity, late waves, repetitive nerve stimulation, evoked potentials, electroretinogram, electroencephalogram, and urethral pressure profile.

**VBMS 7210 RADIATION BIOLOGY (4)** LEC. 4. Exploration of biological, physical, and chemical basis of radiotherapy with emphasis on the biological effects of ionizing radiation at the cellular and molecular level. Effects of irradiation on the tumor, normal tissues, and the patient will be addressed. DVM degree; Residency in Radiation Oncology or Radiology or Small Animal Oncology and registered in the Graduate School.

**VBMS 7220 STRUCTURE AND FUNCTION OF COMPANION ANIMAL SKIN (3)** LEC. 3. The course will cover the comparative aspects of the structure and function of the skin of companion animals in healthy and diseases states.

**VBMS 7230 CUTANEOUS DISORDERS OF LARGE AND EXOTIC ANIMALS (3)** LEC. 3, IND/LEC. 9-12. In depth review of the common and uncommon dermatologic conditions affecting large animal and exotic animal species, including emphasis on those conditions considered zoonotic.

**VBMS 7250 NORMAL RADIOLOGICAL ANATOMY (3)** LEC. 3. A detailed study of the normal structure, size and position of the various organs of the cat, dog, horse, cow, and other veterinary species as they appear on plain and contrast radiographs. DVM Degree, acceptance in an established residency program.

**VBMS 7260 ADVANCED RADIOLOGY (3-5)** LEC. Detailed study of concepts and techniques of all imaging procedures. For graduate students and residents in DCS program or DVM or equivalent. Course may be repeated for a maximum of 5 credit hours.

**VBMS 7270 RADIOLOGICAL INTERPRETATIONS (1-3)** LEC. The interpretation of various diagnostic imaging modalities used in veterinary medicine and their applications in the diagnostic work-up of clinical cases presenting to the College of Veterinary Medicine. DVM Degree. Course may be repeated for a maximum of 3 credit hours.

**VBMS 7280 PHYSICS OF DIAGNOSTIC IMAGING (3)** LEC. 3. Principles of physics related to the imaging modalities of diagnostic radiology, ultrasonography, magnetic resonance imaging, scintigraphy, computed tomography, and radiation therapy. Students will study physics at the atomic level but must also develop an understanding of construction, function, and hazards of modern imaging equipment. DVM Degree.

**VBMS 7300 AVIAN DIAGNOSTIC PATHOLOGY (1-3)** LAB. 1-3. SU. Residents enrolled in the Veterinary Biomedical Sciences Avian Pathology specialty program will interpret lesions for the diagnosis of avian diseases using necropsy procedures. Focus will be placed on an integrated comparative understanding of the pathophysiology of disease in commercial poultry. Course may be repeated for a maximum of 3 credit hours.

**VBMS 7310 ADVANCED VETERINARY ANESTHESIOLOGY (1) LEC.** 1. This course will be delivered in weekly one hour lecture format. The presenter for each lecture will rotate between course students and veterinary faculty. For each hour, the presenter will be required to deliver a lecture on a topic related to the overarching subject for that semester course. The lecture will be delivered at an in-depth level utilizing currently scientific literature, text books, and other reference materials resulting in delivery of state of the art information. Graduate standing in Biomedical Sciences, College of Veterinary Medicine. Must have a DVM degree or equivalent. Course may be repeated for a maximum of 9 credit hours.

**VBMS 7320 EVALUATION OF CURRENT AND EMERGING LITERATURE IN VETERINARY ANESTHESIA (1) LEC.** 1. This course will be delivered in weekly one hour lecture format. The presenter for each lecture will rotate between course students and veterinary faculty. For each hour, the presenter will be required to deliver an in-depth evaluation and summary of two medial journal manuscripts related to veterinary anesthesiology. The presenter will be required to discuss the manuscript format, study design, data analysis, results, and conclusions including discussion on the pros and cons of the study. Manuscript selection for each class will be at the discretion of the presenter and copies of the manuscripts will be made available electronically to all faculty and students of the course one week prior to the class. Graduate standing in Biomedical Sciences, College of Veterinary Medicine. Must have a DVM degree or equivalent. Course may be repeated for a maximum of 9 credit hours.

**VBMS 7330 EVIDENCE BASED EQUINE SURGERY (3) LEC.** 3. DVM and enrollment in the College of Veterinary Medicine's Equine Medicine or Surgery Residency. Provides an introduction to evidence based medicine and meta-analysis with application to topics in equine surgery.

**VBMS 7340 LARGE ANIMAL SURGERY AND MEDICINE SEMINAR (1) SEM.** 1. Departmental approval. Seminar required of all graduate students in large animal surgery and medicine. Meets at scheduled intervals each year.

**VBMS 7350 ADVANCED LARGE ANIMAL UROGENITAL SURGERY (5) LEC.** 3. LAB. 6. Departmental approval. Research in surgery. Advanced techniques for urogenital surgical procedures in large domestic animals.

**VBMS 7360 ADVANCED LARGE ANIMAL SOFT TISSUE SURGERY (5) LEC.** 4. LAB. 2. Departmental approval. Research in surgery. Advanced techniques for soft tissue surgical procedures in large domestic animals.

**VBMS 7370 ADVANCED LARGE ANIMAL ORTHOPEDIC SURGERY (5) LEC.** 3. LAB. 2. Research and advanced techniques for orthopedic surgical procedures in large domestic animals.

**VBMS 7380 ADVANCED FOOD ANIMAL MEDICINE (3) LEC.** 3. Departmental approval. In-depth study of food animal medical diseases of all body systems with emphasis on pathophysiologic mechanisms. DVM degree.

**VBMS 7400 GYNECOLOGY OF LARGE DOMESTIC ANIMALS (3) LEC.** 3. Departmental approval. Diseases and problems of the reproductive system in the female domestic animals. Normal and abnormal conditions of various species are covered. DVM degree.

**VBMS 7410 ANDROLOGY OF LARGE DOMESTIC ANIMALS (3) LEC.** 3. Departmental approval. Diseases and problems of the reproductive system in male domestic animals. DVM degree.

**VBMS 7420 SCIENTIFIC COMMUNICATION (3) LEC.** SU. Building skills towards effective and impactful communication of scientific evidence via writing, for thesis/dissertation and scientific journals, and via oral presentation.

**VBMS 7440 ADVANCED EQUINE ARTHROSCOPIC SURGERY (5) LEC.** 3. LAB. 6. Departmental approval. Research in surgery. Advanced techniques for arthroscopic surgical procedures in the horse. DVM degree.

**VBMS 7450 SELECTED TOPICS IN GRADUATE EDUCATION RESEARCH (1) LEC.** 1. SU. Departmental approval. Overview of research funding strategies, grant preparation, transfer of research technology and patents, research ethics, etc.

**VBMS 7460 MICROBIAL PATHOGENESIS (3) LEC.** 3. Departmental approval. Mechanisms of infection and disease production by bacteria, viruses, and parasites in animals.

**VBMS 7470 ADVANCED EPIDEMIOLOGY (3) LEC.** 3. Departmental approval. Advanced epidemiological techniques and their application to disease research, clinical retrospective and prospective studies, and disease outbreak investigation. Introductory statistics course

**VBMS 7480 METHODS IN IMMUNOLOGY (5) LEC.** 1. LAB. 8. Pr. VBMS 7500. Departmental approval. Theoretical concepts underlying immunological methods combined with practical hands-on immunological experimentation focused on application to research in the biological sciences.

**VBMS 7500 CELLULAR AND MOLECULAR IMMUNOLOGY (3)** LEC. Departmental approval. Current literature in immunobiology, emphasis on cellular/ biochemical/genetic basis of immune response.

**VBMS 7520 EUKARYOTIC MOLECULAR BIOLOGY (3)** LEC. 3. Genetic mechanisms regulating genomes and gene expression by which eukaryotic cells replicate, communicate and differentiate. Current literature will be used extensively.

**VBMS 7530 EXPERIMENTAL TECHNIQUES IN MOLECULAR AND CELL BIOLOGY (3)** LEC. 2. LAB. 6. Nucleic acid detection/ amplification/sequencing, primer design, CRISPR, transfection, protein/ antibody chemistry, flow cytometry, immunofluorescence microscopy, fluorochromes, radioisotopes, centrifugation, and cell culture will be discussed.

**VBMS 7540 CURRENT TOPICS IN MOLECULAR VIROLOGY (3)** LEC. 3. Pr. (VBMS 7520 or BIOL 5230 or BIOL 6230). Departmental approval. Viral gene expression and evasion of host defense mechanisms.

**VBMS 7550 ADVANCED GENERAL PATHOLOGY (1-3)** LEC. SU. Departmental approval. Structured examination of current textbooks and literature related to the pathologic basis of veterinary diseases. Open to residents in anatomic and clinical pathology and other post-DVM students with special approval. Course may be repeated for a maximum of 3 credit hours.

**VBMS 7560 GENERAL PATHOLOGY (4)** LEC. 3. LAB. 3. Departmental approval. Fundamental alterations of disease. Satisfactory courses in histology and physiology.

**VBMS 7570 DIAGNOSTIC PATHOLOGY (1-3)** LEC. SU. Diagnosis of animal diseases using necropsy procedures and histopathology. Required every semester of all graduate students and residents in pathology. DVM degree. Course may be repeated for a maximum of 3 credit hours.

**VBMS 7580 SURGICAL PATHOLOGY (1-3)** LEC. SU. Histopathologic diagnosis of surgical biopsy or necropsy specimens. Available to residents in anatomic and clinical pathology. Course may be repeated for a maximum of 3 credit hours.

**VBMS 7600 ADVANCED CLINICAL PATHOLOGY I (3)** LEC. 3. Pr. VMED 5230 or VMED 9230. Departmental approval. The lymphohematopoietic system. Normal components and evaluation of disease states.

**VBMS 7610 ADVANCED CLINICAL PATHOLOGY II (3)** LEC. 3. Departmental approval. Laboratory evaluation of organ function; disease pattern recognition.

**VBMS 7620 DIAGNOSTIC ONCOLOGY (3)** LEC. 3. Pr. VMED 9220. Departmental approval. Principles of gross and microscopic interpretation of animal neoplasms using basic and specialized techniques.

**VBMS 7630 BASIC AND CLINICAL ONCOLOGY (3)** LEC. 3. Comparative aspects of the etiology, pathophysiology, diagnosis and treatment of cancer.

**VBMS 7640 MECHANISMS OF DISEASE (3)** LEC. 3. Pr. VMED 9220. Departmental approval. Understanding of disease through in-depth discussion of pathophysiology of various disease processes, disorders and diagnostic modalities. Focus will be placed on an integrated comparative understanding of the pathophysiology of disease in major veterinary species as it pertains to current and historically significant disease, as well as emerging diseases. Emphasis is placed on the morphologic, molecular and genetic aspects of disease processes.

**VBMS 7650 VETERINARY DERMATOPATHOLOGY I (1-3)** LEC. SU. This course aims to share theoretical and practical foundations on dermatopathology with residents in the Anatomic Pathology and/or Veterinary Dermatology program(s). The lectures will consist of 1-hour long Powerpoint presentations or case discussions on relevant integumentary diseases, with summarized clinical features and a particular focus on the histopathology perspective of cases that usually warrant biopsy. At the end of the course, it is expected that residents learn the fundamental terminologies used in dermatopathology, in addition to pattern recognition of major cutaneous diseases that afflict domestic animals. Course may be repeated for a maximum of 3 credit hours.

**VBMS 7660 VETERINARY DERMATOPATHOLOGY II (1-3)** LEC. SU. This course aims to share theoretical and practical foundations on dermatopathology with residents in the Anatomic Pathology and/or Veterinary Dermatology program(s). The lectures will consist of 1-hour long PowerPoint presentations or case discussions on relevant integumentary diseases, with summarized clinical features and a particular focus on the histopathology perspective of cases that usually warrant biopsy. At the end of the course, it is expected that residents learn the fundamental terminologies used in dermatopathology, in addition to pattern recognition of major cutaneous diseases that afflict domestic animals. Course may be repeated for a maximum of 3 credit hours.

**VBMS 7670 PATHOLOGY PARASITIC DISEASES (3)** LEC. 2. LAB. 2. Pr. VBMS 7560. Departmental approval. Gross and microscopic pathology of parasitic diseases of veterinary importance.

**VBMS 7680 PATHOLOGY SEMINAR (1)** LEC. 1. Pr. VMED 9220. Departmental approval. Weekly conference to discuss gross and histologic pathology in animal tissues. Open to residents in anatomic and clinical pathology. Course may be repeated for a maximum of 3 credit hours.

**VBMS 7690 READINGS IN IMMUNOLOGY AND INFECTIOUS DISEASE (1-3)** LEC. 1-3. To familiarize students with current scientific literature in immunology and infectious diseases and the methods employed. Course may be repeated for a maximum of 6 credit hours.

**VBMS 7710 ADVANCED EUKARYOTIC MOLECULAR BIOLOGY (3)** LEC. 3. Pr. VBMS 7520. Current literature in molecular mechanisms of information transfer and regulation in eukaryotes.

**VBMS 7720 DEVELOPMENTAL MOLECULAR BIOLOGY (3)** LEC. 3. Pr. VBMS 7520. Genetic mechanisms by which eukaryotes differentiate from single cells to complex multicellular organisms will be covered. Important examples of biomedical dysfunction will be used to illustrate developmental pathways. Current literature will be used extensively.

**VBMS 7750 GRADUATE COLLOQUIUM IN VETERINARY CLINICAL SCIENCE (1)** CLN. 1. Departmental approval. Forum to present topics relevant to the students clinical and research interests. This a mandatory seminar for graduate students in the Department of Clinical Science. DVM degree Course may be repeated for a maximum of 5 credit hours.

**VBMS 7760 ADVANCED VETERINARY NEUROSURGERY (4)** LEC. 1. LAB. 3. Enrolled in the CVM's MS or PHD program. Veterinary neurosurgery. All aspects of veterinary neurosurgery will be covered. Content delivery is via didactic lecture, small group discussion, and skills laboratories.

**VBMS 7770 ADVANCED SMALL ANIMAL GENERAL SURGERY (3)** LEC. 2. LAB. 3. Application of critical thinking skills to perioperative plans and tasks. DVM or VMD degree, or equivalent.

**VBMS 7780 VETERINARY WOUND MANAGEMENT AND RECONSTRUCTIVE SURGERY (4)** LEC. 2. LAB. 2. Techniques in veterinary wound management and reconstructive surgery in large and small animals. DVM degree or equivalent.

**VBMS 7790 SMALL ANIMAL ORTHOPEDICS (5)** LEC. 5. Review of orthopedic diseases in small animals, interactive review of recent literature and advanced laboratory sessions intended for residents in small animal surgery. DVM degree or equivalent.

**VBMS 7800 ADVANCED SMALL ANIMAL NEUROLOGY (3)** LEC. 3. Advanced study of neurodiagnostics and non-surgical therapy of neurological disorders in small domestic animals.

**VBMS 7810 ADVANCED SMALL ANIMAL MEDICINE I (5)** DSL/LEC. Departmental approval. Special study of the causes, methods of diagnosis, treatment and control of non-surgical urogenital diseases of small animals. DVM degree.

**VBMS 7820 ADVANCED SMALL ANIMAL MEDICINE II (3-5)** LEC. 3. Departmental approval. Special study of the causes, methods of diagnosis, treatment and control of non-surgical gastrointestinal diseases of small animals. DVM degree. Course may be repeated for a maximum of 5 credit hours.

**VBMS 7830 ADVANCED VETERINARY ONCOLOGY (3)** LEC. 3. SU. Departmental approval. Special study of veterinary oncology and general tumor biology. DVM degree required. Course may be repeated for a maximum of 6 credit hours.

**VBMS 7840 ADVANCED CRITICAL CARE MEDICINE I: PATHOPHYSIOLOGY (1)** LEC. 1. Advanced topics in veterinary critical care are discussed. Topics include pathophysiology, pharmacology, and specific therapy of critical illness. Graduate standing in Biomedical Sciences, College of Veterinary Medicine. Course may be repeated for a maximum of 5 credit hours.

**VBMS 7850 ADVANCED VETERINARY MEDICAL SPECIALTY TRAINING (1-4)** LEC. 1. LAB. 2. SU. Advanced veterinary medical specialty training is provided to residents and board-eligible veterinary trainees with hands-on instruction in clinical activities commensurate with the board-certification expectation of various veterinary medical specialties. Up to 3 hours may be used toward BMS degree program, course may be repeated for a maximum of 6 credit hours.

**VBMS 7870 ADVANCED VETERINARY OPHTHALMOLOGY: OPHTHALMIC MEDICINE (3)** LEC. 3. Advanced ophthalmology with emphasis on diagnosis, pathophysiology and treatment of ocular diseases of domestic animals. DVM degree or equivalent.

**VBMS 7880 ADVANCED VETERINARY OPHTHALMOLOGY: OPHTHALMIC MEDICINE (3)** LEC. 1. LAB. 6. Pr. VBMS 7870. Advanced ophthalmology with emphasis on ophthalmic surgery.

**VBMS 7890 ADVANCED VETERINARY OPHTHALMOLOGY: OPHTHALMIC BASIC SCIENCES (3)** LEC. 3. Advanced ophthalmology with emphasis on diagnosis, pathophysiology and treatment of ocular diseases of domestic animals. DVM degree or equivalent.

**VBMS 7900 VETERINARY OPHTHALMIC PATHOLOGY (1)** LLB. This course aims to share theoretical and practical foundations on ocular pathology with residents in the Anatomic Pathology and/or Veterinary Ophthalmology program(s). The lectures will consist of 1-hour long PowerPoint presentations on significant ocular/orbital abnormalities, with summarized clinical features and a particular focus on the histopathology perspective of cases that usually warrant biopsy, enucleation, evisceration, or orbital exenteration. At the end of the course, it is expected that residents build acquaintance with the fundamental terminologies used in ocular pathology, in addition to the recognition of major pathologic processes of the ocular/orbital structures.

**VBMS 7930 ADVANCED SMALL ANIMAL ORTHOPEDICS: AXIAL SKELETON (2)** LEC. 2. Advanced topics in small animal orthopedics are discussed. Topics include anatomy, pathophysiology, pharmacology, and medical/surgical therapy of axial skeletal disease in small animals.

**VBMS 7940 CURRENT TOPICS IN IMMUNOBIOLOGY (1)** LEC. 1. The focus of this journal club is to discuss recently published advanced research topics in immunobiology research field pertaining to graduate student's research work. Course may be repeated for a maximum of 12 credit hours.

**VBMS 7960 VETERINARY NEURORADIOLOGY (1)** LEC. 1. SU. Departmental approval. This course will cover fundamental concepts and principles of imaging modalities commonly used in veterinary neurology, namely MRI, CT, & radiography. Course material includes imaging of common neurologic lesions including congenital, neoplasia, trauma, vascular, inflammatory, and infectious diseases.

**VBMS 7970 RESEARCH PROBLEMS IN BIOMEDICAL SCIENCES (1-5)** RES. Departmental approval. Research problems for graduate students, under supervision of faculty, in variety of specialized disciplines related to the biomedical sciences. Faculty approval. Course may be repeated for a maximum of 15 credit hours.

**VBMS 7980 NON-THESIS PROJECT (1-3)** LEC. SU. Departmental approval. Non-thesis project, to be determined by faculty advisor and student's graduate advisory committee. DVM degree

**VBMS 7990 RESEARCH AND THESIS IN BIOMEDICAL SCIENCES (1-10)** MST. Credit to be arranged. Course may be repeated with change in topics.

**VBMS 8000 ADVANCED SMALL ANIMAL EMERGENCY AND CRITICAL CARE LITERATURE REVIEW (1)** LEC. 1. SU. Review of current literature pertaining to Small Animal Emergency and Critical Care. Review includes group discussion of study design, procedural and physiologic concepts, statistical analysis, and relevance of outcomes.

**VBMS 8010 EMERGING PEDAGOGIES IN ANATOMIC PATHOLOGY (1-3)** LLB. SU. The overall objective of this course is to expose Graduate Teaching Assistants (GTA) to pedagogy strategies related to general pathology with specific emphasis on competency-based medical education for second-year veterinary students. Trainees will be introduced to diverse classroom dynamics, such as case- and problem-based laboratories, flipped classroom, and other collaborative learning techniques.

**VBMS 8360 ADVANCED EQUINE MEDICINE I: GI DISEASE (2)** LEC. 2. Advanced topics in equine gastrointestinal disease are discussed. Topics include pathophysiology, pharmacology, and specific therapy of GI disease in horses. Graduate standing in Biomedical Sciences, College of Veterinary Medicine. Must have DVM or equivalent.

**VBMS 8370 ADVANCED EQUINE MEDICINE II: RENAL/ENDOCRINE (2)** LEC. 2. Advanced topics in equine renal and endocrine disease are discussed. Topics include pathophysiology, pharmacology, and specific therapies. Graduate standing in Biomedical Sciences, College Veterinary Medicine. Must have DVM or equivalent.

**VBMS 8380 ADVANCED EQUINE MEDICINE III: NEUROMUSCULAR (2)** LEC. 2. Advanced topics in equine neuromuscular disease are discussed. Topics include pathophysiology, pharmacology, and specific therapies. Graduate standing in Biomedical Sciences, College Veterinary Medicine. Must have DVM or equivalent.

**VBMS 8390 ADVANCED EQUINE MEDICINE IV: CARDIORESPIRATORY (2)** LEC. 2. Advanced topics in equine cardiorespiratory disease are discussed. Topics include pathophysiology, pharmacology and specific therapies. Graduate standing in Biomedical Sciences, College Veterinary Medicine. Must have DVM or equivalent.

**VBMS 8480 EXPERIMENTAL METHODS IN VETERINARY MEDICINE (3)** LEC. 3. Departmental approval. This course is intended to provide the biomedical sciences graduate student with the necessary tools to design and analyze a straightforward Masters-level veterinary biomedical research study, and interpret common statistical methods in the veterinary biomedical literature. Students will review and discuss examples from the veterinary research literature and acquire experience performing analysis using commonly available software packages.



**VBMS 8950 BIOMEDICAL SCIENCES SEMINAR (1) SEM.** 1. SU. Recent advances in biochemistry, cell biology and molecular biology will be critically presented and discussed by graduate faculty and students. Course may be repeated for a maximum of 10 credit hours.

**VBMS 8990 RESEARCH AND DISSERTATION (1-10) DSR.** Course may be repeated with change in topics.

## Veterinary Medicine Courses

**VMED 9000 ORIENTATION TO VETERINARY MEDICINE (0) SEM.** 1. SU. Overview of organized veterinary medicine, history of the profession, professional responsibilities and privileges, and career opportunities within the profession.

**VMED 9009 PROFESSIONAL SELF CARE SKILLS (1) LEC.** 1. SU. Departmental approval. This course will discuss the factors present within veterinary medicine that put us at risk for empathetic exhaustion, burnout, suicidal ideation and other issues, followed by sharing skills, thoughts and actions that will facilitate resiliency, well-being and fulfillment within the profession.

**VMED 9010 VETERINARY MEDICAL ETHICS & LAW (1) LEC.** 1. Provide a foundation in veterinary medical ethics and legal issues associated with veterinary medicine.

**VMED 9020 PROFESSIONAL COMMUNICATION SKILLS FOR VETERINARY MEDICINE (1) LEC.** 1. LAB. 2. SU. Students will develop skills in communication with faculty, staff, colleagues, pet-owners, and the public sector through lecture and interactive laboratory sessions. These skills will be immediately implementable into everyday student/educational life, clinical practice, and team building settings. Topics include implementation of nonverbal and verbal communication skills during financial discussion, de-escalation, grief and empathy, creating safe spaces for collaborative decision making, and discussing medical errors.

**VMED 9050 PROFESSIONAL DEVELOPMENT AND BUSINESS FUNDAMENTALS (1) LEC.** 15. Auburn University CVM Professional Development and Business Fundamentals course is a 1 credit-hour course encompassing the study, understanding and application of pertinent business disciplines guiding the decision-making responsibilities of practice owners, veterinarians, veterinary students, veterinary technicians and practice managers that seek to improve profitability and efficiency allowing for a competitive advantage and long term success in their personal and professional careers.

**VMED 9060 ELEVATING YOUR IMPACT: TOOLS FOR COMMUNITY-CENTERED MEDICINE (1) LEC.** 12. LAB. 1. SU. This experience will provide students with an introduction to a wide range of animal welfare topics in a hands-on interactive environment. Subject matter experts will present, lead discussions, and facilitate student activities throughout this 2-day intensive weekend elective. Students will have the opportunity to practice spay/neuter techniques using easily buildable string models, become the crime scene investigator on animal cruelty cases, and learn countless other skills that will help them become better advocates for the animals and pet owners in their communities regardless of the specific veterinary field they choose to enter post-graduation.

**VMED 9062 CLINICOPATHOLOGY CONFERENCE CRITICAL THINKING (1) LEC.** 14. SU. Review and assessment of material presented in a case-based format by faculty and house officers to develop and refine clinical thinking and critical thinking skills. Course may be repeated with change in topics.

**VMED 9070 APPLIED CLINICAL PATHOLOGY (1) LEC.** 1. SU. This course covers the use and interpretation of hematologic, clinical biochemical, coagulation, urinalysis and cytologic laboratory data in the diagnosis of diseases and pathophysiologic processes, building on the foundation established in the first two years of the professional DVM curriculum. The data discussed in this course are taken from clinical cases from the AU teaching hospitals.

**VMED 9080 VETERINARY PAIN MANAGEMENT (1) LEC.** 1. SU. The veterinary pain management course will serve to increase a student's knowledge base on many aspects of pain management of the veterinary patient. Subjects covered in this course will include in depth review of neuroanatomy and physiology of pain, pathophysiology of pain, pharmacology of medications used for pain management, non-pharmacologic treatments for pain, and specific pain management strategies for various domestic species, and exotic and zoo animals. Content in this class will be delivered through lecture or other formats depending on the presenting faculty. Departmental approval required.

**VMED 9090 CANINE AND FELINE DENTISTRY (1) LEC.** 1. SU. This elective is designed to build upon Small Animal Dentistry knowledge and teach entry level abilities to help 2nd and 3rd year veterinary students become clinic and practice ready. Departmental approval required.

**VMED 9100 PREPARING FOR YOUR FINANCIAL FUTURE (1) LEC.** 1. SU. Departmental approval. This course will introduce principles of financial preparedness for the major challenges students will face both now and after graduation from veterinary school (student loans, home mortgage, vehicle purchase, retirement plan, etc.).

**VMED 9110 PHYSIOLOGY I (5)** LEC. 5. LAB. 1. Cellular, Cardiovascular, Renal, and Respiratory Physiology.

**VMED 9111 VETERINARY ANATOMY I (SMALL ANIMAL) (4)** LEC. 2. LAB. 2. Basic concepts of body structure and small animal gross anatomy with veterinary medical applications. Credit will not be given for both VMED 5111 and VBMS 6111.

**VMED 9120 PHYSIOLOGY II (4)** LEC. 5. Gastrointestinal Physiology, Metabolism, Endocrinology, and Reproductive Physiology.

**VMED 9121 VETERINARY ANATOMY II (3)** LEC. 1. LAB. 2. In-depth study of the gross anatomy of the ox, horse, and minor species with inclusion of clinical relevance.

**VMED 9130 GENETIC AND CELLULAR BASIS OF ANIMAL DISEASE (1)** LEC. 3. One credit course focused on the relationship between genetics and animal diseases.

**VMED 9131 BASIC MICROANATOMY/DOMESTICS ANIMALS (3)** LEC. 1. LAB. 2. Functional comparative microstructure of cells, basic tissues, cardiovascular system, urinary system, skeleton and osteogenesis, respiratory system, and blood of domestic animals.

**VMED 9140 ADVANCED ANESTHESIA AND PAIN MANAGEMENT (1)** LEC. 1. SU. This course is intended to expand on the basic topics covered in the veterinary curriculum. The content will be selected by the participants on the first day and a syllabus generated based on a consensus of topics the group would like to discuss. All topics in the realm of anesthesia and pain management are within the scope of possibilities. This course is not designed to be a review of topics already covered in other classes, but to expand on those topics. Departmental approval required.

**VMED 9141 ORGANOLOGY OF DOMESTIC ANIMALS (2)** LEC. 1. LAB. 2. Comparative microstructure of the digestive system, lymphoid system, endocrine system, integumentary system, reproductive system, and placentation of domestic animals.

**VMED 9150 DIAGNOSTIC IMAGING (2)** LEC. 2. LAB. 1. Basic radiographic and ultrasonographic physics; introduction to computed tomography, magnetic resonance imaging, and nuclear imaging.

**VMED 9151 VETERINARY NEUROSCIENCES (4)** LEC. 3. LAB. 1. Gross and microscopic morphology and physiology of the peripheral and central nervous systems. Course may be repeated for a maximum of 12 credit hours.

**VMED 9160 VETERINARY PUBLIC HEALTH (3)** LEC. 3. This first half of this class will include instruction on the zoonoses, and the principles of epidemiology or population medicine. For the zoonoses primary mechanisms of transmission and inclusion in differential diagnosis lists will be emphasized. The role of the veterinarian in prevention of human disease from the zoonoses will be stressed. Epidemiologic methods for investigation of disease distribution and dynamics in populations also will be covered. The second half of the course will provide a broad One Health/ Public Health overview of food safety and food security issues, including pet food and animal feeds. Basic concepts and principles will be illustrated and reinforced through the study of food- and water-borne diseases. This part of the course will address food and water-borne pathogens, their public health impacts (historic and present-day), prevention and mitigation measures (sanitary production and processing, pasteurization, and preservation techniques). The history and importance of regulatory controls and oversight in order to assure food and feed safety, consumer confidence, sustainability, and stable markets for American agriculture will be discussed.

**VMED 9170 PROFESSIONAL COMMUNICATION SKILLS (1)** LEC. 1. SU. Departmental approval. Students will develop skills in communication with colleagues, clients and staff through lecture and interactive laboratory sessions. Students will also improve their ability to give and receive feedback from peers. Professional presentation skills will be developed during the course with a final presentation given in laboratory setting.

**VMED 9180 VETERINARY ETHOLOGY (2)** LEC. 2. Basic concepts of ethology and other approaches to animal behavior, introduce diagnostic and treatment methods, discuss relevant cases. Course may be repeated for a maximum of 6 credit hours.

**VMED 9190 INTRODUCTION TO VETERINARY PHARMACOLOGY (1)** LEC. 3. An organized foundation of information to develop clinical thinking skills in veterinary pharmacology. Course may be repeated for a maximum of 16 credit hours.

**VMED 9200 VETERINARY PARASITOLOGY I (3)** LEC. 3. LAB. 1. Platyhelminthes, trematodes, and nematodes of domestic animals.

**VMED 9210 VETERINARY PARASITOLOGY II (2)** LEC. 3. LAB. 1. Arthropods, protozoa, helminths, and acanthocephalans of domestic animals. Parasiticides.

**VMED 9220 PRINCIPLES OF VETERINARY PATHOLOGY (3)** LEC. 4. LAB. 1. General principles of pathology and mechanisms of disease processes affecting animals.

**VMED 9230 VETERINARY CLINICAL PATHOLOGY (3)** LEC. 47. LAB. 8. Laboratory test principles and results interpretations in evaluation of hematopoietic, coagulation, hepatic, renal, gastrointestinal, acid/base and fluid status of animals.

**VMED 9240 PRINCIPLES OF VETERINARY IMMUNOLOGY (3)** LEC. 2. LAB. 1. Principles underlying the immune system's ability to protect animals from disease and mechanisms by which immune responses contribute to disease.

**VMED 9250 VIROLOGY & PRIONS (2)** LEC. 2. LAB. 1. Principles of infectious agents and their pathogenic attributes, infectious diseases of animals, and mechanisms of antimicrobial agents. Course may be repeated for a maximum of 6 credit hours.

**VMED 9260 VETERINARY PHARMACOLOGY (3)** LEC. 5. LAB. 1. Overview of drugs relevant to veterinary practice; pharmacodynamics, pharmacokinetics, clinical application.

**VMED 9270 INTRODUCTION TO CYTOLOGY (1)** LEC. 1. LAB. 1. The principles and practice of evaluation of blood films, cytologic preparations, and urine sediments from various veterinary species.

**VMED 9280 BACTERIOLOGY & MYCOLOGY (3)** LEC. 3. LAB. 1. Veterinary bacterial and fungal pathogens, diseases caused by each, prevention, treatment and presumptive laboratory diagnoses. Course may be repeated for a maximum of 9 credit hours.

**VMED 9290 CLINICAL ANATOMY AND INTRO TO AQUATIC ANIMAL MEDICINE (1)** DSL/LLB. SU. This course delves into the unique anatomic and physiologic features of aquatic animals and serves as an introduction into topics including aquaculture, aquatic toxicology, aquatic research models, diseases of fish, and aquatic medicine. In addition, basic fish anatomy and diagnostic techniques will be taught in laboratory sessions.

**VMED 9300 REPTILE ANATOMY AND MEDICINE (1)** LEC. 1. LAB. 1, LLB. 0. SU. This course will be divided evenly between anatomy and natural history of reptiles. There will be 15 one-hour lectures and 2 two-hour wet labs.

**VMED 9301 PHYSICAL DIAGNOSES OF LARGE AND SMALL ANIMALS (2)** LEC. 2. LAB. 1. Basic approach to physical examination of large and small animals.

**VMED 9309 AVIAN ANATOMY AND MEDICINE (1)** LLB. SU. This course will be divided between the anatomy and natural history of birds. There will be 15 one-hour lectures and 2 two-hour wet labs.

**VMED 9310 INTRODUCTION TO SURGERY (2)** LEC. 2. LAB. 2. Current standing in the DVM professional curriculum and completion of the first 3 semesters of the professional program. Introduction to the fundamental principles and techniques of veterinary surgery.

**VMED 9311 SURGICAL PRACTICUM (0-1)** LAB. 5. SU. Aseptic technique, instrument handling, suture patterns, surgical ties, anesthetic administration/monitoring, surgical incision/tissue handling, wound closure, postoperative patient management. Course may be repeated for a maximum of 1 credit hours.

**VMED 9320 LARGE ANIMAL NUTRITION (2)** LEC. 2. LAB. 0. Proper nutrition for health and disease prevention and treatment in large animals in different stages of life. May count either VMED 5320 or VMED 5420. Course may be repeated for a maximum of 6 credit hours.

**VMED 9330 EXOTIC COMPANION ANIMAL MEDICINE (2)** LEC. 4. Care, diagnosis, and treatment of exotic companion animals. May count either VMED 5330 or VMED 5430. Course may be repeated for a maximum of 6 credit hours.

**VMED 9340 EMERGENCY MEDICINE AND CRITICAL CARE (2)** LEC. 5. Emergency presentations, critical care management.

**VMED 9350 VETERINARY TOXICOLOGY (2)** LEC. 2. LAB. 1. Poisons and poisonous plants affecting large and small animals, chemical properties, signs, lesions, diagnosis, treatment.

**VMED 9360 PRODUCTION AND PREVENTATIVE MEDICINE (3)** LEC. 5. Principles of disease prevention and maximization of production application of food safety principles.

**VMED 9370 ONCOLOGY (1)** LEC. 3. Diagnostic and therapeutic measures used to manage animals with oncologic diseases.

**VMED 9380 PHYSICAL DIAGNOSIS II (1)** LEC. 1. LAB. 2. Continued experience in the performance of routine physical examination in small and large animal species. Satisfactory advancement into the second year of the professional (DVM) program.

**VMED 9390 ADVANCED ANATOMY AND SURGICAL SKILLS (1)** LEC. 1. SU. This elective is based on a flipped classroom model. Each enrollee will be required to prepare one PowerPoint presentation selected from the list of cases provided (or the presenter can elect to bring his or her own case based on past experience) and then discuss it with the group. The presenter will carry out research at home ahead of the class. He will get guidance from instructor who will provide additional notes, video and anatomical resources for each of the listed cases. Departmental approval required.

**VMED 9400 EQUINE THERIOGENOLOGY CASE OF THE WEEK (1)** LEC. 1. SU. Departmental approval. This course provides students an introduction to equine theriogenology using clinical cases received on the equine theriogenology service of the J.T. Vaughan Large Animal Teaching Hospital.

**VMED 9410 APPLIED CLINICAL IMAGING (2)** LEC. 3. Define and describe abnormalities of various systems detected through imaging. Course may be repeated for a maximum of 6 credit hours.

**VMED 9420 SMALL ANIMAL NUTRITION (2)** LEC. 2. Proper nutrition for health and disease prevention and treatment in large animals in different stages of life. May count either VMED 9320 or VMED 9420. Course may be repeated for a maximum of 6 credit hours.

**VMED 9440 CLINICAL VETERINARY PARASITOLOGY (1)** LEC. SU. Departmental approval. This course will provide students with a case-based lecture format for expansion of foundational parasite knowledge, focusing on further discussions of the diagnosis, treatment, and prevention of common parasitic problems faced by general practitioners (small animal, large animal, and mixed) in the US. Hosts will include, but not be limited to: dogs, cats, horses, cattle, small ruminants, camelids, poultry and swine.

**VMED 9450 EQUINE VETERINARY HUSBANDRY (1)** LEC. 1. SU. This course is designed to familiarize veterinary students with the basic principles of equine husbandry as related to veterinary medicine, including uses and medical conditions of certain breeds, biosecurity, infectious disease prevention, parasite control programs, dental and hoof care, transport, and nutrition.

**VMED 9460 FELINE MEDICINE ELECTIVE (1)** LEC/LLB. SU. Departmental approval. This course provides an opportunity to increase practical knowledge of a variety of topics in feline medicine. Topics are designed to supplement course work, or include areas that are not covered in depth in regular courses.

**VMED 9470 PRACTICAL KNOWLEDGE FOR EQUINE PRACTITIONERS (1)** LEC. 1. SU. Discussions of common equine practice topics by medicine and surgery clinicians and staff.

**VMED 9502 CURRENT TOPICS IN VETERINARY MEDICINE (1)** LEC. 1. SU. Emerging topics in veterinary medicine, current literature. Course may be repeated for a maximum of 15 credit hours.

**VMED 9510 HEMOLYMPHATIC SYSTEM (1)** LEC. 3. LAB. 1. Diagnosis, treatment and prevention of diseases affecting the integumentary and hemolymphatic systems. Course may be repeated for a maximum of 3 credit hours.

**VMED 9520 CARDIOVASCULAR SYSTEM (2)** LEC. 3. LAB. 1. Pathophysiology, pathologic lesions, radiographic and ultrasonographic lesions, diagnosis, treatment and prevention of diseases affecting the cardiovascular system.

**VMED 9530 RESPIRATORY SYSTEM (3)** LEC. 3. Pathophysiology, pathologic lesions, radiographic and ultrasonographic lesions, diagnosis, treatment and prevention of diseases affecting the respiratory system.

**VMED 9540 SMALL ANIMAL ALIMENTARY SYSTEM (2)** LEC. 5. Pathophysiology, pathologic lesions, radiographic and ultrasonographic lesions, diagnosis, treatment and prevention of diseases affecting the alimentary system. Course may be repeated for a maximum of 6 credit hours.

**VMED 9550 URINARY SYSTEM (2)** LEC. 3. Pathophysiology, pathologic lesions, radiographic and ultrasonographic lesions, diagnosis, treatment, and prevention of disease affecting the urinary system.

**VMED 9560 ENDOCRINE SYSTEM (2)** LEC. 3. Pathophysiology, pathologic lesions, diagnosis, treatment and prevention of diseases of the endocrine system.

**VMED 9570 THERIOGENOLOGY (4)** LEC. 5. Pathophysiology, pathologic lesions, radiographic and ultrasonographic lesions, diagnosis, treatment; and prevention of diseases of the reproductive system.

**VMED 9580 NERVOUS SYSTEM (2)** LEC. 5. LAB. 1. Pathophysiology, pathologic lesions, radiographic and ultrasonographic lesions, diagnosis, treatment, and prevention of diseases affecting the nervous system.

**VMED 9590 MUSCULOSKELETAL SYSTEM (3)** LEC. 3. Pathophysiology; pathologic, radiographic and ultrasonographic lesions; diagnosis; treatment; and prevention of diseases affecting the musculoskeletal system.

**VMED 9600 ADVANCED EQUINE PHYSICAL DIAGNOSIS I (1)** LAB. 1. SU. Departmental approval. An introduction to basic physical examination techniques and clinical conditions commonly used when examining horses clinically. Part 1 of a 2 part series, this course introduces students to common clinical conditions that may be encountered in equine practice.

**VMED 9601 VETERINARY CLINICAL ROTATIONS (3)** CLN. 40. Clinical experiences through various specialty service in the Veterinary Medical Teaching Hospital. Course may be repeated with change in topics.

**VMED 9602 RESEARCH PROBLEMS IN BIOMEDICAL SCIENCE (1-10)** RES. SU. Research problems in a variety of specialized disciplines for veterinary students and advanced undergraduates.

**VMED 9610 ADVANCED EQUINE PHYSICAL DIAGNOSIS II (1)** LAB. 1. SU. Departmental approval. This course is a continuation of physical examination techniques and diagnostic procedures used when examining horses clinically. This is the second part of a two part elective to introduce students to common procedures that may be encountered in clinical practice of equine medicine.

**VMED 9620 INTEGRATIVE & COMPLEMENTARY MEDICINE (1)** LEC. 1. SU. Departmental approval. This course will cover concepts in acupuncture, chiropractic adjustment, massage, and physical therapy as applied to veterinary medicine. The laboratory session will allow for hands on experience through application of techniques.

**VMED 9621 CLINICAL ROTATIONS IN VETERINARY MEDICINE (2)** CLN. 40. Clinical practicum experiences in large and small animal teaching hospitals on the veterinary medical campus. Course may be repeated with change in topics.

**VMED 9630 LEGAL PRINCIPLES OF VETERINARY FORENSICS (1)** LEC. 1. SU. Fundamental concepts of animal crimes and the role and responsibilities of veterinarians in reporting animal abuse and identifying, documenting, and processing forensic evidence in a criminal case.

**VMED 9631 ALTERNATIVE ROTATIONS IN VETERINARY MEDICINE (2)** CLN. 40. SU. Clinical practicum experiences in alternative large and small animal disciplines. Course may be repeated with change in topics.

**VMED 9640 LARGE ANIMAL ALIMENTARY SYSTEM (2)** LEC. 5. Pathophysiology, pathologic lesions, diagnosis, treatment and prevention of diseases affecting the large animal alimentary system. Course may be repeated for a maximum of 6 credit hours.

**VMED 9660 BASIC SPANISH FOR VETERINARIANS (1)** LEC. 1. SU. Departmental approval. Learn basic words and terminology used in veterinary medicine, including species, household and farm items, basic body parts, etc.

**VMED 9669 ADVANCED SPANISH FOR VETERINARIANS (1)** LEC. 1. SU. Learn how to communicate in Spanish different diseases, treatments and recommendations for pet owners, including but not limited to dogs, cats, horses, cattle and farm animals. At the end of the course, students should be able to obtain a history, explanation of physical exam and diagnostic tests, description of clinical exam findings, treatments and recommendations.

**VMED 9670 OPHTHALMOLOGY (1)** LEC. 2. LAB. 1. Common procedures for evaluation, diagnosis and treatment of eye disorders in domestic species are covered to provide basic veterinary ophthalmology knowledge to veterinary students.

**VMED 9680 VACCINES (1)** LEC. 1. SU. This course will cover animal and human vaccines, including their history, impact, and recent developments in vaccine technology through evaluation of current primary literature.

**VMED 9690 REPTILE AND AMPHIBIAN MEDICINE (1)** LEC. 1. SU. Diseases, treatment, husbandry, handling, restraint, examination, sample collection in reptiles and amphibians.

**VMED 9700 INTRODUCTION TO ANESTHESIA (3)** LEC. 3. LAB. 1. Principles and practices of veterinary anesthesia in large and small animals.

**VMED 9710 PRACTICE MANAGEMENT (1)** LEC. 1. SU. Fundamental principles of effective client, personnel, practice and business management for the veterinarian.

**VMED 9720 DISASTER MEDICINE FOR VETERINARIANS (1)** LEC. 1. SU. Pr. (VMED 9111 or VMED 5111). Explores the role of the veterinarian in preparing and responding to natural and man-made disasters, including animal health emergencies.

**VMED 9730 SELECT TOPICS IN FOOD ANIMAL MEDICINE (1)** LEC. 1. SU. This course covers a wide variety of topics involving food animals (bovine, swine, small ruminants, camelids and poultry) which are more in depth than in the standard DVM curriculum.

**VMED 9750 DIAGNOSTIC VETERINARY ULTRASONOGRAPHY (1) LAB.** 1. SU. Departmental approval. Basic physics, instrumentation, and scanning techniques of ultrasonography. Normal sonographic anatomy correlated with the cross-sectional anatomy of body structures and organs.

**VMED 9780 CLINICAL CONCEPTS & PROFESSIONAL DEVELOPMENT (1) LEC.** 1. SU. A weekly case-based presentation that illustrates current concepts in the professional DVM curriculum, as well as concepts that are less commonly emphasized in the curriculum. Course may be repeated for a maximum of 6 credit hours.

**VMED 9800 APPLIED SMALL ANIMAL NEUROLOGY (1) LEC.** 1. SU. Clinical management of commonly occurring neurologic diseases of small domestic animals.

**VMED 9801 PRECEPTORSHIP (3) LAB.** 320. SU. Training in a practice situation under the direct supervision of a veterinarian or, under certain conditions, in specialized programs. Approval of Preceptorship Committee.

**VMED 9802 DATA ANALYSIS OF EPIDEMIOLOGICAL STUDIES (1) LEC.** 1. SU. Departmental approval. This course will cover basic data analysis of epidemiological studies that will be especially useful to students considering pursuit of an internship or residency. Epidemiologic techniques emphasized will be outbreak investigation, evaluation of diagnostic tests and disease surveillance.

**VMED 9810 INTEGUMENTARY SYSTEM (2) LEC.** 2. Diagnosis, treatment and prevention of diseases affecting the integumentary system.

**VMED 9820 ADVANCED REPRODUCTIVE TECHNIQUES—DOMESTIC ANIMAL REPRODUCTION—SECTION 1 (1) LEC.** 1. LAB. 1. SU. Class discussions will surround those topics not covered elsewhere in the core reproductive curriculum (e.g., innate breeding behaviors, advanced techniques such as in-vitro production of embryos, in-depth penile injury management, and advanced dystocia management to name a few). There will be an emphasis placed on current research and literature discussion on a weekly basis.

**VMED 9840 WILDLIFE DISEASES (1) LEC.** 1. SU. Control and role of veterinarian in prevention of disease in wild animals, specifically wildlife indigenous to U.S.

**VMED 9850 MARINE ANIMAL ANATOMY AND NECROPSY TECHNIQUES (2) LAB.** SU. Departmental approval. This course will provide an overview of dolphin, pinniped and sea turtle anatomy, necropsy techniques and live and dead animal stranding response. This course will be spread over two weekend-long sessions.

**VMED 9870 SMALL OCEANARIUM ELECTIVE (1) LLB.** SU. Departmental approval. This course takes place in one weekend-long session on site at Gulf World Marine Park in Panama City Beach, FL. The course provides a brief overview of medicine and husbandry related to the common species found in small oceanariums. Instruction is divided between lecture format and hands-on demonstrations.

**VMED 9890 GENOMICS AND PRECISION MEDICINE (1) LEC.** 1. SU. With this course, the student is expected to have a thorough understanding of the historical and current status of the studies on genomics and personalized medicine, with a specific focus on veterinary species.

**VMED 9940 COMPANION ANIMAL THERIOGENOLOGY (1) LEC.** 1. SU. This course gives students an overview of companion animal reproduction. It is clinically based and offers lectures and discussions to provide a better understanding and deeper knowledge of canine and feline reproduction in practice.

**VMED 9950 CLINICOPATHOLOGIC CONFERENCE (1) SEM.** 1. SU. Oral presentation of veterinary clinical case or case material.

**VMED 9995 VETERINARY CLINICAL ROTATIONS - EXTERNSHIPS (0) CLN.** SU. Successful completion of didactic veterinary curriculum. Students will participate in clinical rotations including specialty rotations.