

# College of Veterinary Medicine



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UNIVERSITY OF MISSOURI

COLLEGE OF VETERINARY MEDICINE  
CATALOG 2009–2010

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**About the artist:** MU College of Veterinary Medicine student Rachel Cherico sketched the cover art, *The Doctor's Trio*, for a friend who owns a mixed animal veterinary practice. She gave a copy of the artwork as a gift to the MU CVM Office of Student and Alumni Affairs. Rachel, who was raised in Landenberg, Pa., will graduate with a Doctor of Veterinary Medicine in May 2009.

## *The comprehensive mission*

of the College of Veterinary Medicine is to provide excellence in professional, graduate and undergraduate education; animal disease diagnosis; patient care; extension education of the public; continuing education of veterinarians; and research.

These programs benefit the veterinary profession and the livestock-, poultry- and companion-animal-owning public; support wildlife conservation programs; bolster the economy of Missouri; support agricultural and biomedical research; offer educational opportunities to Missouri residents; and provide competent veterinarians needed to assure the protection of animal health, the relief of animal suffering, the promotion of public health, and the advancement of medical knowledge.



**Dr. Neil C. Olson**  
Dean  
MU College of Veterinary Medicine

**U** Thank you for your interest in the University of Missouri College of Veterinary Medicine.

The MU College of Veterinary Medicine has graduated more than 3,000 DVMs in its 60-plus year history. Our alumni live throughout the world and work in a variety of disciplines.

The college is committed to building on its rich tradition of educating veterinarians, providing service to the animal-owning public, and advancing knowledge of animal and human disease. We hope this catalog will answer questions regarding our programs and provide insight into the exciting career opportunities in veterinary medicine!

The MU College of Veterinary Medicine has a three-fold mission: teaching, service and research. It is the only Missouri institution that awards the Doctor of Veterinary Medicine degree, graduating about 75 new veterinarians each year.

We truly attract the *best and brightest* to our profession. Our students are the college's best ambassadors. Prior to admission, these students must complete a minimum of 60 semester hours of college-level courses. Those admitted to the professional program progress through a rigorous four-year curriculum. Courses in the first two years provide a

solid foundation in basic science, followed by two years of largely hospital-based instruction.

Our graduates are qualified to pursue a host of career options. Most enter private clinical practice, but others choose careers in government, industry and academia. The college also offers post-graduate training to interns, residents in various specialties, and graduate students. The interaction among faculty and both veterinary and postgraduate students creates a special synergy, ideal for learning.

Have you noticed that people today want to provide their animals with the same quality health care they receive themselves? We have! These needs are met through the College's Veterinary Medical Teaching Hospital and Veterinary Medical Diagnostic Laboratory. Since 1993, the teaching hospital has been housed in Clydesdale Hall, a state-of-the-art facility with 140,000 square feet of floor space that serves the needs of small companion animals, horses and food animals.

Our clinical faculty provides both primary care and a host of sophisticated diagnostic procedures and treatment options not available in most private practices. Examples include a magnetic resonance imaging (MRI) unit, hip replacement surgery, a treadmill for evaluation of lameness in horses, an underwater treadmill that provides therapy to dogs recovering from orthopedic and neurological conditions, and herd-health consultation for farmers.

Each year, we care for approximately 17,000 hospitalized animals and thousands more on farms. Many of these animals come from the Columbia area for primary care and others are referred to the hospital by veterinarians throughout the Midwest for specialized services. The Veterinary Medical Diagnostic Laboratory provides comprehensive services for companion and farm animals. In

particular, the laboratory works conscientiously with veterinarians and farmers to protect Missouri's \$3 billion animal agriculture industry.

Through its research mission, the college fulfills a solemn obligation to advance our understanding of diseases affecting not just animals, but also people. After all, we share the same environment and are exposed to the same infectious organisms and environmental pollutants. It should come as no surprise therefore, that animals and people develop many of the same diseases. We are positioned to lead interdisciplinary research into new treatments that will benefit both human and animal health — the One Medicine/One Health concept. Collaborative and translational research on MU's campus is greatly facilitated by the presence of the College of Agriculture, Food and Natural Resources, College of Engineering, College of Human Environmental Sciences, Bond Life Sciences Center, School of Medicine, School of Nursing, School of Health Professions and the nation's most powerful university research reactor.

College faculty also received NIH funding to establish a newly opened regional biocontainment laboratory that will contribute to the nation's bio-defense network. Additional federal support has allowed construction of a national laboratory to characterize swine models of human disease.

This catalog outlines the multiple dimensions of veterinary medicine and details the teaching, service, and research programs of the college. Information on admissions requirements, the DVM curriculum, and career opportunities are also included. We hope you share our enthusiasm for veterinary medicine and, in particular, MU's College of Veterinary Medicine!

#### STATEMENT OF ACCREDITATION

The MU College of Veterinary Medicine is fully accredited by the Council on Education of the American Veterinary Medical Association.

#### THE ADMINISTRATIVE STRUCTURE

The College has three departments: Biomedical Sciences, Pathobiology, and Veterinary Medicine and Surgery. Additionally, the College comprises a veterinary diagnostic laboratory, a veterinary medical teaching hospital and a research farm.

#### ADMINISTRATORS

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Zac March



Welcome to Collegetown, U.S.A.: Columbia, Missouri — a progressive community offering the best of rural and metropolitan experiences.



### Welcome to Collegetown, U.S.A.: Columbia, Missouri

Students at MU's College of Veterinary Medicine pursue their veterinary medicine education while enjoying the lifestyle of a progressive community where residents celebrate the best of rural and metropolitan experiences.

The presence of three institutions of higher education in the downtown area: the University of Missouri flagship campus; the all-female Stephens College; and Columbia College, a private, not-for-profit, liberal arts and sciences college; has earned Columbia the nickname Collegetown U.S.A. Columbia's public school system includes four high schools, three junior high schools, three middle schools and 20 elementary schools with a student-teacher ratio of

13:1. Boone County also offers 17 private schools. *Forbes* magazine listed Columbia as one of the top 20 American cities to educate children in 2007, and in 2008 ranked Columbia 11th in its Smartest Cities in America study.

However, Columbia is more than an educational hub and *Forbes* is not the only national publication to give the city high marks. In a 2006 study that considered housing, student test scores, air quality, commute time and residents' health, *Money* magazine ranked Columbia in the Top 100 Best Places to Live. *Outside Magazine* included Columbia among the top 20 Best Towns of 2008 based on civic reinvention and fresh ideas. The city is also known for offering affordable housing, excellent health care, a strong economy, ample leisure activities and a diverse cultural scene.

Columbia encompasses 53 square miles centrally located in the state





approximately 120 miles from both Kansas City and St. Louis. The population includes more than 94,000 people with a median age of 28 and median household income of \$38,800.

There are more than 3,000 acres of state park lands within 10 miles of Columbia. The city itself has 1,500 acres of parks. Federal forests and wildlife refuges are nearby, as is Katy Trail State Park — a hiking and biking trail that stretches for more than 225 miles across Missouri and is accessible from the nine-mile MKT Trail, which has several trailheads throughout Columbia.

Columbia is only a few hours' drive from scenic lakes and crystalline spring-fed streams that are ideal for float trips, sailing and swimming. One of the world's largest underground lakes offers a unique scuba diving adventure less than three hours away. Camping and backpacking opportunities abound,

while just south of the College of Veterinary Medicine campus Capen Park's limestone rocks challenge climbers with a variety of routes. For outdoors lovers whose tastes tend more to tee times than top-roping, there are two municipal golf courses along with several public and private courses.

The city's Activity and Recreation Center features a leisure pool, lazy river, slide and lap pool, an indoor track, cardio and strength equipment, a variety of group exercise classes from boot camp to Zumba and sport specific training. MU's own \$40 million Student Recreation Complex is one of the 10 largest facilities in the country with features that include rock climbing and bouldering walls, extensive cardio and strength training equipment, and Tiger Grotto, a beach getaway in mid-Missouri.

When you tire of working out and are ready for some spectator sports,

the university offers Big 12 Conference football, basketball, baseball and other sports. MU's football team won the 2008 Cotton Bowl game against Arkansas and won the Big 12 North Division Title. Kansas City and St. Louis both have major-league baseball and football teams. Kansas City also has major league soccer, while across the state, the St. Louis Blues heat up the ice.

Music clubs, art galleries and creative eateries anchor the cultural atmosphere of the downtown district. The Missouri Symphony Society is housed in the Missouri Theatre Center for the Arts, a pre-Depression era movie house that is on the National Register of Historic Places. The city hosts a number of festivals including the growing True/False Film Fest, which features documentary movies, and the annual Roots 'N Blues 'N BBQ Festival with its who's who lineup of blues to bluegrass greats.



MU is two great universities in one.

# 12 Big Reasons to Pursue Veteri

1 MU provides all the benefits of two universities in one — it is a major land-grant institution and Missouri’s largest public research university. Collaborative and translational research on MU’s campus is facilitated by the simultaneous presence of the College of Veterinary Medicine, College of Agriculture, Food and Natural Resources, College of Engineering, College of Human Environmental Sciences, Bond Life Sciences Center, School of Medicine, School of Nursing School of Health Professions and the nation’s most powerful university research reactor.

2 **IMPROVE HUMAN AND ANIMAL HEALTH**  
Currently, more than 1,000 faculty life scientists at MU are working to improve human and animal health, our food supply and the environment.

3 **ADVANCING TREATMENT FOR CANCER**  
MU is home to the largest United States producer of radioisotopes for diagnosing and treating cancer.

4 **INTEGRATION OF RESEARCH AND EDUCATION**  
The National Science Foundation has recognized MU as one of the top 10 universities in the country for successfully integrating research into undergraduate education.

5 **MU ATTRACTS MULTI-MILLION DOLLAR GRANTS**  
From 1997 to 2007, MU scientists spent more than \$2 billion in research funds, most of which came to Missouri from outside the state. It takes MU’s high-quality faculty and infrastructure capacity to attract multi-million dollar federal research grants. The state has built this capacity, or “critical mass,” at MU. The College of Veterinary Medicine received \$17 million in research grants from the National Institutes of Health, National Science Foundation, USDA and others during FY07.

6 **AAU DESIGNATED RESEARCH UNIVERSITY**  
MU is one of only 34 public U.S. universities, and the only public institution in Missouri, to be selected for membership in the Association

## A Major Land Grant Institution





# nary Medicine Studies at MU

of American Universities and designated “Research University/Very High” by the Carnegie Foundation for the Advancement of Teaching. Research strengths include cardiovascular disease, diabetes, animal and human reproductive biology, aging, plant genomics and biotechnology, geo-spatial informatics, bioengineering, rural economic development policy, math education, nanoscience and nanotechnology, cognitive and neurodevelopmental sciences, exercise physiology, autism, nuclear medicine and comparative medicine.

## 7 A LEADER IN COMPARATIVE MEDICINE AND PLANT GENOMICS

MU is a national leader in comparative medicine, in which researchers collaborate by sharing discoveries, innovations and treatments for humans and animals. A national leader in plant genomics research, MU is seventh in the nation in plant sciences funding from the National Science Foundation.

## 8 MU'S NEW VIEW OF MOLECULES

MU and its biochemistry researchers have a new \$2.3 million high-powered nuclear magnetic resonance spectrometer (NMR), only the second of its generation in the United States and the only one in Missouri. Scientists use the NMR to see molecules in three dimensions and view their interactions. Understanding these interactions is crucial to understanding health and disease.

## 9 COLLABORATION RELIEVES SUFFERING

MU is one of only 15 sites in the United States where the National Cancer Institute provides funding for clinical trials on animals. Veterinary medicine and human medicine oncologists developed Quadramet for bone cancer pain, one of many MU discoveries based on collaborative research.

## 10 INTERDISCIPLINARY RESEARCH

Interdisciplinary research is the hallmark of the university's Dalton Cardiovascular Research Center. Mizzou scientists from such fields as biochemistry, biological engineering, electrical engineering, medicine, physiology and veterinary medicine come together and apply their particular expertise to health problems like hypertension, cancer, cystic fibrosis and heart disease.

## 11 MU IS HOME TO SOME OF THE BEST NANOSCIENTISTS

Mizzou is home to some of the world's best nanoscientists, who work with particles at the nearly unimaginable scale of one billionth of a meter. The new \$10 million International Institute for Nano and Molecular Medicine will house scientists fighting cancer and other diseases.

## 12 PRODUCTIVE DIAGNOSTIC LAB SERVING MISSOURI

MU's Veterinary Medical Diagnostic Laboratory conducts more than 300,000 diagnostic tests annually to find the cause of death and disease in animals.

**Missouri's Largest Public Research University**





# 4 CVM: The College of Veterinary Medicine

We have a long and distinguished history in service and leadership.



The College has graduated more than 3,000 veterinarians since 1946.

**1884**  
Veterinary Medicine education begins at MU



**1910-11**  
Connaway Hall built



**1946**  
Professional Curriculum developed

**1950**  
First DVM degrees awarded at MU



## History

**V**eterinary education at the University of Missouri began in 1884 as a course in veterinary science. In 1885, the first vaccine-virus laboratory in the United States was established at the veterinary science department. A veterinary laboratory was erected in 1887. During those early years, staff veterinarians taught courses to medical and agricultural students, conducted research on tick fever, and investigated livestock diseases throughout the state.

The College's first building, Connaway Hall, was built in 1910–11 to house veterinary science faculty who taught courses to agricultural students, investigated animal and poultry diseases, conducted diagnostic and extension work, and produced animal vaccines.

The professional curriculum leading to the Doctor of Veterinary Medicine degree was established in 1946 to offer educational opportunities to World War II veterans. In 1950, 26 new graduates were awarded the first Doctor of Veterinary Medicine degrees from the University of Missouri.

From 1946–65 there were 30 Missouri residents in each of the four classes studying for the Doctor of Veterinary Medicine degree. In 1965, class size doubled and non-residents were admitted in response to federal funding incentives. These federal "capitation" funds were provided to alleviate a national shortage of veterinarians and stimulated a further increase in class size to 76 students in 1976. In the early '80s, the national need for veterinarians

stabilized, federal funding was withdrawn and the class size was lowered to 64. The College has graduated more than 3,000 veterinarians since 1946.

A teaching hospital was built in 1961, and a diagnostic laboratory and a teaching-research building were added in 1977. Clydesdale Hall, a 149,000-square-foot medical teaching hospital, was completed and occupied in March 1993. A multi-million dollar renovation to the veterinary diagnostic laboratory and Connaway Hall were completed in 1997 and 1999, respectively. The 1961 teaching hospital was renovated in 1997 and 2002 to enhance classrooms, provide new research space, and add a conference center.



1961

Teaching hospital built

1965

DVM class size doubles – non-residents admitted

1977

Diagnostic laboratory and teaching-research building added

1993

Clydesdale Hall completed



1997 and 2002

Teaching hospital renovated



Our hospital and laboratory are the only full-service diagnostic centers in Missouri.



### Distinctive Features

#### Distinctive Degree

The MU College of Veterinary Medicine is the only institution in Missouri that awards the Doctor of Veterinary Medicine degree. The professional curriculum is integrated with College services including statewide animal disease diagnostic services, extension and continuing education programs for animal owners and veterinarians, patient care referral and consultation services for all species of animals, research programs in animal and human diseases, and advanced specialized training in veterinary and comparative medicine.

#### Fully Accredited

The curriculum is carefully monitored by the Council on Education of the American Veterinary Medical Association. To be accredited, the College must maintain high teaching standards, and students must develop knowledge, skills, and experience in diseases and health-related conditions affecting all species of domestic animals.

Animal facilities and management are fully accredited by the Association for Assessment and Accreditation of Laboratory Animal Care.

#### A Unique Clinical Curriculum

The MU College of Veterinary Medicine has a unique clinical curriculum. Clinical training is initiated at the start of the third year of the professional curriculum and incorporates flexibility to allow students to engage in a preceptorship at private practices.

#### Full-Service Diagnostic Center

The Veterinary Medical Teaching Hospital and the Veterinary Medical Diagnostic Laboratory are the only full-service veterinary diagnostic centers in Missouri. They are among only five such centers in the Midwest.

#### Joint Human-Animal Programs

MU offers unique collaborative opportunities between its divisions and other institutions. MU is one of only a few veterinary medical colleges on the same campus as a medical college. There are currently joint programs under way in orthopedics, ophthalmology, oncology, neurology and comparative medicine.

The proximity and size of the MU Animal Science Research Center has resulted in many collaborative projects. The Dalton Cardiovascular Research

Center and the MU Research Reactor are facilities that give MU investigators unique opportunities for many types of research. Washington University, St. Louis University and Lincoln University also provide opportunities for collaborative research or instructional grants.

#### Large Library Resource

The Zalk Veterinary Medical Library is a regional resource of information for research and clinical investigations. Holdings include more than 30,000 books and 25,000 journals.

#### Strong Caseloads

MU's location between two major metropolitan areas and adjacent rural areas allows for a strong caseload in companion, equine, and food-animal species.

#### Comparative Medicine Training

The Comparative Medicine Training Program is the most successful in the nation. This program has been funded continuously by the National Institutes of Health for more than three decades.





### Disease Diagnosis and Prevention

The National Swine Research and Resource Center, the National Rat Resource and Research Center, and the Mutant Mouse Regional Resource Center are housed at the College, strengthening MU's abilities in disease diagnosis, identification, and prevention.

### Regional Biocontainment Lab

Faculty from the Department of Veterinary Pathobiology were instrumental in obtaining a Regional Biocontainment Laboratory for the MU campus.

### Biomedical Sciences

The Department of Biomedical Sciences has active and successful research programs in exercise physiology, cardiovascular disease, and gender physiology. The area of reproductive biology at the MU College of Veterinary Medicine includes studies on reproductive disorders, premature birth, embryo transfer, prostate development, and breast cancer mechanisms.

### Endowed Professorships

Eight endowed professorships or programs have been established at the College of Veterinary Medicine since 1994:

- Dr. Dennis O'Brien, professor of veterinary medicine and surgery and director of the comparative neurology program in the MU College of Veterinary Medicine, was named as the **Chancellor's Chair for Excellence in Comparative Neurology**. The appointment comes with funding from an endowment that will enhance the research and clinical service O'Brien and the comparative neurology team conduct.
- Tom and Betty Scott from Kansas City endowed a program that will allow the College to become a major Midwestern referral center for animals suffering from cancer. **Cancer diagnosis** is aided by the use of magnetic resonance imaging, computed tomography, and a linear accelerator.
- The **E. Paige Laurie-Missouri Program in Equine Lameness** will facilitate research related to improving the diagnosis and treatment of lameness in horses. This endowment was made possible by a gift from Bill and Nancy Laurie, owners of Crown Center Farm in Columbia, Mo., and named in honor of their daughter, Paige.
- The **Charles and Charlene McKee Professorship in Microbial Pathogenesis** endowed the recruitment of a leader in infectious disease research.
- The **Thelma Zalk-Missouri Professorship in Tumor Angiogenesis** will integrate the College's strong vascular biology and cancer programs.
- The **Ruth M. Kraeuchi Endowed Professorship** investigates structural and functional aspects of retinal cell biology, comparative aspects of clinical retinal disease, and intraocular microsurgery.
- The **Gilbreath-McLorn Professor of Comparative Medicine** conducts research in comparative medicine, cryobiology, and reproductive biology.
- The **Nestle Purina-Missouri Program in Small-Animal Nutrition** is studying how nutrition can prevent disease and enhance overall health.

We are a fully accredited institution.



## Service Units and Programs

The Veterinary Medical Teaching Hospital, Clydesdale Hall, is a state-of-the-art teaching and medical service facility. The VMTH is an integral component of the College, and is essential to the teaching mission since it is the required teaching laboratory for training students for the DVM degree. Faculty and students in the VMTH diagnose and treat more than 17,000 patients annually. Students are involved in all cases. The hospital is a clinical laboratory, providing specialty services to animal owners in Missouri and throughout the Midwest.

The Veterinary Medical Diagnostic Laboratory at the College conducts 200,000 diagnostic tests annually. It is the only veterinary diagnostic laboratory in Missouri fully accredited by the American Association of Veterinary Laboratory Diagnosticians. The facility also includes a clinical pathology laboratory

housed in the Veterinary Medical Teaching Hospital. Faculty assigned to this facility participate in the service mission of the laboratory and also in the training of veterinary students, residents, and graduate students.

The Research Animal Diagnostic Laboratory (RADIL) is a brand new \$15.5 million facility at the Discovery Ridge Research Park. RADIL provides a one-of-a-kind training laboratory for residents and graduate students in the University of Missouri Comparative Medicine Training Program. This unique service unit combines a fee-for-service laboratory-animal diagnostic laboratory with a specialty-training program for veterinarians who wish to pursue careers in laboratory-animal medicine and comparative medicine research.

Trainee activities include coordination of necropsy accessions, animal necropsy, and interpretation of results from MU RADIL parasitology, microbiology, serology and molecular biology

testing. Trainees are exposed to a broad range of cases from many species of animals ranging from genetically engineered rodents to primates to amphibians and reptiles. The MU RADIL laboratories provide a window to contemporary problems and questions facing the laboratory-animal community.

This has led to development of a number of student research projects involving discovery and characterization of novel emerging disease-causing agents, development of diagnostic tests and development of new animal models for human disease.

RADIL's service mission includes the Comparative Medicine Program. This postdoctoral (post-DVM) program prepares graduates for research and service careers in comparative medicine and laboratory-animal medicine and meets the training requirements for eligibility for the American College of Laboratory Animal Medicine certification examination. Acceptance for advisement



requires a DVM or equivalent from an accredited college of veterinary medicine or successful completion of the foreign equivalency examination and approval by the Comparative Medicine Program (CMP) faculty. In addition, applicants must meet standards for admission to the Graduate School.

The CMP emphasizes comparative medicine research training and includes graduate course work and residency rotations. In the first year of training, trainees rotate in diagnostic laboratory animal pathology and microbiology in the Research Animal Diagnostic Laboratory and clinical medicine and animal resource management in the Office of Animal Resources (OAR). The remaining two to four years of the training time are primarily devoted to research training under an established investigator. Throughout the program, fellows participate in teaching and instructional programs offered to veterinary students and research personnel.

Veterinary Medical Extension and Continuing Education serves the people and institutions of the state. Veterinary Medical Extension faculty and staff interact with College faculty and the university community to plan and deliver educational programs.

Veterinary Medical Extension provides opportunities for continuing education for practicing veterinarians and educational program for the general public. The objective is to increase the professional knowledge of veterinarians and improve the quality of veterinary medicine. Continuing professional education activities include articles in newsletters, guide sheets, conferences, seminars, and short courses.

A mid-career program is conducted to give in-depth individualized training in special areas to practicing veterinarians or those veterinarians changing their foci. Veterinary Medical Extension works in conjunction with Extension colleagues throughout the state to acquaint owners of food-producing and companion animals with current medical services and principles of preventive medicine. Information regarding disease problems is presented to animal owners and allied interest groups in several ways, including phone consultation, field investigative visits, seminars and newsletters.

Group meetings on general subjects are requested by, or scheduled through, area and state Extension specialists. Participants are encouraged to ask questions and to relate their experiences



and problems. Local practicing veterinarians also are invited to attend and participate in these programs. Veterinary Medical Extension strives to provide the practicing veterinarian and general public with the latest information available.

The MU-CVM Information Technology Unit (CVM-IT) maintains a state-of-the-art information management technology system supporting the College's teaching, service and research missions. CVM-IT provides end-user support for the CVM's computing technology infrastructure for biomedical research, veterinary care, educational applications, specialized graphics arts production services and College-wide administrative support. The unit assists faculty, staff and students in developing educational and research presentations materials.



Our facilities are state-of-the-art.

## Facilities

The Veterinary Medical Diagnostic Laboratory provides in-depth laboratory diagnostic support to veterinary practitioners, livestock and poultry industry farmers, pet owners, wildlife conservationists, state and regulatory officials and clinicians of the MU Veterinary Medical Teaching Hospital.

The laboratory handles more than 200,000 specimens a year and serves all of Missouri's 114 counties and surrounding states by performing more than 300,000 diagnostic tests annually. The facility supports toxicology, histopathology, serology, bacteriology, molecular biology, and virology diagnostic laboratories. It also provides the opportunity for veterinary medical students to receive instruction in diagnostic laboratory medicine.

It is one of only 41 veterinary medical diagnostic laboratories in the nation accredited by the American Association of Veterinary Laboratory Diagnosticians.

The Veterinary Medical Teaching Hospital (Clydesdale Hall) serves as a comprehensive medical center and a setting for clinical instruction.

All levels of patient care, extending from routine preventive medicine to referral services in most clinical disciplines are provided. Students pursuing the DVM degree and interns/residents engaged in postgraduate training actively participate with Department of Veterinary Medicine and Surgery faculty and staff in each phase of patient care.

New capabilities are continually being added to the VMTH to ensure

state-of-the-art service. Recent examples include the establishment of an electronic medical records system and digital imaging upgrades. Also, an MRI machine was added for improved diagnostic abilities.

The VMTH is accredited by the American Animal Hospital Association and certified by the Missouri Veterinary Medical Board.

Clydesdale Hall includes three separate hospitals for horses, food animals, and companion animals. The Equine Hospital occupies approximately one-third of the first floor and includes about 35 stalls, a neonatal unit, two large surgery suites, a special diagnostics room, an arena, and a treadmill for evaluation of equine lameness. An equine field-service program was launched in 2001 to complement in-hospital services.

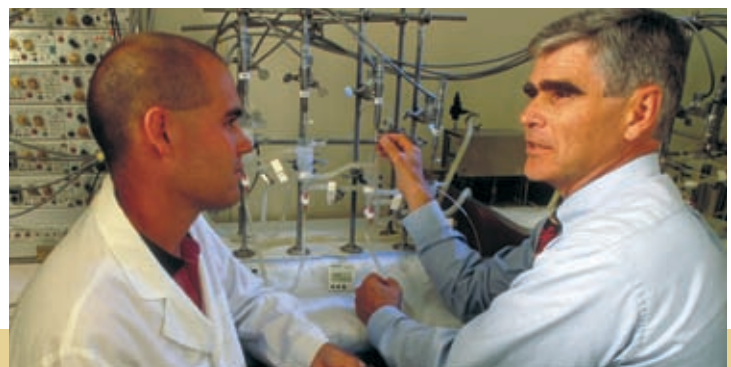
The Food-Animal Hospital also occupies approximately one-third of the first floor and provides comprehensive health care for livestock. The design of the corrals, stalls and chutes permits efficient, safe movement and restraint of cattle. About 35 stalls are available; some are designed to manage paralyzed cattle and recumbent calves. The Food-Animal Ambulatory Service provides individual and herd-health services for area livestock through the use of fully equipped vehicles.

The Companion-Animal Hospital has 16 examination rooms (one specialized for oncology examinations, two for cardiology exams, and two for specialized ophthalmology cases), and more than

150 cages and runs. Each exam room contains a computer to the hospital information system (UVIS) so students can enter and retrieve client/patient data while examining the patient.

The Community Practice Service provides preventive medicine, dentistry and routine small-animal outpatient services. Veterinarians throughout the state and region refer clients to the Companion-Animal Hospital to take advantage of its many specialized veterinarians.

The hospital also houses a variety of state-of-the-art equipment including computerized tomography, magnetic resonance imaging, a linear accelera-





tor to administer radiation therapy, the Hill's Endoscopy Center, a cardiac catheterization laboratory, and specialized orthopedic and ophthalmology surgical suites. The hospital's intensive care unit (ICU), expanded in 2000, is staffed 24 hours a day. Doctors are always on site to ensure quality care.

The Veterinary Medicine Building houses teaching laboratories, classrooms, seminar rooms, computer laboratories, a large amphitheater and conference room, administrative offices, and the veterinary medical library.

The Zalk Veterinary Library, a branch of MU's Ellis Library, has two learning

centers with individual autotutorial carrels. Open daily, it serves the teaching and research needs of the College.

Teaching laboratories facilitate learning through visual aids and demonstration materials, and provide work and storage space for each student.

The College has one of the largest computer facilities on the MU campus. One lab has 40 computers available on a 24/7 basis for student use. The other facility houses 80 computers for use in the teaching of histology, microbiology, parasitology, and pathology. This facility is also used to administer the computerized exams. This facility is primarily used as a lecture/laboratory, but is available for student use outside of normal class time.

The Veterinary Medicine Building also houses facilities for electron microscopy and transgenic animals, and the H. Richard Adams Conference Room and Auditorium. This 250-seat conference center and auditorium is used for meetings, research, teaching, and other instructional purposes by the College. It features state-of-the-art audiovisual and computer support equipment.

The Department of Veterinary Pathobiology and its associated teaching and research programs are located in Conaway Hall. It houses state-of-the-art research labs specializing in infectious disease research, genetic testing, and molecular biology.

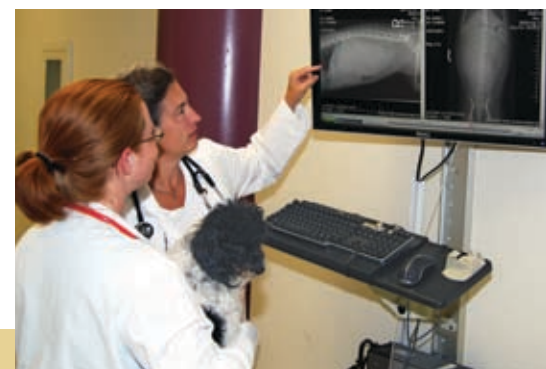
The Veterinary Medical Science Building accommodates research labo-

ratories and office space for faculty and graduate students in the Departments of Biomedical Sciences, Veterinary Pathobiology, Veterinary Medicine and Surgery and the Veterinary Medical Diagnostic Laboratory.

Middlebush Farm, a 288-acre farm south of Columbia, provides space and facilities for theriogenology instruction and veterinary medical research projects. A College-owned herd of cattle is maintained for teaching purposes.

The College houses campus core facilities for electron microscopy and transgenic animals. Additional equipment available to all departments include a confocal microscope, a computerized tomography unit, a radioanalytic imaging system, an MRI, an optic imaging platform and frame integrator for ethidium bromine gels, a research animal angiography laboratory, and still photograph and video digitizing equipment.

The Research Animal Diagnostic Laboratory (RADIL) is a brand new \$15.5 million facility at the Discovery Ridge Research Park. RADIL is the second-largest research animal diagnostic laboratory in the world — the *only* one in an academic setting. RADIL provides infrastructure for more than 1,000 clients furthering research to treat and prevent animal and human disease. Clients include universities, pharmaceutical companies, research institutes, biotechnology companies and research hospitals.



Our alumni are respected leaders in their fields.



## Faculty

The faculty consists of more than 125 assistant, associate or full professors. There are also 20 adjunct faculty members who assist in specialized areas. In addition, there are more than 60 graduate students, 15 post-doctoral candidates and 46 residents and interns.

## Student Body

The College graduates annually approximately 75 new veterinarians from the rigorous four-year curriculum. Students in the College are involved in many activities related to veterinary medicine. Several have held offices in the national Student American Veterinary Medical Association. Many are active in the local community, especially participating in pet-therapy groups, and other educational service organizations. A full listing of student clubs can be found at: <http://www.cvm.missouri.edu/clubs.htm>.

An Open House for the public is organized and conducted each year by veterinary student volunteers. The goal is to educate the public on the scope and depth of veterinary medicine. More than 2,000 people tour the College and attend Open House demonstrations.

## Alumni

New graduates of the MU College of Veterinary Medicine receive more job offers at graduation than the national average for new veterinary medical graduates. Approximately 60 percent seek employment in Missouri. Graduates also travel to 21 other states. Many new graduates — approximately 47 percent — find employment in practices that focus primarily on small animals; 28 percent work in large-animal or mixed practices that include horses; and 19 percent move on to advanced training programs.

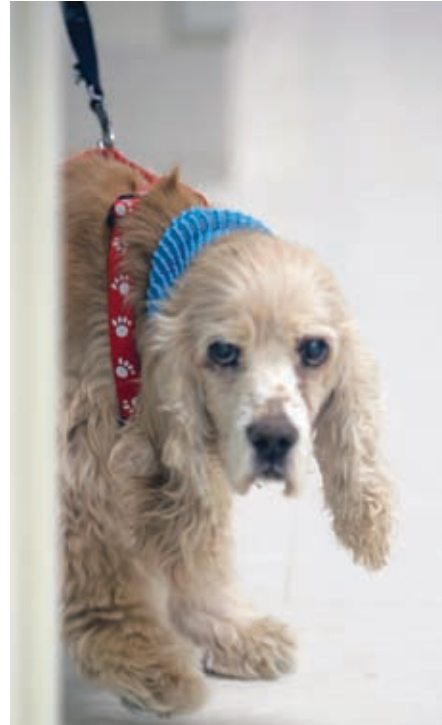
The nearly 3,000 alumni of the College have been successful in their

chosen areas of the profession. Many become involved in community affairs by becoming members of school boards, city councils, and mayors of towns and cities. Some are elected members of state legislative bodies. Many are elected to offices of state and national veterinary medical associations. Some have been prominent in federal positions.

Others have advanced to prominence in veterinary medical colleges in teaching and research roles. Alumni have been active as administrators in veterinary medical colleges, industry, and government work. In the last 12 years, three of the presidents of the American Veterinary Medical Association, which represents approximately 80,000 veterinarians, were graduates of the MU College of Veterinary Medicine.

The College of Veterinary Medicine Alumni Organization is centered in the MU College of Veterinary Medicine Dean's Office. Officers are elected by





the alumni. The Associate Dean of Student and Alumni Affairs is a permanent member of the board of the Alumni Organization. Each autumn, in conjunction with the Alumni Organization, the MU College of Veterinary Medicine hosts an alumni reunion day. The MU College of Veterinary Medicine currently has the highest percentage of graduates who become members of the MU Alumni Association.

### College Publications

The official chronicle of College activities is *Veterinary Medical Review*, a four-color magazine. It is sent to all MU veterinary medical alumni, former faculty, current students, parents of students, friends of the College, and all veterinarians practicing in Missouri.

*Arkeology* is a colorful newsletter that reports the impact of gifts on the College and recognizes students, staff,

and faculty for their achievements. It is mailed to MU Veterinary Medical Teaching Hospital clients, alumni, donors, and other interested people.

### College Web Site

The College's main Web site is [www.cvm.missouri.edu](http://www.cvm.missouri.edu). Information for prospective and current students can be found at this Web site as well as news and information about activities and upcoming events at the College and news articles about faculty and students. Current information on the admissions and instructional resources can be found here. The Veterinary Medical Teaching Hospital's Web site is located at: [www.vmeth.missouri.edu](http://www.vmeth.missouri.edu). Department and program Web sites are accessible from these sites.





## Preparation and Requirements

### Preparation in High School

Preparation for applying to the MU College of Veterinary Medicine is best begun while in high school. The selection process for entrance evaluates academic and non-academic criteria.

### Academic Preparation

No fixed requirements exist for the recommended high school curriculum. However, a high school student is generally advised to take four years of mathematics, four years of English (grammar and composition), two years of biology, and as much chemistry and physics as possible. Basic computer skills, such as keyboarding and word processing, are useful. Speech, debate and drama also help prepare the student for communication skills expected of veterinarians.

### Nonacademic Preparation

Involvement in extracurricular activities, such as school clubs, athletics, band, FFA, 4-H, Boy Scouts, Girl Scouts, church activities, and any other organized activity requiring teamwork, interpersonal skills and diversity are encouraged and scored for selection purposes.

Applicants are expected to have had experiences observing a variety of

animals. Some of this experience must be while observing an actual veterinary medical practice. High school students considering veterinary medicine as a career are encouraged to seek out such opportunities to see the actual practice of veterinary medicine. Agricultural, biomedical, research and public health experience is also highly regarded.

### Requirement for Observation of the Profession

Applicants are required to spend a *minimum of 40 hours* observing one or more veterinarians actively engaged in their work environment. Observation must be as a third person, not as a client (i.e., small- or large-animal practice, public health, laboratory-animal medicine or research). The veterinarians observed by the applicant should be among the four invited external reviewers.

### Pre-Veterinary Medical Scholars Program

The Pre-Vet Scholars Program provides early assurance of admission to the MU College of Veterinary Medicine to selected students pursuing undergraduate studies at MU. It is open to high school seniors and MU freshman.

Selection is based on meeting eligibility requirements and attaining a satisfactory score from an interview. Selected scholars are assigned faculty mentors and attend case rounds. Scholars also serve as research assistants.

For more information about entry into this program, contact the College's admissions office, or consult the College's Web site: [www.cvm.missouri.edu](http://www.cvm.missouri.edu).

### MU AgScholars Program

This program provides early assurance of admission to the MU College of Veterinary Medicine to selected students pursuing undergraduate science studies while at MU. Selection is based upon meeting the academic eligibility requirements and attaining a satisfactory score in an interview.

Faculty mentorship, veterinary observation and agricultural experience are part of this program.

For more information about entry into the AgScholars program, contact the College's admissions office or consult the College Web site.



### Preparation in Undergraduate College

The Admissions Committee accepts credit and grades from any U.S. accredited institution of higher learning. To ensure proper counseling and support, it is advised that undergraduate work be acquired at an institution with an active pre-veterinary medical club.

Students enrolled in the University of Missouri are not given preference when applying for admission to the College of Veterinary Medicine unless they have qualified for and are participants in the Pre-Veterinary Medicine Scholars or AgScholars Programs.

### Undergraduate Majors

Since some students interested in becoming veterinarians are not accepted into veterinary medical college, students should emphasize a bachelor's degree program rather than pre-veterinary medical studies. A student should enroll in the school/college offering the degree major selected as a career alternative to veterinary medicine. Most pre-veterinary medical students enroll in animal science, biology or chemistry.

### Type and Sequence of Undergraduate Courses

Students should be guided by the requirements of their degree majors and our pre-veterinary requirements. Catalogs and bulletins usually provide good direction, particularly with regard to required courses in the major. Students should consult their advisors about supporting courses and electives that will strengthen their majors.

The following courses and credit hours must be taken in residence at an accredited institution of higher learning to qualify for admission to the College of Veterinary Medicine.

SEMESTER* CREDIT HOURS	
Composition or courses in <b>communication skills</b>	6
College algebra or more <b>advanced mathematics</b>	3
<b>Inorganic Chemistry</b>	8
<b>Physics</b> [comprehensive introductory course or courses ]**	5
<b>Biological science</b>	10
<b>Social science or humanistic studies</b>	10
<b>Electives</b>	10
<b>MINIMUM TOTAL SEMESTER CREDIT HOURS</b>	<b>60</b>
* Multiply quarter credits by 0.67 to convert to semester credits.	
** 5 hours in only the first of a companion series in physics will not suffice.	

Students should take in-depth courses in these areas:

- Inorganic chemistry courses that prepare them for organic chemistry and biochemistry;
- Biology department courses, which may be selected from zoology and botany or as required in foundation courses for a biology major.

NOTE: Courses taken on campuses other than MU in Columbia may not meet the content or degree of subject depth required to apply to the MU College of Veterinary Medicine. Whenever there is doubt as to whether a course will fulfill the requirements to apply, the applicant should contact the admissions advisor, MU College of Veterinary Medicine, as soon as possible. If the course is acceptable, the applicant is advised to include a copy of the associate dean's response letter with the completed application forms.

### Bachelor of Science in Animal Sciences and Doctor of Veterinary Medicine Degrees

Students who take prescribed undergraduate courses in the MU College of Agriculture, Food and Natural Resources, Department of Animal Sciences, and are then successful in being selected to a class in the MU College of Veterinary Medicine will receive elective credits concurrently for up to 32 hours of professional degree courses. This enables qualifying students to

### FOR MORE INFORMATION, CONTACT:

**Dr. George W. Jesse**  
S110 Animal Science Center  
University of Missouri  
Columbia, MO 65211  
Phone: 573-882-2644

**Dr. Robert Youngquist, DVM**  
Associate Dean for  
Academic Affairs  
W-203 Veterinary Medicine  
University of Missouri  
Columbia, MO 65211  
Phone: 573-884-6774

receive a Bachelor of Science degree with three years of undergraduate work and one year of professional studies; i.e., BS and DVM degrees in seven years.

### Personal Attributes and Experience Desired

The Admissions Committee expects that applicants should demonstrate certain abilities and personal traits:

- Experience working with a variety of animal species;
- Familiarity with the veterinary medical profession;
- Community-minded with demonstrated leadership abilities;
- Effective communicator;
- Possess time and stress-management skills;
- Sincerely motivated;
- Have realistically evaluated plans for financing their education.

### Residency

Residency status is determined by the MU Residency Office, not by the College of Veterinary Medicine. Questions concerning residency status should be directed to:

Residency Office  
University of Missouri  
123 Jesse Hall  
Columbia, MO 65211  
Phone: 573-882-3852

An agreement exists with Arkansas that may reduce tuition for residents of that state. The number of non-resident positions are variable based on annual applicant pools. Consideration is only given to U.S. citizens or holders of permanent alien visas.

## 6 Procedure to Apply for Admission

Our students come to MU from throughout the country.



### APPLICANT TIMETABLE

#### July 1 — Nov. 1

Online applications available.

#### By October

VMCAS application deadline for non-Missouri residents. (Specific date varies year to year.)

#### By Nov. 1

Completed resident applications due and non-resident supplemental applications due.

#### By Feb. 1

Reference letters, MCAT or GRE scores, and transcripts due. Personal interviews begin.

#### By April 15

Selection results announced.

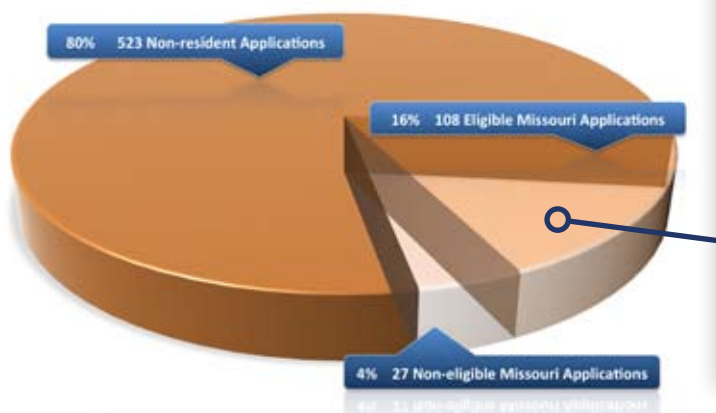
#### By July 1

Grades for all required courses due.

### Profile of Individuals Accepted Into the Class of 2012

In order that you have some idea of the competitive nature of your application, a summary profile of those selected to enter the Class of 2012 is given below. Please remember that students ranged above or below the averages listed.

### Applicants into the Class of 2012



APPLICANT BREAKDOWN	
Agriculture	35
Arts & Sciences	36
Other majors & undeclared	4
First-time applicants	67
Second-time applicants	7
More than twice	1
Total New Accepted Applicants	75
Women	57
Men	18
Pre-Veterinary Medical and AgScholars	10

### Profile of all Fully Qualified Missouri Applicants in 2007-2008

Admission to the College of Veterinary Medicine is on a competitive basis with limited enrollment. More people are interested in pursuing careers in veterinary medicine than can be provided the opportunity. We hope the information provided below will be helpful in making a decision regarding your future academic and career plans.

### DATA FOR 108 FULLY QUALIFIED MISSOURI APPLICANTS

**3.49**  
GPA  
**OVERALL GRADE POINT AVERAGE**  
34% 3.6 GPA or ↑  
61% 3.4

**3.51**  
GPA  
**LAST THREE SEMESTERS' GRADE POINT AVERAGE**  
44% 3.6 GPA or ↑  
66% 3.4 GPA or ↑  
91% 3.0 GPA or ↑

**15**  
CR HR  
**AVERAGE COURSE LOAD TAKEN PER SEMESTER**  
53% averaged 15.00 credit hours or ↑  
80% averaged 14.00 hours or ↑  
89% averaged 13.00 hours or ↑

**19.94**  
ave. score  
**ACADEMIC EVALUATION SCORES**  
23% scored 25.00 or ↑  
44% score 20.00 or ↑  
63% scored 15.00 or ↑

DEGREE AND TEST STATS	
Bachelor's degree	57
Non-degree	18
Ave. GPA	3.71
Ave. Last 3 Semesters	3.73
Ave. GRE Score	1140/ 4.3
Ave. MCAT Score	23
Ave. ACT Score	27
Ave. Cr. Hrs./Semester	15.00
Ave. Academic Score	27.14
Ave. Non-Academic Score	37.02
Ave. Age	23

APPLICANT BACKGROUND	
Farm	18
Small Town	16
Urban (10-50,000)	27
Metropolitan	13

UNIVERSITIES LAST ATTENDED	
MU	34
University MO-Kansas City	2
University MO-Rolla	1
University MO-St. Louis	2
Drury College	1
Missouri State University	4
Northwest MO State	1
University of Central Missouri	1
Truman State University	2
Southeast Missouri State	1
St. Louis University	2
Washington University	1
Other	23

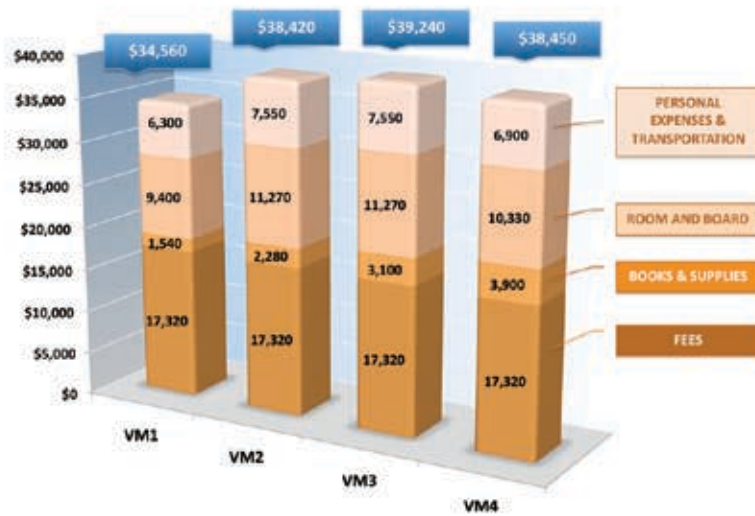
STATE RESIDENCY	
Missouri	57
Arkansas	2
Arizona	1
California	2
Colorado	2
Iowa	1
Illinois	2
Kentucky	1
Montana	1
New Jersey	1
Pennsylvania	1
Puerto Rico	1
Rhode Island	1
Utah	1
Virginia	1



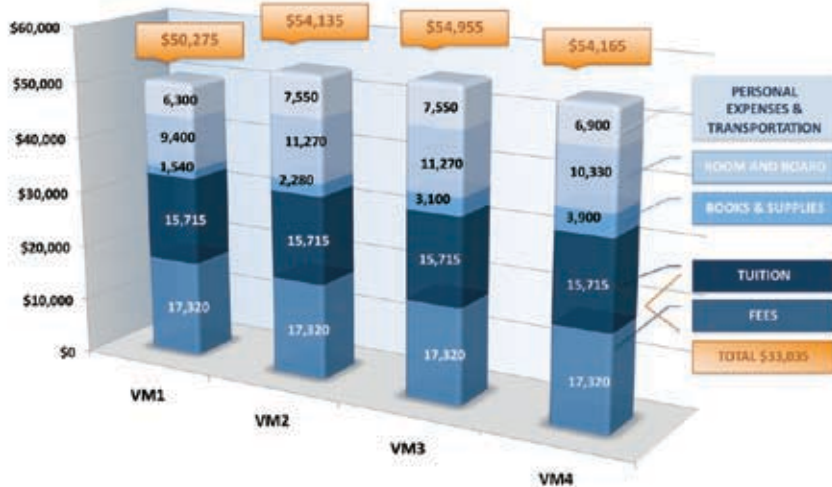


## 2008-2009 COST OF EDUCATION

### MISSOURI RESIDENTS



### NON-RESIDENTS



The university reserves the right to modify by increase or decrease the fees charged for attendance and other services at the university when the Board of Curators considers it in the best interest of the university to do so. Any increase in fees must be approved by the Board of Curators not less than thirty (30) days prior to the beginning of the academic term (semester, etc.) to which the fees will be applied.

Any change in fees will be effective irrespective of whether fees have or have not been paid by or on behalf of a student prior to the effective date of the modification.

### Standardized Testing

Applicants must submit scores attained within the last three years from the Medical College Admissions Test (MCAT) or the general GRE. A minimum acceptable score on the MCAT is 15 (combined score from the verbal reasoning, physical and biological sciences sections) and a 640 (total of verbal and quantitative scores) on the GRE with a 1.5 score on the analytical section.

For MCAT and GRE information:

#### MCAT

P.O. Box 4056  
Iowa City, IA 52243

[www.aamc.org](http://www.aamc.org)

#### GRE

[www.GRE.org](http://www.GRE.org)

MU has numerous scholarship and loan funds available.



## Scholarships, Awards and Aid Programs

Perkins Loan

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Health Professional Loan

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Ford Federal Direct Loan

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Emergency Loan Program

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Scholarships

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Student Employment

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The College of Veterinary Medicine and university maintain several programs to assist students in financing their educations.

### Loans

Students should establish themselves as professional students before applying for money from the funds available to veterinary medicine.

To apply for the Health Professional Loan, Perkins Loan, or the Ford Federal Direct Loan Program (subsidized or unsubsidized student loans), students must complete the Free Application for Federal Student Aid (FAFSA).

Health Professions Student Loan Program (HPLV) loans are federal loans borrowed directly from the University

of Missouri. Eligibility is determined by information the student and parents provide on the FAFSA. The yearly maximum is set by the Student Financial Aid Office, not to exceed financial need. HPL loans have a 5 percent interest rate and a 12-month grace period. The Department of Health and Human Services makes the in-school and grace period interest payments. You must include parental financial information on your FAFSA regardless of age, marital status, or dependency status.

Perkins Loan is a federal loan borrowed directly from the University of Missouri. Eligibility is determined by the information provided on the FAFSA by the student. The yearly maximum is set by the Student Financial Aid Office,



not to exceed the \$6,000 federal allowed maximum. This loan has a 5 percent interest rate and a nine-month grace period. The Department of Health and Human Services makes the in-school and grace period interest payments.

Ford Federal Direct Loan Program Subsidized Loan (FFDL) is a loan borrowed from the federal government and is based on eligibility determined by the FAFSA. The yearly maximum is \$8,500, and for new borrowers, the interest rate is fixed at 6.8 percent. The federal government makes the in-school and grace period interest payments. There is a six-month grace period after graduating or dropping below half-time enrollment.

Ford Federal Direct Loan Program Unsubsidized Loan is a federal loan borrowed directly from the federal government. Eligibility is based on the cost of education. A FAFSA is required. The yearly maximum is \$30,000, plus any amount you did not borrow on the FFDL, or a maximum of \$38,500 for the two programs. The interest rate for new borrowers is 6.8 percent. Students are responsible for the in-school and grace period interest payments, but they can be deferred. There is a six-month grace period after graduating or dropping below half-time enrollment.

Ford Federal Direct Grad PLUS Loan is a loan from the U.S. Department of Education that provides additional funds for educational expenses not met by other types of aid. They enable a graduate/professional student to borrow up to the cost of education minus other aid. For more information, please visit the Web site at [www.sfa.missouri.edu](http://www.sfa.missouri.edu).

For more information about financial aid, contact Sheila Hawkey-Page, 11 Jesse Hall, University of Missouri, Columbia, MO 65211. Phone: 573-882-7506 or 800-225-6075 (in Kansas, Illinois and Missouri).

### **College-Maintained Emergency Loan Program**

The College maintains an emergency loan program. Information about these loans is available through the Office of Academic Affairs at the College of Veterinary Medicine.

### **College-Maintained Scholarships and Awards**

The College maintains several scholarships and awards that are awarded to students each spring during the College's Honors Banquet. In 2008 these awards totaled almost \$300,000. These scholarships are often funded by alumni or friends of the College. More information about these scholarships and awards is available through the Office of the Associate Dean for Student and Alumni Affairs, W-213 Veterinary Medicine Building, College of Veterinary Medicine, University of Missouri, Columbia, MO 65211.

### **Student Employment**

Many students work part time while attending school. Because of the higher number of classroom and laboratory hours required of veterinary medical students, it is recommended that outside work be kept at a minimum, especially during the first year. Some students are employed on research projects in laboratories and in clinics.

The Veterinary Medical Teaching Hospital has several employment opportunities for students who have an interest in clinical medicine. The Office of Financial Aid, 11 Jesse Hall, provides information and assistance to students seeking part-time work.



#### **More information on these funds:**

Director of Financial Aid  
11 Jesse Hall  
Columbia, MO 65211  
Phone: 573-882-7506 or 800-225-6075  
(in Kansas, Illinois, and Missouri)

Office of the Associate Dean for Student  
and Alumni Affairs  
W-213 Veterinary Medicine Building  
College of Veterinary Medicine  
University of Missouri  
Columbia, MO 65211

Veterinary medicine students participate in a wide variety of professionally and personally enriching activities.

Students, during their four-year educational program, are encouraged to actively engage with the College through programs, leadership opportunities and social events. These activities not only help the student learn valuable life skills, but bond with their classmates and create lifelong friendships.



## Student Conduct

**H**onesty is an essential component of professionalism. The College's Code of Ethics places the responsibility for honor and honesty on the student.

Examinations are not closely proctored by faculty members. Drugs and equipment used in clinics and laboratories are made available for instruction with the understanding that the DVM

degree candidate will use these materials only for their intended purposes without being policed by faculty.

The code applies to all students in the MU College of Veterinary Medicine and helps to promote ethical standards of personal and professional conduct among students. Reports of violations of this code are carefully investigated by the Student Honor Committee and every precaution is taken to arrive at a

just decision. A student guilty of violating the code may be dismissed from the College. Anyone unwilling to accept the responsibility for maintaining the code should not apply for admission to the College of Veterinary Medicine.

As set forth in the preamble to the MU College of Veterinary Medicine Honor Code, the students of the College have established a code deserving of the high trust and irreproachable





[ Photo below is courtesy of Mizou Rec Services and Facilities. ]



conduct demanded by their chosen profession. The honor committee is composed of two regular and two alternate members from each class. The president of SCAVMA, with approval of the membership, appoints the Student Honor Committee. The committee is led by a fourth-year member. Details of the Student Honor Code and Academic Regulations can be found in the Student Handbook on the College Web site.

### Student Chapter of the American Veterinary Medical Association

All veterinary medical students are eligible for membership in the Missouri Student Chapter of American Veterinary Medical Association (SCAVMA). The student chapter is a divisional arm of Missouri Students Association and functions as the Veterinary Medical Student Council. The chapter sends delegates to

the national convention, offers support for members to attend national educational symposiums, and provides numerous benefits for new graduates.

Members of the student chapter of the AVMA elect a president, vice president, secretary, and treasurer who, along with several members of each class, make up the executive council. Committees for the student chapter of the AVMA are appointed by the president.





Membership requirements are annual dues and the commitment to work at the SCAVMA booth during at least one football game while being a VM-1 and VM-2.

Benefits of membership include:

- Reduced subscription rate for the *Journal of the AVMA*.
- Free registration to national AVMA meetings.
- Surgery instrument rental program.
- Beeper use during clinical rotations.
- Free AVMA dues first year after graduation.
- Financial support to attend symposiums and meetings.

### Class Officers

Annually, each class elects a president, vice president, secretary-treasurer, and a class representative. Each class president and the AVMA student chapter president serve on the student advisory council, which meets regularly with the dean, associate dean for academic



affairs, and the associate dean for student and alumni affairs to discuss College concerns.

### Student Clubs and Interest Organizations

College of Veterinary Medicine students have wide and varied interests in the care of animals. They also share their interests outside the classroom.

The College hosts several animal-related clubs to allow students to engage

in further study of veterinary medicine. Subjects include cattle, horses, cats, dogs, swine, veterinary medical ethics, and zoo medicine. Many clubs are affiliated with national organizations. Others provide service and education to the community. These include a band, mule club, business club, and raptor rehabilitation project.

Other activities include softball, football, soccer and bowling teams.



## Honor Societies

There are two honor societies at the MU College of Veterinary Medicine. Phi Zeta is a veterinary honorary society to which third- and fourth-year veterinary medical students may be elected. Gamma Sigma Delta, a national organization, recognizes students of the Colleges of Agriculture, Food and Natural Resources; Veterinary Medicine; and Human Environmental Sciences, who have shown exceptional ability during undergraduate or graduate work.

## Graduate Honor Societies

The Rollins Society is the graduate-level organization that recognizes leadership, service and scholastic achievement.

## Ad-Hoc Committees

One of the largest non-sporting public events on the MU campus is planned and executed by veterinary medical students. The College's annual Open House attracts almost 2,000 visitors who enjoy animal- and health-related exhibits and demonstrations. Students handle logistics, marketing and advertising, crowd control, and coordinating with outside vendors. Students serve as spokespeople to the media, representing themselves, their College, and their profession.

## Other Campus Activities

All students are members of the Missouri Students Association and have a voice in campus affairs. They are offered opportunities to fulfill their responsibilities to the student community through a system of student self-government, with emphasis at the divisional level. There are social fraternities and sororities on campus with national affiliations.





The DVM degree is achieved after a four-year course of study.



## The Undergraduate Curriculum

The DVM degree is achieved after a four-year course of study. At the University of Missouri, the first two years are largely spent in classrooms and laboratories with the second two years devoted to clinical study in the MU Veterinary Medical Teaching Hospital.

The curriculum at the University of Missouri College Of Veterinary Medicine is designed to provide students with the knowledge and technical skills necessary to be competent entry-level veterinarians. We prepare our students for general veterinary practice, or for entry into graduate or specialty training programs. In addition, we provide students with the background necessary for careers in regulatory medicine.

The first two years of the veterinary curriculum are designed to provide the student with a solid foundation in basic biomedical science. The courses in the preclinical professional curriculum include anatomy, physiology, cell and molecular biology, pathology, pharmacology, microbiology, virology, and toxicology. The fundamentals of the clinical disciplines are also taught during this time and include anesthesiology, clinical pathology, radiology, public health, and medicine and surgery.

The organizational structure of the professional curriculum differs from other schools in that the first two academic years are divided into eight-week



instructional periods that run from August through June. The students have a summer break between the first and second year and second and third year of instruction that is six weeks in duration.

Clinical training in the Veterinary Medical Teaching Hospital and the Veterinary Medical Diagnostic Laboratory consists of 12 six-to-eight-week clinical blocks. Students must complete the

to participate in elective rotations (cardiology, production medicine, special imaging etc.). In addition to required and elective blocks, students are allotted three blocks as 'free' time. Most students utilize their free time to study for licensing examinations, complete preceptorships at practices, or interview with prospective employers. They may also take additional rotations during this time.

lines on animal care and use constitute the minimum basis for the care provided MU animals.

All live animals used in teaching are obtained from sources approved by the U.S. Department of Agriculture, the governing authority for the humane use of animals in research and teaching in the United States. Procedures performed on these animals must be approved in advance by the MU Animal Care and Use Committee, which comprises faculty from multiple disciplines and includes an at-large member not affiliated with the university. Each procedure is evaluated for evidence of its instructional value, the availability of alternative means of teaching, and the adequacy of pain control. All procedures performed on patients of the Veterinary Medical Teaching Hospital are done with the consent of the animal's owner and in compliance with the standard practice of veterinary medicine.



following clinical requirements: Food-Animal Medicine and Surgery, Equine Medicine and Surgery, Small-Animal Medicine (Internal Medicine and Community Practice), Small-Animal Surgery (Soft-Tissue Surgery, Hard-Tissue Surgery, and Neurology/Neurosurgery), Diagnostic Pathology and Special Species Medicine, Clinical Radiology (1/2 clinical block), Clinical Anesthesiology (1/2 clinical block), Theriogenology (1/3 clinical block), Oncology (1/3 clinical block), and Clinical Ophthalmology (1/3 clinical block). Requirements take seven clinical blocks to complete.

In addition, students must select elective rotations for a total of two clinical blocks (up to four three-week rotations). Students may repeat required clinical rotations, or they may choose

The required curriculum results in the accumulation of 160 semester credit hours. Most students graduate with a higher number of credit hours as a result of taking didactic or clinical elective courses.

Applicants seeking admission to the University of Missouri College of Veterinary Medicine should be aware that the professional degree curriculum includes the use of live animals and cadavers in required courses such as laboratories in anatomy, physical diagnosis, and surgery. Some of these use terminal procedures on the animals. In all cases, animals are legally acquired, properly housed, fed, cleaned, and cared for to ensure reasonable comfort and well-being. U.S. Department of Agriculture and National Institutes of Health guide-

### Preceptorships

Missouri students may use free blocks for preceptorships to meet requirements of Missouri's Veterinary Medical Practice Act. Preceptorships require the signing of a logbook in the Office of Academic Affairs indicating intent to spend free block time gaining experience in the practice of veterinary medicine under the direct supervision of a licensed veterinarian. Contact the Missouri Veterinary Medical Board for its preceptorship requirements. The board, not the MU College of Veterinary Medicine, has discretion as to whether the preceptorship qualifies in lieu of a post-graduate internship. The MU College of Veterinary Medicine does not have the authority to approve the use of student free block time or the veterinarians with whom they gain experience.

*See typical course load on page 32*



**PREFIX CODES**

**VBMS** Veterinary Biomedical Sciences

**VMS** Veterinary Medicine and Surgery

**VPB** Veterinary Pathobiology

**INSTRUCTIONAL PERIODS 1–4**

Period 1		CR HR
<b>VBMS 5500</b>	Veterinary Anatomy: Part 1	2.5
<b>VBMS 5502</b>	Veterinary Microscopic Anatomy: Part 1	1.5
<b>VBMS 5504</b>	Veterinary Physiology: Part 1	3
<b>VBMS 5506</b>	Veterinary Cellular & Molecular Biology: Part 1	2
Period 2		CR HR
<b>VBMS 5500</b>	Veterinary Anatomy: Part 2	2.5
<b>VBMS 5502</b>	Veterinary Microscopic Anatomy: Part 2	1.5
<b>VBMS 5504</b>	Veterinary Physiology: Part 2	3
<b>VBMS 5506</b>	Veterinary Cellular & Molecular Biology: Part 2	2
Period 3		CR HR
<b>VBMS 5011</b>	Veterinary Anatomy: Part 1	4
<b>VBMS 5503</b>	Veterinary Microscopic Anatomy	2
<b>VBMS 5051</b>	Veterinary Gastrointestinal Physiology	2
<b>VMS 6140</b>	Veterinary Nutrition	1.5
Period 4		CR HR
<b>VBMS 5012</b>	Veterinary Anatomy: Part 2	4
<b>VBMS 5052</b>	Veterinary Endocrinology & Reproductive Biology	2
<b>VPB 5511</b>	Veterinary Immunology: Part 1 (Same as VPB 4510, Introduction to Immunology)	1.5
<b>VPB 5555</b>	Epidemiology & Biostatistics (Same as VPB 4550, Epidemiology & Biostatistics)	2



**INSTRUCTIONAL PERIODS 5–9**

Period 5		CR HR
<b>VPB 5512</b>	Veterinary Immunology: Part 2 (Same as VPB 4510, Introduction to Immunology)	1.5
<b>VPB 5552</b>	Veterinary Bacteriology I	3
<b>VPB 5575</b>	General Veterinary Pathology	3
<b>VPB 5579</b>	Veterinary Genomics	1
<b>VPB 5580</b>	Introduction to Veterinary Informatics	1
Period 6		CR HR
<b>VPB 5553</b>	Veterinary Bacteriology II	2.5
<b>VPB 5554</b>	Veterinary Virology (Same as VPB 4540, Domestic Animal Virology)	2.5
<b>VPB 5557</b>	Veterinary Parasitology (Same as VPB 4570, Animal Parasitology)	3
<b>VPB 5576</b>	Veterinary Systemic & Special Pathology I	3
Period 7		CR HR
<b>VBMS 5507</b>	Veterinary Pharmacology	3
<b>VPB 5558</b>	Veterinary Public Health (Same as VPB 4580, Veterinary Public Health)	2
<b>VPB 5577</b>	Veterinary Systemic & Special Pathology II	3
<b>VMS 6130</b>	Fundamentals of Veterinary Business Management	1
Period 8		CR HR
<b>VBMS 5508</b>	Veterinary Pharmacology	2
<b>VPB 5578</b>	Veterinary Clinical Pathology	3
<b>VPB 6010</b>	Laboratory Animal Medicine	1.5
<b>VMS 6020</b>	Veterinary Radiology	2
Period 9		CR HR
<b>VBMS 5509</b>	Veterinary Toxicology	3
<b>VMS 6030</b>	Veterinary Anesthesiology	2
<b>VMS 6040</b>	Companion Animal Medicine	4
<b>VMS 6060</b>	Small Animal Surgery	2





CLINICAL EXPERIENCE		
<b>Instructional Period 10</b>		<b>CR HR</b>
VMS 6050	Small Animal Medicine	2.5
VMS 6071	Small Animal Surgery	2
VMS 6072 or 6073	Small Animal Surgery & Anesthesia Labs	.5
VMS 6081	Food Animal Medicine & Surgery	2.5
VMS 6151	Equine Animal Medicine & Surgery	2
VMS 6090	Small Animal Critical Care	1
<b>Instructional Period 11 (August-October)</b>		<b>CR HR</b>
VMS 6152	Equine Medicine & Surgery	1.5
VMS 6110	Theriogenology	3
VMS 6120	Veterinary Ophthalmology	1
VMS 6082	Food Animal Medicine & Surgery	2
<b>Elective Opportunities (up to 2 credit hours may be taken)</b>		<b>CR HR</b>
VPB 5991	Introduction to Avian Medicine	1
VMS 6987	Problem-Based Clinical Preparation	1
VMS 6989	Advanced Oncology of Companion Animals	1
VMS 6990	Zoological Medicine	1
VMS 6991	Advanced Equine Lameness	1
VMS 6993	Advanced Veterinary Anesthesia	1
VMS 6994	Advanced Techniques in Small Animal Surgery	1
VMS 6995	Advanced Didactic Cardiology	1
VMS 6996	Advanced Dermatology	1
VMS 6997	Food Animal Diagnostic Exercises	1
VMS 6998	Small Animal Behavioral Medicine	1
VMS 6999	Food Animal Surgery Lab	1

REQUIRED CLINICAL BLOCKS		CR HR
VMS 6400	Food Animal Medicine & Surgery I	6
VMS 6410	Small Animal Medicine I	6
VMS 6420	Equine Medicine & Surgery I	6
VMS 6430	Small Animal Surgery I	6
VMS 6441	Clinical Radiology I	3
VMS 6442	Clinical Anesthesiology I	3
VMS 6450	Theriogenology I	2
VMS 6460	Clinical Ophthalmology I	2
VPB 6647	Diagnostic Pathology & Special Species Medicine I	8
VMS 6490	Small Animal Specialty Medicine I (Oncology)	2
CLINICAL ELECTIVE ROTATIONS (12–24 credit hours)		
Electives		
VPB 6676	Laboratory Animal Medicine & Management II	
VPB 6678	Epidemiology & Community Health	
VPB 6679	Diagnostic Pathology & Special Species Medicine II	
VPB 6684	Research Techniques in Veterinary Pathobiology	
VMS 6700	Food Animal Medicine & Surgery II	
VMS 6710	Small Animal Medicine II	
VMS 6720	Equine Medicine, Surgery, or Ambulatory Practice	
VMS 6730	Small Animal Surgery II	
VMS 6741	Clinical Radiology II	
VMS 6742	Clinical Anesthesiology II	
VMS 6750	Theriogenology II	
VMS 6770	Herd-Health Management & Nutrition II [to follow Food Animal Medicine and Surgery and Theriogenology blocks]	
VMS 6751	External Food Animal Service & Theriogenology Program	
VMS 6800	Clinical Ophthalmology II	
VMS 6810	Cardiology II	
VMS 6820	Small Animal Emergency & Critical Care	
VMS 6830	Food Animal Production Medicine [once every other year]	
VMS 6850	Small Animal Specialty Medicine II [Oncology]	

The Doctor of Veterinary Medicine degree is awarded after successful completion of the professional program.



Forms and additional information:  
MMACU Office  
30 Jesse Hall  
University of Missouri  
Columbia, MO 65211  
573-882-6794

## Schedule and Completion of Required Courses

**I**n the first two years, all students follow the same schedule, and courses must be successfully completed in sequence. Because pre-clinical courses are offered yearly, academic or hardship issues that prevent a student from completing a course will prolong professional training by one year.

In the final two years of the professional program the student must successfully complete seven required clinical blocks and two elective clinical blocks to fulfill graduation requirements.

It is the prerogative of the veterinary medical faculty to determine the curriculum and to require that such lectures, demonstrations, exercises and experiences using live animals, cadavers or clinical patients are important, required or necessary. To receive the DVM degree, students must pass all required courses. In addition to passing examinations, attendance and participation in all lectures, laboratories and clinical exercises is necessary.

The Doctor of Veterinary Medicine degree is awarded after successful completion of the professional program.

### Academic Probation

Any student who receives a grade of D in any required course of the professional curriculum and whose cumulative GPA is less than 2.0 will be placed on academic probation. Probation must be removed by the end of the next two successive grading periods.

Any student whose term GPA is less than 2.0 will be placed on academic probation. Probation must be removed by the end of the next successive grading period.

### Dismissal from the College on Academic Grounds

A student who receives a grade of F in any required course of the professional curriculum will be dismissed. Any student failing to remove probation in the prescribed time will be dismissed. Students on academic probation will not be permitted to graduate. Students who accumulate in excess of 9.0 credit hours of D grades in the professional curriculum will be dismissed.

## Undergraduate Courses in Biomedical Sciences

In addition to the four-year professional curriculum leading to the Doctor of Veterinary Medicine degree, the College offers a variety of undergraduate courses. Courses serve as electives for other degree programs, can be a component of the general studies degree program, and serve partial requirements in the pre-veterinary medicine program.

A Dean's Certificate of Achievement in Biomedical Sciences is awarded to any student who takes at least 15 credit hours in biomedical courses and achieves a biomedical grade point average of 3.0 or higher, with a grade of no less than a C- in any biomedical course on the first attempt.

MU is a member of the Mid-Missouri Associated Colleges and Universities (MMACU). This consortium of MU, Williams Woods University, Stephens College, Westminster College and Lincoln University allows full-time undergraduate students at the five colleges or universities to take courses for credit at any of the campuses. This cross-registration supports students' educational needs when a desired course is unavailable at the home institution or when there are schedule conflicts.



## Undergraduate Courses in Biomedical Sciences

FALL SEMESTER		
NO.	TITLE & DESCRIPTION	CR HR
1010	<b>Biomedical Career Explorations</b> An introductory course for freshmen interested in a career in some aspect of the biomedical sciences.	1
2001	<b>Topics</b> Debut of new courses in biomedical sciences.	arr.
2085	<b>Problems in Biomedical Research</b> Assignment of problems for training in research.	arr.
2120	<b>Animal Handling and Physical Restraint</b> Procedures for handling and restraining a variety of animals with emphasis on safety of the animal and its handler.	2
2230	<b>Animal Sanitation and Disease Prevention</b> Preventative measures for disease and parasites of farm animals.	3
2420	<b>Inactivity &amp; Disease</b> Biology of inactivity as a causal factor in chronic disease.	2
2490	<b>Internship in Biomedical Sciences</b> Supervised work experience in biomedical sciences.	arr.
3001	<b>Topics</b> Debut of new courses in biomedical sciences.	arr.
3085	<b>Problems in Biomedical Research</b> Assignment of problems for training in research.	arr.
3326	<b>Pharmacology</b> General principles of pharmacodynamics in domesticated animals.	3
4001	<b>Topics</b> Debut of new courses in biomedical sciences.	arr.
4010	<b>Life Sciences Research: Models and Methods</b> Laboratory animal and non-animal research models in biomedical sciences.	3
4333	<b>Veterinary Cell Biology</b> (Same as VBMS 5506 Veterinary Molecular and Cellular Biology.) Course material stresses cell biology as related to animal health and medical issues. Consent of instructor required.	4
4993	<b>Internship in Veterinary Medical Technical Specialties</b> Supervised work in veterinary technology specialties. Requires AAS in veterinary technology or the equivalent.	arr.
WINTER SEMESTER		
2001	<b>Topics</b> Debut of new courses in biomedical sciences.	arr.
2085	<b>Problems in Biomedical Research</b> Assignment of problems for training in research.	arr.
2110	<b>Biomedical Terminology</b> Terms commonly used in the life sciences.	3
2111	<b>Veterinary Medical Terminology</b> Medical terms unique to veterinary medicine. Must be taken prior to or concurrent with Biomedical 2110.	1
2140	<b>Companion Animals</b> Focus on companion dog-, cat- and horse-owner concerns such as health issues, zoonoses, legal responsibilities, inbreeding, choice-of-breeds, behavioral problems and loss of companion animals.	3
2210	<b>Microbiology for Health Sciences</b> A basic microbiology course for nursing, health related professions and other interested students.	5
2490	<b>Internship in Biomedical Sciences</b> Supervised work experience in biomedical sciences.	arr.
3001	<b>Topics</b> Debut of new courses in biomedical sciences.	arr.
3085	<b>Problems in Biomedical Research</b> Assignment of problems for training in research.	arr.
3310	<b>Equine Health Topics</b> An in-depth examination of equine health including diseases of continual concern and emerging diseases such as West Nile Virus.	3
4001	<b>Topics</b> Debut of new courses in biomedical sciences.	arr.
4993	<b>Internship in Veterinary Medical Technical Specialties</b> Supervised work in veterinary technology specialties. Requires AAS in veterinary technology or the equivalent.	arr.
TIME DETERMINED BY INSTRUCTOR		
2235	<b>Domestic Animal Behavior</b> An examination of the normal and abnormal behaviors of companion and farm animals.	3
3219	<b>Elements of Comparative Anatomy</b> Relationship of organ structure and function in humans and common domestic animals.	5
3250	<b>Parasitology</b> Parasites of medical and veterinary importance are discussed as are the principles of parasitism.	3
3335	<b>Techniques in Pathology</b> Methods and techniques in fixing, preparing, and staining pathological specimens.	arr.
3300	<b>Animal Welfare and Ethics</b> Contemporary ethical issues relating to animal welfare versus rights, agriculture and cloning.	3
3347	<b>Clinical Epidemiology and Environmental Health</b> Ecologic basis of health and cause-effect relationships. Evaluation of control programs. Includes epidemiology of important acute and chronic disease.	arr.

For additional information about undergraduate classes offered by the College of Veterinary Medicine see the Web site at [www.cvm.missouri.edu/undergrad](http://www.cvm.missouri.edu/undergrad) or contact:

**C.B. Chastain, DVM, MS**

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Graduate education and research are integral parts of veterinary medical training.



**G**raduate education and research are integral parts of veterinary medical training. Research programs in the MU College of Veterinary Medicine contribute to the advancement of science and significantly enhance the quality of professional education. Participation by students provides a clearer understanding of disease processes, methods of prevention, and treatment of diseases of animals and humans.

Members of the veterinary medical profession, because of their versatile training, can work in a variety of research areas, such as infectious and noninfectious diseases of livestock, poultry and companion animals, zoonoses (diseases transferred from animal to human), reproductive biology, comparative anatomy, physiology, pharmacology, pathology, neoplasia, laboratory animal medicine, veterinary public health, environmental health, radiation biology, clinical research and drug evaluation, and nutritional studies.

College research projects are supported by federal grants, foundation awards and grants, contracts from industries, livestock producer association funds, and money from other groups.

## Master's Degree

### Veterinary Clinical Sciences Emphasis Area

The Department of Veterinary Medicine and Surgery offers graduate training leading to the Master of Science degree through the Veterinary Clinical Sciences Emphasis Area in the Biomedical Sciences Degree Program. The department's graduate faculty comprises more than 30 members with dynamic and diverse research programs. Research areas include comparative orthopedics and oncology, food-animal, equine, and small-animal medicine and surgery, physiology, pharmacology, cell and molecular biology, imaging, neurology, nuclear medicine, ophthalmology, and tissue engineering, among others.

Department research projects are supported by federal grants, foundation awards and grants, corporate grants and contracts, and intramural funds.

### Comparative (Veterinary) Medicine Emphasis Area

Master's Degree: Comparative (Veterinary) Medicine Emphasis Area: The Comparative Medicine Program [ <http://www.radil.missouri.edu/cmp/> ] is a postdoctoral (post-DVM) program that prepares graduates for careers in comparative medicine research and laboratory-animal medicine. The CMP emphasizes comparative medicine research training that can be coupled with a laboratory-animal medicine residency, which meets the training requirements for eligibility for the American College of Laboratory Animal Medicine (ACLAM) certification examination. If a concurrent residency is pursued, two residency rotations are performed: laboratory-animal diagnostics and research pathology in the Research Animal Diagnostic



Laboratory (RADIL) and clinical medicine and animal resource management in the Office of Animal Resources (OAR). The remaining time in the program is primarily devoted to research training under an established investigator. Trainees may select from more than 50 laboratories across the MU campus. These labs encompass multiple disciplines including immunology, infectious disease, biodefense, cancer, exercise and cardiovascular physiology, genetics, translational medicine, reproductive biology, and many more. The MS degree (Comparative Medicine Emphasis Area) requires the completion of a significant manuscript suitable for publication in a refereed journal or an approved equivalent scholarly effort. Trainees desiring to obtain a PhD have opportunities to do so in a variety of programs such as the Pathobiology Area Program.

## Master's and PhD Programs

### Biomedical Sciences

The graduate program in Biomedical Sciences offers graduate training leading to the Doctor of Philosophy or the Master of Science degree. The program in biomedical sciences provides in-depth, multidisciplinary training to prepare scientists in comprehensive research at the integrative, organ, cellular, and molecular levels. Individuals who successfully complete this program will have diverse backgrounds in state-of-the-art research methodologies and approaches that will make them well-rounded, competitive scientists. Departmental faculty represent a diversity of medical and related basic science disciplines. They provide a rich environment for graduate study and a unique opportunity for training scientists in comprehensive interdisciplinary research. Current faculty interests include cardiovascular, exercise and health membrane transport, neurohumoral regulation, and reproductive endocrinology.

### Master of Science Degree

The Department of Veterinary Pathobiology offers a graduate program leading to the Master of Science degree. For admission, the candidate should have completed the DVM or an acceptable baccalaureate degree. Parts I, II, and III of the GRE must be taken before entering Graduate School. Students should rank in the upper third of their class. The PhD program in the area of pathobiology is presented by faculty in the departments of Pathology in the School of Medicine and Veterinary Pathobiology in the MU College of Veterinary Medicine. PhD candidates may choose their research areas to take advantage of the interests and specialties of advisers in the departments. Research is conducted in areas such as morphologic alterations in response to disease, ultrastructural and histochemical changes, clinical chemistry, molecular biology, and pathology, all of which are related to host-agent interrelationships in the pathogenesis of disease. Included in these studies are food animals, companion animals, laboratory animals, and some exotic or wild animals.

### Combined DVM/ Graduate Degree (Dual) Programs and Leave of Absence

Veterinary medical students with a baccalaureate degree and who otherwise qualify for graduate school may take graduate courses during the DVM program when permitted by the DVM schedule and DVM degree requirements. Departments and graduate committees establish specific requirements to achieve graduate degrees. Interested students should contact the associate dean for Academic Affairs or the associate dean for Research and Postdoctoral Studies for further information.

To facilitate progression toward graduate degrees in combined DVM-graduate degree programs, an academic

leave of absence for one year to take graduate courses may be requested. The time of absence will typically occur from the end of instructional period seven to the next academic year's instructional period eight. Permission is required from the student's graduate program committee and from the Committee on Admissions and Scholarship. Requests for deferment must be received at least six weeks prior to the beginning of instructional period seven.

### Internships

Internships are available in small-animal medicine and surgery, equine medicine and surgery and food-animal medicine and surgery.

### Residency Programs

The College of Veterinary Medicine administers residency training programs through the Veterinary Medical Teaching Hospital, the Veterinary Medical Diagnostic Laboratory, and the Research Animal Diagnostic Laboratory.

#### AVAILABLE CLINICAL SPECIALTY TRAINING RESIDENCY PROGRAMS

OPEN	Anesthesiology
3	Small-animal internal medicine
4	Small-animal surgery (including fourth-year student)
OPEN	Equine medicine
1	Equine surgery
2	Food-animal medicine and surgery
1	Food-animal production
3	Oncology
2	Ophthalmology
1	Radiation oncology
2	Radiology
	Toxicology
	Pathology
1	Cardiology
	Clinical pathology
OPEN	Theriogenology
3	Neurology
4	Small-animal emergency medicine and critical care
	Comparative medicine
1	Nutrition
	Zoo



## BIOMEDICAL SCIENCES

### PROFESSIONAL PROGRAM

Department of Biomedical Sciences faculty play a large role in the early didactic training of our veterinary students. During the first year, students study the gross and microscopic anatomy of food-producing animals, companion animals, and selected laboratory animals. They learn normal cell function, tissues, organs and body systems in physiology, and cellular and molecular biology. These studies provide the basis for understanding disease processes and the recognition and treatment of animal diseases.

During the second year, students study pharmacology, which includes actions of drugs and factors influencing the responses of animals to drugs. In the study of toxicology, the student studies disease conditions resulting from poisonous materials including plants, agricultural and industrial chemicals, feed additives, and drugs.

### GRADUATE PROGRAM

The graduate program in Biomedical Sciences offers graduate training leading to the Doctor of Philosophy or the Master of Science degree. The program in Biomedical Sciences provides in-depth, multidisciplinary training to prepare scientists in comprehensive research at the integrative, organ, cellular and molecular levels. Individuals who successfully complete this program will have diverse backgrounds in state-of-the-art research methodologies and approaches that will make them well-rounded, competitive scientists. Departmental faculty represent a diversity of medical and related basic science disciplines. They provide a rich environment for graduate study and a unique opportunity for training scientists in comprehensive interdisciplinary research.

Department of Biomedical Sciences faculty are committed to the training of research scientists. The research activities of the department address biomedical issues that have a critical

impact on health problems of people and animals. Well-developed research programs evaluate cellular, molecular, and organismal aspects of biomedical problems. Current faculty interests include cardiovascular science, membrane transport, neurohumoral regulation, and reproductive endocrinology.

Departmental faculty maintain research laboratories in the College of Veterinary Medicine and the Dalton Cardiovascular Research Center. State-of-the-art techniques and equipment are used for analysis of biomedical questions at the whole animal, organ, cellular and molecular levels.

The course curriculum centers on developing a multidisciplinary understanding of biomedical research. Core courses include physiology, cell biology, and multidisciplinary approaches to biomedical research. Students also take a minimum of one additional course in each of the areas of molecular biology, cellular biology and integrative biology.

### CONTACT INFORMATION

**Details on admission and degree requirements are listed in the Graduate School Catalog:**

Graduate School  
205 Jesse Hall  
Columbia, MO 65211

or online at:

<http://gradschool.missouri.edu/programs/catalog/>

More information regarding this program and links to an online application:

<http://mmi.missouri.edu/graduateprogram/programindex.php>



## BIOMEDICAL SCIENCES COURSE OFFERINGS

2085	<b>PROBLEMS</b> (cr. arr) Assignment of special problems or topics for training in research.	5507	<b>VETERINARY PHARMACOLOGY</b> (3) General principles of pharmacy, pharmacokinetics, and pharmacodynamics, with emphasis on drugs affecting the central and autonomic nervous systems, cardiovascular, and hematologic systems.
2222	<b>FUNDAMENTALS OF ANIMAL PHYSIOLOGY</b> (3) For students not enrolled in the professional veterinary medical curriculum. Relationship of structure and function in common domestic animals. Study of cells, tissues, organs, and systems.	5508	<b>VETERINARY PHARMACOLOGY</b> (2) Continuation of 5507. Antiseptics, auto-coids, hemostatics and anticoagulants, fluid and electrolytes, reproductive, endocrine and gastrointestinal drugs.
3326	<b>VETERINARY PHARMACOLOGY</b> (3) General principles of pharmacodynamics in domesticated animals.	5509	<b>PROBLEMS</b> (3) Local and various systemic clinical responses of domestic animals to foreign chemicals including metals, pesticides, water-and food-borne agents, biotoxins, industrial and plant toxins. The principles, mechanism(s) of action, diagnosis, prevention, and treatment of chemical intoxications are also presented.
5011	<b>VETERINARY ANATOMY I</b> (4) Detailed study of the macroscopic structure of the domestic ungulates and birds and the developmental anatomy of the domestic mammals. All of Biomedical Sciences 5011 and the first 6.5 weeks of Biomedical Sciences 5012 are concerned primarily with: 1) gross anatomy of the horse and ox, especially the anatomic structures of clinical significance; and 2) mammalian developmental anatomy. Clinically significant structures of the other domestic ungulates (pig, sheep, and goat) are also presented, as well as comparative references to the structure of the dog and cat.	7085	<b>PROBLEMS</b> (cr. arr) Assignment of special problems or topics for training in research.
5012	<b>VETERINARY ANATOMY II</b> (4) Continuation of 5011. The final 1.5 weeks deal with the structure of the domestic birds.	7302	<b>CYTOLOGY, HISTOLOGY, AND ORGANOLGY OF DOMESTIC ANIMALS I</b> (3) Detailed study of the structure and function of the cell, basic tissues (epithelium, connective tissue, nervous tissue, muscle), and several organ systems (cardiovascular, lymphatic, integument, digestive, visual, auditory) of domestic mammals and birds. Prerequisites: graduate standing, background in biological sciences, and instructor's consent.
5051	<b>VETERINARY GASTROINTESTINAL PHYSIOLOGY</b> (2) Continuation of 5504. Physiology of the gastrointestinal tract, exocrine pancreas, and liver. Lecture and lab are designed to emphasize principles important to the practice of veterinary medicine.	7303	<b>CYTOLOGY, HISTOLOGY, AND ORGANOLGY OF DOMESTIC ANIMALS II</b> (2) Continuation of 7302. Detailed study of the urinary system, respiratory system, endocrine glands, female reproductive system, placenta, male reproductive system, and integument (hoof and claw) of domestic mammals and birds. Prerequisites: 7302 and instructor's consent.
5052	<b>VETERINARY ENDOCRINOLOGY AND REPRODUCTIVE BIOLOGY</b> (2) Continuation of 5051. Comparative endocrinology and reproductive biology.	7307	<b>EMBRYOLOGY AND DEVELOPMENT OF DOMESTIC ANIMALS</b> (2) Developmental anatomy of domestic animals. Special written report or review required. Prerequisites: background in biological sciences and departmental consent.
5500	<b>VETERINARY ANATOMY</b> (5) Correlative study of the structure of domestic and laboratory animals in which gross anatomy is emphasized. A segment is devoted to neuroanatomy. Dissection includes the dog, cat and common laboratory animals.	7326	<b>VETERINARY PHARMACOLOGY</b> (3) General principles of pharmacodynamics in domestic animals.
5502	<b>VETERINARY MICROSCOPIC ANATOMY</b> (3) Detailed study of the structure and function of the cell, basic tissues (epithelium, connective tissue, nervous tissue, muscle), and several organ systems (cardiovascular, lymphatic, integument, digestive, visual, auditory) of domestic mammals and birds.	7327	<b>PRINCIPLES OF PHYSIOLOGIC ADAPTATION</b> (3) Physiologic mechanisms, in individual mammals, in coping with acute and chronic alterations in the physical environment. Pressure, temperature, gravity, and radiation are considered. Prerequisites: four hours of vertebrate physiology or physiological zoology and five hours of chemistry, or instructor's consent.
5503	<b>VETERINARY MICROSCOPIC ANATOMY</b> (2) Continuation of 5052. Detailed study of the urinary system, respiratory system, endocrine glands, female reproductive system, placenta, male reproductive system, and integument (hoof and claw) of domestic mammals and birds.	7333	<b>VETERINARY CELL BIOLOGY</b> (4) A comprehensive overview of molecular and biochemical issues of cell function especially as related to medicine and the underlying molecular causes of disease. (Same as 5506)
5504	<b>VETERINARY PHYSIOLOGY</b> (6) Physiology of nervous, muscular, circulatory, renal, and respiratory systems. Lecture and lab are designed to emphasize principles important to the practice of veterinary medicine. (Same as 8420)	8010	<b>COMPARATIVE ANATOMY OF THE CARDIOVASCULAR SYSTEM</b> (1) The systemic and pulmonary circulation. The heart and vessels in detail. One midterm exam and final term paper. (Eight hours lecture and 16 hours laboratory)
5506	<b>VETERINARY CELL BIOLOGY</b> (4) A comprehensive overview of molecular and biochemical issues of cell function especially as related to medicine and the underlying molecular causes of disease. (Same as 7333)	8085	<b>PROBLEMS</b> (cr. arr.) Selected problems and topics for advanced study in special areas to meet needs of individual students.



**BIOMEDICAL SCIENCES COURSE OFFERINGS**

<b>8405</b>	<b>MEMBRANE STRUCTURE AND FUNCTION</b> (3) The structure and function of biological membranes are examined from a biochemical perspective. Topics include membrane proteins, transport, membrane biogenesis, and analytical techniques. Prerequisites: 7333 or equivalent, graduate standing, and instructor's consent.
<b>8409</b>	<b>ADVANCED MICROSCOPIC ANATOMY</b> (cr. arr) Advanced study of selected topics in vertebrate microscopic anatomy. Special report required. Prerequisite: departmental consent.
<b>8410</b>	<b>SEMINAR</b> (1) Presentation and discussion of investigations and topics in anatomy, physiology, or related fields, by qualified students, instructors, and guests. Prerequisite: departmental consent.
<b>8420</b>	<b>VETERINARY PHYSIOLOGY</b> (6) Systemic physiology for graduate students with primary interest in nonhuman mammals. Function of nervous, muscular, circulatory, renal, and respiratory systems. Prerequisites: Biochemistry 4270 and 4272.
<b>8421</b>	<b>VETERINARY PHYSIOLOGY</b> (4) Continuation of 8420. Physiology of the gastrointestinal tract, exocrine pancreas and liver, comparative endocrinology, and reproductive biology. Lecture and lab are designed to emphasize principles important to the practice of veterinary medicine.
<b>8450</b>	<b>RESEARCH</b> (cr. arr.) Open to graduate students with requisite preparation. Research expected to be presented as a thesis.
<b>8490</b>	<b>RESEARCH</b> (cr. arr.) Open to graduate students with requisite preparation. Research expected to be presented as a thesis.
<b>9425</b>	<b>MICROVASCULAR CIRCULATORY FUNCTION</b> (3) An in-depth study of microcirculatory structure and function in various tissues, with emphasis on recent developments in the understanding of the mechanisms involved in nutrient supply, edema formation, lymphatic function, and fluid balance. Prerequisites: Veterinary Physiology 8420 and 8421 or Medical Pharmacology and Physiology 8411 or equivalent.

**9427 FATE OF DRUGS IN THE ANIMAL BODY** (2) Principles concerned with absorption, distribution, excretion, and biotransformation of drugs. Prerequisites: 10 hours of physiology, five hours of pharmacology, and five hours of biochemistry. (Same as Medical Pharmacology and Physiology 9427.)

**9434 ADVANCED CLINICAL PATHOLOGY** (3) Survey of current and in-depth mechanisms involved in ovarian, testicular, and epididymal function. Emphasis will be given to comparative differences in gonadal functions among domestic animals. Prerequisites: Animal Sciences 4314 (Physiology of Reproduction) or equivalent, a course in endocrinology, and biochemistry or cell biology. (Same as Animal Sciences 9434, Gonadal Function.)

**Note: 5000-6000 level courses are restricted to veterinary medical students. Graduate standing required for all 8000 level courses.**





## VETERINARY PATHOBIOLOGY

### PROFESSIONAL PROGRAM

Courses offered in the microbiology section provide instruction on special properties of pathogenic microorganisms, the host response to invading microorganisms, and techniques for isolation and identification of microorganisms. Special emphasis is placed on the transmission, prevention and control of infectious and parasitic diseases, veterinary community health, epidemiology and immunology. Lectures, laboratory exercises, special demonstrations, special projects, computer-assisted programs and problem-based programs are offered.

The primary function of the veterinary pathology section is to teach professional courses in morphologic and biochemical alterations, which form the basis for changes that occur in tissues and fluids of diseased animals. The teaching is conducted in didactic and applied courses. Second-year veterinary medical students study general, systemic and special pathology; veterinary clinical pathology; and laboratory-animal medicine. The extensive and varied case loads in clinical pathology and Veterinary Medical Diagnostic Laboratory programs are used as teaching resources during the third and fourth years of the professional curriculum.

### GRADUATE PROGRAM

The department offers a graduate program leading to the Master of Science in biomedical sciences with a specialization in veterinary pathobiology or comparative medicine.

Faculty in the College of Veterinary Medicine, School of Medicine, College of Arts and Science, and College of Agriculture present the PhD program in pathobiology. PhD candidates may choose their research areas to take advantage of the interests and specialties of advisers in the departments. Research is conducted in areas such as veterinary microbiology, immunology, molecular genetics, parasitology, genomics, pathology, toxicology, infectious and parasitic diseases, public health and laboratory-animal medicine.

The Department of Veterinary Pathobiology, in partnership with the faculty from the Department of Molecular Microbiology and Immunology, offers a comprehensive graduate program leading to the PhD degree. This program provides individualized training that is strongly oriented toward basic research in molecular and cellular biology, immunology and host-parasite interactions. Graduates completing this training are prepared to pursue challenging and rewarding professional careers that involve research and teaching at supervisory levels in academic and private sectors.

### CONTACT INFORMATION

**Details on admission and degree requirements are listed in the Graduate School Catalog:**

Graduate School  
205 Jesse Hall  
Columbia, MO 65211

or online at:

<http://gradschool.missouri.edu/programs/catalog/>

More information regarding this program and links to an online application:

<http://mmi.missouri.edu/graduateprogram/programindex.php>

VETERINARY PATHOBIOLOGY COURSE OFFERINGS	
2085	<b>PROBLEMS</b> (cr. arr.) Assignment of special topics for research training in veterinary pathobiology. Prerequisite(s): instructor's consent.
2210	<b>MICROBIOLOGY FOR HEALTH SCIENCES</b>
3085	<b>PROBLEMS</b> (cr. arr.) Prerequisite(s): DVM and departmental consent.
3250	<b>PARASITOLOGY</b> (4) Parasitism is considered a fundamental type of interspecies interaction. Principles of parasitism that apply to humans and animals are presented with emphasis on parasitic morphology, biology, control and host-parasite relationships. Prerequisite(s): Eight hours of biology.
3335	<b>TECHNIQUES IN PATHOLOGY</b> (cr. arr.) Methods and techniques in fixing, preparing and staining pathological specimens.
3345	<b>VETERINARY AND HUMAN PARASITOLOGY</b> (4) Protozoa and helminths of veterinary and human importance; three one-hour lectures, one two-hour lab each week. Advanced undergraduate or graduate standing in biological, veterinary or medical sciences. Prerequisite(s): Biological Sciences 2210 or equivalent and instructor's consent.
3347	<b>CLINICAL EPIDEMIOLOGY AND ENVIRONMENTAL HEALTH</b> (1-10) Ecologic basis of health and disease and cause-effect relationships. Evaluation of control programs. Includes epidemiology of important acute and chronic animal diseases.
5511	<b>VETERINARY IMMUNOLOGY</b> (1.5) (Same as Veterinary Pathobiology 8451) Fundamentals of immunology as applied to domestic animals. Part I Instructional periods four and five.
5512	<b>VETERINARY IMMUNOLOGY</b> (1.5) Continuation of 5511. Fundamentals of immunology as applied to domestic animals Part II. Instructional periods four and five.
5552	<b>VETERINARY BACTERIOLOGY I</b> (3) Classification and properties of pathogenic bacteria and fungi of animals; relationship to public health; considers pathogenesis, immunology of infection. Instructional period five.
5553	<b>VETERINARY BACTERIOLOGY II</b> (2.5) Continuation of 5552. Instructional period six.
5554	<b>VETERINARY VIROLOGY</b> (2) Classification and properties of viruses. Considers the etiologic, pathologic and immunologic aspects of viral diseases of animals. Prerequisite: enrollment in the College of Veterinary Medicine. Instructional period six. (Same as Veterinary Pathobiology 8454)
5555	<b>EPIDEMIOLOGY AND BIostatISTICS</b> (2) Instructional period four. (Same as VPB 8455, Epidemiology and Biostatistics)
5557	<b>VETERINARY PARASITOLOGY</b> (3) Instructional period six. (Same as VPB 8457, Animal Parasitology)
5558	<b>VETERINARY PUBLIC HEALTH</b> (2) Instructional period seven. (Same as VPB 8458, Veterinary Public Health)
5575	<b>GENERAL VETERINARY PATHOBIOLOGY</b> (3) Fundamental biochemical and anatomic alterations of disease. Includes disturbances in metabolism, circulation, growth and cell differentiation. Also includes the pathology of tumors. Instructional period five.
5576	<b>VETERINARY SYSTEMIC AND SPECIAL PATHOLOGY I</b> (3) Pathologic manifestations of disease in the organ systems includes changes caused by infectious agents and metabolic disturbances. Stresses the gross and microscopic criteria by which definitive diagnosis are made. Instructional period six.
5577	<b>VETERINARY SYSTEMIC AND SPECIAL PATHOLOGY II</b> (3) Continuation of 5576. Instructional period seven.
5578	<b>VETERINARY CLINICAL PATHOLOGY</b> (3) Physiologic basis, interpretation and clinical application of laboratory assays in hematology, chemistry, cytology, and urinalysis, utilization of laboratory methods to define pathological states and to diagnose disorders of domestic animals. Prerequisite: enrollment in College of Veterinary Medicine. Instructional period eight.
5579	<b>VETERINARY GENOMICS</b> (1) Instructional period five.
5580	<b>INTRODUCTION TO VETERINARY INFORMATICS</b> (1) Instructional period five.
5991	<b>INTRODUCTION TO AVIAN MEDICINE</b> (1).
6010	<b>LABORATORY ANIMAL MEDICINE</b> (1.5) Principles of Veterinary Medicine applied to laboratory animals as pets and in research. Husbandry, handling and clinical techniques, diseases, and use as disease models are discussed. Instructional period eight.
6647	<b>DIAGNOSTIC PATHOLOGY AND SPECIAL SPECIES MEDICINE I</b> (8) Application of laboratory techniques used to diagnose disease by macroscopic, microscopic, biochemical, microbiologic, and toxicologic findings. Case method of teaching. Domestic avian species and laboratory animals included. Six times yearly.
6676	<b>LABORATORY ANIMAL MEDICINE AND MANAGEMENT</b> Elective offered third- and fourth-year students, subject to approval of course coordinator and supervising faculty. Concentrated study/experience in laboratory animal disease(s)/colony management. Available to veterinarians as a continuing education program.
6678	<b>EPIDEMIOLOGY AND COMMUNITY HEALTH</b> (2-6) Elective covering advanced aspects of epidemiology and community health. Emphasizes problem solving and is designed to meet needs of the individual student. Prerequisite: 5558 or instructor's consent.
6679	<b>DIAGNOSTIC PATHOLOGY AND SPECIAL SPECIES MEDICINE II</b> Third- and fourth-year students. Elective. Approval of coordinator and supervisory staff. Continuation of 6647 with more depth. Available to DVMs as part of continuing education program. Prerequisite: 6647 or equivalent.
6684	<b>RESEARCH TECHNIQUES IN VETERINARY PATHOBIOLOGY</b>
8401	<b>TOPICS</b> (cr. arr.) Courses with lectures in various topics in veterinary pathobiology will be given on a trial basis, depending on faculty expertise and student demand. Credit hours are usually one or three. Specialized topics will be covered. Prerequisite: instructor's consent.
8410	<b>SEMINAR</b> (1) Discussion of current research methods in veterinary pathology and Air Force Institute of Pathology case studies.



8411	<b>SEMINAR IN HISTOPATHOBIOLOGY</b> (1) Discussion of current research and case studies in pathology of diseases of domestic animals, laboratory animals and avian species. Team taught.	8446	<b>ADVANCED IMMUNOLOGY AND IMMUNOPATHOLOGY</b> (3) Study of the immune system at the level of the intact animal. Includes a discussion of immunity-infectious diseases. Prerequisite(s): Microbiology 4304 (Immunology), graduate standing and instructor's consent.
8421	<b>ADVANCED EPIDEMIOLOGY</b> (3) (Same as Family and Community Medicine 8421 w., even years.	8447	<b>ONCOGENIC ANIMAL VIRUSES</b> (3) Biology of RNA and DNA containing animal tumor viruses and their in vitro and in vivo interactions with host cells.
8430	<b>COMPARATIVE PATHOLOGY</b> (3) Biochemical and morphologic lesions related to the mechanisms of disease expression in plants and animals.	8448	<b>MOLECULAR METHODS IN NUCLEIC ACIDS</b> (3) The course focuses on the most recent developments in technology related to eukaryotic and prokaryotic molecular biology such as analysis and manipulation of nucleic acids and their application to define structure, function, and biosynthesis of macromolecules. Prerequisite: instructor's consent.
8431	<b>RESEARCH METHODS AND DATA ANALYSIS</b> (1-5) Specific assignments on diagnostic methods including surgical pathology, necropsies, toxicology. Prerequisite: departmental consent.	8450	<b>NON-THESIS RESEARCH</b> (cr.arr.) Research not expected to terminate in dissertation.
8432	<b>ADVANCED HISTOPATHOLOGY</b> (5) Advanced microscopic studies of pathological tissues. Prerequisite: departmental consent.	8451	<b>INTRODUCTION TO IMMUNOLOGY</b> (3) (Same as Veterinary Pathology 5512 and 5551) Fundamentals of immunology as applied to domestic animals.
8433	<b>VETERINARY ONCOLOGY</b> (2) History and molecular biology of neoplasia; laboratory for discussion of practical aspects of diagnosis. Prerequisite: graduate standing and instructor's consent.	8452	<b>CELL AND MOLECULAR ELECTRON MICROSCOPY</b> (4) Lecture class that describes the use of electron microscopy (transmission and scanning) in biomedical research. Students receive hands-on experience by completing a laboratory project.
8434	<b>ADVANCED CLINICAL PATHOLOGY</b> (4) Lecture/tutorial teaching: Pathogenesis of clinical abnormalities with emphasis on abnormal clinical laboratory test results. Lab: Recognition and pathogenesis of abnormalities found via microscopic or other clinical laboratory analysis. Prerequisite: departmental consent.	8454	<b>DOMESTIC ANIMAL VIROLOGY</b> (2) (Same as Veterinary Pathobiology 5554) Classification and properties of viruses. Considers the etiologic, pathologic and immunologic aspects of viral diseases of animals. Instructional periods six and seven. Prerequisite: instructor's consent.
8436	<b>PATHOGENIC MECHANISMS IN VETERINARY PATHOBIOLOGY</b> (3) This course will include disease mechanisms, described at the cellular and molecular level, which result in tissue morphologic (gross and microscopic) and clinical abnormalities. Examples of discussion topics include soluble mediators of inflammatory processes, host-agent interactions, and host defense mechanisms. Prerequisite: instructor's consent.	8455	<b>EPIDEMIOLOGY AND BIostatISTICS</b> (2) Prerequisite: instructor's consent. (Same as VPB 5555)
8437	<b>PATHOLOGY OF LABORATORY ANIMALS</b> (4) Gross and microscopic study of spontaneous and naturally occurring diseases in laboratory animals. Prerequisite: departmental consent.	8457	<b>ANIMAL PARASITOLOGY</b> (5) Prerequisite: instructor's consent. (Same as VPB5557)
8438	<b>PRIMATOLOGY</b> (3) Diseases and pathology of primates. Prerequisite: departmental consent.	8458	<b>VETERINARY PUBLIC HEALTH</b> (2) Prerequisite: instructor's consent. (Same as VPB 5558)
8441	<b>TOPICS IN VETERINARY PATHOBIOLOGY</b> (1-3) Subjects appropriate to veterinary pathobiology or epidemiology, taught on a one-time basis or infrequently. May include highly specialized topics. Specific course must be approved by departmental faculty. Prerequisite(s): graduate standing and instructor's consent.	8468	<b>LABORATORY ANIMAL BIOLOGY</b> (4) Taxonomy, anatomy, physiology, nutrition and behavior of laboratory animals including non-human primate and less common species are covered. Genetics, gnotobiology, housing and production are also presented. Prerequisite: instructor's consent.
8442	<b>ADVANCED VETERINARY PATHOGENIC BACTERIOLOGY</b> (3) Study of pathogenic bacteria causing animal disease. Pathogenic mechanisms and host-parasite relationships are emphasized. Laboratory procedures for isolation and identification of pathogens are included. Prerequisite(s): graduate standing and instructor's consent.	8490	<b>THESIS RESEARCH</b> (cr.arr.) Open to graduate students with requisite preparation. Research on specific animal diseases, prevention and treatment. Graded on an S/U basis only.
8443	<b>VIRAL INFECTION AND IMMUNITY</b> (3) Study of virus infection at the level of the intact animal. Includes immunology of domestic animal species. Prerequisite(s): graduate standing and instructor's consent.	8641	<b>INTRODUCTION TO RESEARCH ETHICS</b> (1). This course provides students with a brief overview of many of the ethical issues that confront today's scientist. It is important that scientist think about and develop their abilities to make well-reasoned responses to ethical problems.
8445	<b>ADVANCED VETERINARY PARASITOLOGY</b> (3) Parasitic diseases of domestic and exotic animals and those of public health significance. Prerequisite(s): one course in general parasitology and graduate standing.	9090	<b>AREA VETERINARY PATHOBIOLOGY DISSERTATION RESEARCH</b> (cr.arr.) Dissertation research for PhD students. Prerequisite: departmental consent, must have passed comprehensive exams. May be repeated for credit. Graded on S/U basis only.

Note: 5000-6000 level courses are restricted to veterinary medical students. Graduate standing required for all 8000 level courses.



## VETERINARY MEDICINE AND SURGERY

### PROFESSIONAL PROGRAM

During the third and fourth clinical years of the professional curriculum, students learn to combine the art and science of clinical veterinary medicine and surgery. Two didactic blocks in the VM-3 year provide instruction in clinical subjects not addressed earlier. Practical application of basic principles of medicine and surgery to diagnose, prevent and treat disease in all animals presents a challenge to the student's mental and physical resources.

Proficiency in clinical medicine is gained by working closely with experienced clinicians in the small-animal, food-animal, equine, and ambulatory areas of the Veterinary Medical Teaching Hospital. Through the patient-care method of study, professional students are given considerable responsibility for the total health requirements of animals assigned to their care. Discussion periods, formal lectures, rounds, and laboratory training guide the clinical student's progress in systematic medicine and surgery. Broad exposure to clinical practice is gained through curriculum design.

In addition to the required clinical rotations involving care for a spectrum of domestic species, a number of elective experiences are also part of the clinical curriculum.

### GRADUATE PROGRAM

Graduate education and research are integral parts of veterinary medicine. Research programs are needed to provide a better understanding of normal and disease states, and the prevention of diseases of animals and humans. Such efforts contribute to the advancement of biomedical science and significantly enhance animal and human health.

The MU College of Veterinary Medicine offers graduate study leading to the Master of Biomedical Sciences in the following areas of specialization: biomedical (basic) sciences, clinical sciences, laboratory animal medicine and pathobiology.

If students elect two areas of specialization, they must enroll in appropriate courses to assure competence in both areas. Candidates must have completed a baccalaureate, DVM, or MD degree. Completion of the DVM degree is a prerequisite for admission to the MS degree program in the area of laboratory-animal medicine. This program includes residency training and is designed to prepare trainees for board certification, and is the basis for a career in teaching, research or public or private practice.

The MU Graduate School requires that the Graduate Record Examination (GRE) be taken prior to application. Minimum GRE scores for Parts I (verbal), II (quantitative), and III (analytical) are established by the faculty of the area. MU Graduate School acceptance is required of all applicants. The application must include a complete curriculum vitae, a statement of professional and academic goals, three letters of reference, and copies of all university transcripts. The director of graduate studies of each area will evaluate the adequacy of academic records and will act on admission. Prior to acceptance, each applicant must have a major advisor who is a member of the emphasis area.

### CONTACT INFORMATION

**Details on admission and degree requirements are listed in the Graduate School Catalog:**

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205 Jesse Hall  
Columbia, MO 65211

or online at:

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VETERINARY MEDICINE AND SURGERY COURSE OFFERINGS	
1010	<b>BIOMEDICAL CAREER EXPLORATIONS</b> (1) An introduction to the variety of career possibilities within the growing field of biomedical sciences. Speakers from various aspects of biomedical sciences will be invited to present opportunities within their respective disciplines. Grading based on S/U basis. Fall semester.
2001	<b>BIOMEDICAL AND VETERINARY MEDICAL TERMINOLOGY</b> (2-3) Terms commonly used in the life sciences. Winter semester.
2001	<b>ANIMAL HANDLING AND RESTRAINT</b> (2) Techniques of handling and restraint of animals that reduce the risk to the handler and stress to animals. Fall semester.
2140	<b>COMPANION ANIMALS</b> (3) Same as Animal Science 2140. Focus on companion dog, cat, horse owners concerns, re: health, zoonoses, legal responsibilities, inbreeding, choice of breeds, behavioral problems and loss of companion animals.
2230	<b>ANIMAL SANITATION AND DISEASE PREVENTION</b> (3) Preventative measures for disease and parasites of farm animals. Fall only.
2235	<b>DOMESTIC ANIMAL BEHAVIOR</b> (3) An examination of the effects of domestication on the behavior of companion- and food-animal species. Comparisons to similar animals in feral or wild conditions will be made. The causes, development and potential treatments of abnormal behavior will also be examined. Prerequisite: Biological Science 1500 or equivalent, sophomore or above. Winter semester.
3219	<b>ELEMENTS OF VETERINARY ANATOMY</b> (4) Introductory comparative gross anatomy of agriculture and other students desiring a basic knowledge of functional comparative anatomy of domestic animals. Prerequisites: five hours of biological science or zoology or equivalent and instructor's consent. Graded on A-F basis only. Fall only.
3300	<b>ANIMAL WELFARE AND ETHICS</b> (1) An introductory examination of contemporary ethical issues related to biomedical science including animal welfare, agriculture and cloning.
3310	<b>EQUINE HEALTH TOPICS</b> (3) In-depth examination of equine disease and health topics pertinent to today's horse owner and veterinarian. The course will integrate horse management practices with disease recognition, control and prevention. Prerequisites: Horse Production (Animal Science 3254) or equivalent or consent of instructor. Grading based on A-F. Fall semester.
6000	<b>PROBLEMS</b> (cr. arr.) Studies in specific areas of veterinary medicine and surgery.
6020	<b>VETERINARY RADIOLOGY</b> (2) Instructional period eight. Introduces through lectures and demonstrations the principles of radiographic examination and interpretation of disease processes of domestic animals.
6030	<b>VETERINARY ANESTHESIOLOGY</b> (2) Instructional period nine. Basic principles of anesthesiology for any species of domestic and exotic animals.
6040	<b>COMPANION ANIMAL MEDICINE</b> (4) Instructional period nine. Covers basic principles of veterinary internal medicine and selected sub disciplines.
6050	<b>SMALL ANIMAL MEDICINE</b> (2.5) Instructional period 10. Didactic presentations regarding pathophysiology, diagnosis and therapeutic management of organ system diseases in small animals.
6060	<b>SMALL ANIMAL SURGERY</b> (2) Instructional period nine. Basic principles including suture materials and patterns; operative techniques, wound healing of soft-tissue surgery.
6071	<b>SMALL ANIMAL SURGERY</b> (2) Instructional period 10. Continuation of 6060 lectures, focusing primarily on orthopedics.
6072	<b>CONVENTIONAL SURGERY AND ANESTHESIA LABORATORY</b> (0.5) Designed to teach entry-level surgical and anesthesia skills terminal procedures. Instructional period 10.
6073	<b>FUNDAMENTAL SURGERY AND ANESTHESIA LABORATORY</b> (0.5) Instructional period 10. Designed to teach entry-level surgical and anesthesia skills using cadavers and survival spay and neuter procedures. This laboratory is offered as a substitute to VMS 6072 for students with objections to participating in terminal procedure laboratories.
6081	<b>FOOD ANIMAL MEDICINE AND SURGERY</b> (2.5) Instructional period 10. Covers the important diseases of cattle, goats, sheep, and swine. Recognition, management and prevention of diseases are stressed.
6082	<b>FOOD ANIMAL MEDICINE AND SURGERY</b> (2) Instructional period 11. Continuation of 6981. Covers the important diseases of cattle, goats, sheep and swine. Recognition, management and prevention of diseases are stressed.
6090	<b>SMALL ANIMAL CRITICAL CARE</b> (1) Instructional period 10. Basic principles of emergency and critical care of companion animals.
6110	<b>THERIOGENOLOGY</b> (3) Instructional period 11. Fundamentals of reproductive function in domestic animals; and medical and surgical management of diseases of reproductive systems.
6120	<b>VETERINARY OPHTHALMOLOGY</b> (1) Instructional period 11. Covers examination, diagnostic procedures, and treatment of important eye diseases of domestic animals.
6130	<b>FUNDAMENTALS OF VETERINARY BUSINESS MANAGEMENT</b> (1) To realistically present to the second-year veterinary student a basic explanation of the essential need for a strong base of knowledge pertaining to business and management in order to successfully operate a veterinary practice.
6140	<b>VETERINARY NUTRITION</b> (1.5) Nutrition of companion and food-producing animals and nutritional principles important to veterinary medicine. Subjects presented include feeding of animals for maintenance of healthy condition during all life-stages, evaluation of foods and supplements, and methods of diet formulation and evaluation. Grading A-F. Winter semester.
6151	<b>EQUINE MEDICINE AND SURGERY</b> (2) Instructional period 10. Covers the fundamentals of diseases of the equine species. Case management approaches are utilized to provide examples of disease conditions.
6152	<b>EQUINE MEDICINE AND SURGERY</b> (1.5) Instructional period 11. Continuation of 6151. Covers the fundamentals of diseases of the equine species. Case management approaches are utilized to provide examples of disease conditions.
6400	<b>FOOD ANIMAL MEDICINE AND SURGERY</b> (6) Eight times per year. Technical, diagnostic and therapeutic procedures common to the practice of large-animal medicine and surgery. Experience in the operation of a large-animal hospital and farm outpatient practice.

VETERINARY MEDICINE AND SURGERY COURSE OFFERINGS	
6410	<b>SMALL ANIMAL MEDICINE I</b> (6) Eight times per year. Practical discussion of medical diseases of dogs, cats and exotic pets as they affect body systems. Practical experience in the operation of a small-animal hospital and outpatient practice.
6420	<b>EQUINE MEDICINE AND SURGERY</b> (6) Eight times per year. Technical, diagnostic and therapeutic procedures common to equine practice. Emphasis on fundamental principles.
6430	<b>SMALL ANIMAL SURGERY I</b> (6) Eight times per year. Diagnostic procedures and surgical techniques applicable to companion-animal surgery and clinical neurology. Practical experience in the operation of a small-animal surgical practice.
6441	<b>CLINICAL RADIOLOGY</b> (3) Sixteen times per year. Fundamentals of radiology: indications for use, techniques, pathophysiologic alterations, interpretation of results, patient aftercare, protective measures against radiation hazards.
6442	<b>CLINICAL ANESTHESIOLOGY I</b> (3) Sixteen times per year. Fundamentals of anesthesiology: indications for use, techniques, pathophysiologic alterations, and interpretation of results, patient aftercare.
6450	<b>THERIOGENOLOGY I</b> (2) Twenty-four times per year. Practical experience in reproductive techniques, obstetrics, breeding soundness, and herd reproductive problems.
6460	<b>CLINICAL OPHTHALMOLOGY I</b> (2) Twenty-four times per year. Practical application in problem solving and medical and surgical management of eye conditions of domestic animals.
6490	<b>SMALL ANIMAL SPECIALTY MEDICINE I</b> (2) Twenty-four times per year. Clinical rotation in small-animal oncology. Taught in the clinical setting using animals presented to the VMTH for evaluation and treatment of oncologic diseases.
6700	<b>FOOD ANIMAL MEDICINE AND SURGERY II</b> (2-6) Prerequisite: VMS 6400.
6710	<b>SMALL ANIMAL MEDICINE II</b> (2-6) Continuation elective offered to third- and fourth-year students. Opportunity for concentrated study and experience in medical areas. Enrollment subject to approval of course coordinator. Prerequisite: 6410.
6720	<b>EQUINE MEDICINE AND SURGERY II</b> (2-6) Continuation of VMS 6420. Open to third- and fourth- year students, subject to approval of course coordinator. Opportunity for concentration in specific area of interest.
6730	<b>SMALL ANIMAL SURGERY I</b> (2-6) Prerequisite: VMS 6430 or equivalent. Opportunity for concentrated study and advanced surgical experience.
6741	<b>CLINICAL RADIOLOGY I</b> (2-6) Continuation of VMS 6441.
6742	<b>CLINICAL ANESTHESIOLOGY I</b> (2-6) Continuation of VMS 6442. This elective will focus on anesthetizing and monitoring the more challenging anesthetic cases during rotation. Required projects include a review paper on a relevant topic of choice, a written case report and assistance in research activities.
6750	<b>THERIOGENOLOGY II</b> (2-6) Continuation of the prerequisite VMS 6450. Opportunity for concentrated study and experience. An elective, subject to approval of course coordinator and faculty member(s) who supervise students' work.
6751	<b>EXTERNAL FOOD ANIMAL SERVICE AND THERIOGENOLOGY TEACHING PROGRAM</b> (EFAST Teaching Program) (3-6) Additional options for clinical training in theriogenology and food supply veterinary medicine beyond the core curriculum. Winter semester. Requires 6400 and VM-4 status. Concentrated study/experience in feed lot, dairy, cow/calf, swine herd agribusiness enterprises applicable to veterinary practice.
6800	<b>CLINICAL OPHTHALMOLOGY II</b> (2-6) Opportunity for concentrated study and experience. An elective, subject to approval of course coordinator and faculty member(s) who supervise students' work.
6810	<b>CARDIOLOGY</b> (3) Cardiology elective consists of a three-week clinical rotation in the small-animal hospital. Duties include primary case receiving and patient care with clinical case work-up. Additional responsibilities include attendance at clinical rounds and participation in related clinical activities. Students must be currently enrolled in the VM curriculum.
6820	<b>SMALL ANIMAL EMERGENCY AND CRITICAL CARE</b> (2-6) Elective offered to third- and fourth-year veterinary students. Opportunity for concentrated study and experience in small-animal emergency and critical care.
6830	<b>FOOD ANIMAL PRODUCTION MEDICINE</b> (2-6) This six-week rotation will focus on the reproductive, metabolic and immunologic physiology of beef, dairy and swine with additional emphasis on spreadsheet and database applications.
6850	<b>SMALL ANIMAL SPECIALTY MEDICINE II</b> (2-6) Clinical rotation in small-animal oncology. Taught in the clinical setting using animals presented to the VMTH for evaluation and treatment of oncologic diseases.
6884	<b>RESEARCH TECHNIQUES IN VETERINARY PATHOBIOLOGY</b> (3) (Research rotation) Hands-on experience with molecular biology techniques. The student will be required to submit a paper describing the methodologies used, research results, and interpretation.
6987	<b>PROBLEM-BASED LEARNING CLINIC PREPARATION</b> (1) This course is designed to prepare the VM-3 student about to enter clinics for a systematic approach to a clinical case. Emphasis will be placed on developing focused problem, differential lists, and logical choices of diagnostic tests. Fall semester.
6990	<b>ZOOLOGICAL MEDICINE</b>
6991	<b>ADVANCED EQUINE LAMENESS WITH LAB</b>
6992	<b>SMALL ANIMAL ENDOSCOPY</b>
6993	<b>ADVANCED VETERINARY ANESTHESIA</b>
6994	<b>ADVANCED TECHNIQUES IN SMALL ANIMAL SURGERY WITH LAB</b>
6996	<b>ADVANCED DERMATOLOGY</b>
6997	<b>FOOD ANIMAL DIAGNOSTIC EXERCISES</b>
6998	<b>SMALL ANIMAL BEHAVIORAL MEDICINE</b>
6999	<b>FOOD ANIMAL SURGERY LAB</b>
6989	<b>ADVANCED ONCOLOGY OF COMPANION ANIMALS</b>
7301	<b>TOPICS</b> (cr. arr.) Organized study of select topics. Prerequisites: junior standing and instructor's consent.



7303	<b>ADVANCED TOPICS IN VETERINARY ANESTHESIA</b> (1) (Same as VMS 6993)	8031	<b>SEMINARS IN VETERINARY MEDICINE AND SURGERY-OPHTHALMOLOGY SEMINAR AND JOURNAL REVIEW</b> (1) Weekly journal review and seminar on current topics in veterinary ophthalmology, review of pertinent literature in human ophthalmology, and review of ophthalmic texts. Prerequisite: DVM or equivalent degree and acceptance into the ophthalmology residency program. Graded on S/U basis only.
7304	<b>ADVANCED EQUINE SURGERY</b> (2) The purpose of the course is to aid in the preparation of the resident for board certification in the American College of Veterinary Surgeons. Prerequisites include a DVM or equivalent degree, acceptance to the graduate school, acceptance to the residency program, and instructor approval.	8032	<b>SEMINARS IN VETERINARY ANESTHESIOLOGY</b> (1) A journal review will focus on advances in veterinary anesthesiology, pharmacology, and physiology. Prerequisites: DVM and graduate school enrollment or instructor's consent. Graded on S/U basis only.
7328	<b>INTRODUCTORY RADIATION BIOLOGY</b> (3) (Same as Nuclear Engineering 7328, Radiology 7328, Biological Sciences 7328) Prerequisite: junior standing sciences/engineering; one course in biological sciences and physics/chemistry; or instructor's consent.	8033	<b>SEMINARS IN CLINICAL SCIENCES-EQUINE SURGERY JOURNAL REVIEW</b> (1) Journal review will focus on advances in equine surgery and will consist of a review of recent manuscripts pertaining to equine surgery in current journals and review of pertinent book chapters. Graded on S/U basis only.
7351	<b>ADVANCED SURGICAL TECHNIQUES</b> (cr. arr.) Special application to large, small animals. Prerequisite: DVM.	8034	<b>SEMINARS IN VETERINARY RADIOLOGY</b> (1) Journal review focusing on advances in veterinary radiology, ultrasound, and alternate imaging. Literature will be reviewed weekly. Prerequisites: DVM and graduate school enrollment (or permission of instructor) Graded on S/U. Winter, fall, spring, summer.
7355	<b>ADVANCED TECHNIQUES IN RADIOLOGY</b> (cr. arr.) Special application to domestic animals. Prerequisite: DVM.	8090	<b>RESEARCH</b> (cr. arr.) (Thesis)
7385	<b>PROBLEMS</b> (cr. arr.) Studies in specific areas of veterinary medicine and surgery.	8405	<b>COMPARATIVE RESPIRATORY PATHOPHYSIOLOGY</b> (1) A consideration of clinical pathophysiology of the respiratory system relative to diseases of the thorax and clinical anesthesiology.
8401	<b>TOPICS IN CLINICAL VETERINARY SCIENCES</b> (1-3) Current topics, infrequently-taught courses, or new courses not yet designated by a permanent course number.	8410	<b>VETERINARY MEDICINE AND SURGERY RESEARCH SEMINAR</b> (1) Current research in veterinary medicine and surgery. Literature reviews and presentation or original graduate student research. Graded on S/U basis.
8402	<b>SEMINARS IN VETERINARY CLINICAL SCIENCES</b> (1) Graduate seminars and conferences with a focus on current literature within a specialty area. Graded on S/U basis only.	8411	<b>CLINICAL VETERINARY ENDOCRINOLOGY</b> (2) Graduate standing required. A two-hour course for post-DMV graduate students. It will focus on clinically relevant physiology, pathophysiology, and diagnostic evaluation of hormone systems.
8021	<b>SEMINARS IN VETERINARY MEDICINE AND SURGERY-NEUROLOGY SEMINAR AND JOURNAL REVIEW</b> (1) Weekly journal review and seminar on current topics in veterinary neurology, related clinical disciplines, and basic neurosciences. Prerequisites: DVM degree. Graded on S/U basis only.	8413	<b>EQUINE INTERNAL MEDICINE</b> (2) Prerequisite: DVM degree or equivalent.
8022	<b>INTERNAL MEDICINE CLINICOPATHOLOGIC CONFERENCE</b> (1) Graded on S/U basis only.	8415	<b>ADVANCED VETERINARY INTERNAL MEDICINE-NEUROLOGY</b> (2) Basic neuroscience as it relates to clinical neurology and the pathophysiology of diseases of the brain, spinal cord, peripheral nerve and muscle in domestic animals. Prerequisites: DVM degree. A-F grading only.
8023	<b>INTERNAL MEDICINE JOURNAL REVIEW</b> (1) Graded on S/U basis only.	8416	<b>ADVANCED VETERINARY INTERNAL MEDICINE-CARDIOVASCULAR MEDICINE</b> (3) Graduate standing required. Pathologic, pathophysiologic, hemodynamic and pharmacologic mechanisms important to the diagnosis, assessment, management, and research of cardiovascular diseases of animals.
8024	<b>MEDICINE-SURGERY-PATHOLOGY CONFERENCE</b> (1) Graded on S/U basis only.	8417	<b>ADVANCED VETERINARY INTERNAL MEDICINE-CLINICAL ONCOLOGY</b> (2) Provides graduate students in the clinical and basic sciences alike with a working knowledge of the biological mechanisms of cancer development and progression and the related approaches to cancer prevention and therapy. It is assumed that students will have a strong background in biology as a foundation for discussions. Prerequisites: graduate standing; DVM or equivalent degree recommended.
8025	<b>EQUINE MEDICINE JOURNAL REVIEW</b> (1) Graded on S/U basis only.	8418	<b>ADVANCED VETERINARY INTERNAL MEDICINE: FOOD ANIMAL MEDICINE</b> (2) Current concepts in the pathophysiology, diagnosis, and management of medical disorders, diseases of the limbs, and infectious diseases of cattle and food producing animals.
8026	<b>SURGERY JOURNAL REVIEW</b> (1) Graded on S/U basis only.		
8027	<b>FOOD ANIMAL MEDICINE JOURNAL REVIEW</b> (1) Graded on S/U basis only.		
8028	<b>CARDIOVASCULAR MEDICINE JOURNAL REVIEW</b> (1) Graded on S/U basis only.		
8029	<b>EMERGENCY AND CRITICAL CARE JOURNAL REVIEW</b> (1) This course will concentrate on review of emergency and critical care literature. Prerequisite: DVM degree. Graded on S/U basis only.		
8030	<b>SEMINARS IN VETERINARY MEDICINE AND SURGERY-OPHTHALMOLOGY PATHOLOGY SEMINAR</b> (1) Review of clinical cases presented in two formats: histopathology slides and kodachrome slides. Prerequisite: DVM degree or equivalent and acceptance into an ophthalmology residency program. Graded on S/U basis only.		


**VETERINARY MEDICINE AND SURGERY COURSE OFFERINGS**

<b>8421</b>	<b>ADVANCED VETERINARY SURGERY: SMALL ANIMAL SURGERY (2-4)</b> Current concepts in the pathophysiology, diagnosis and management of surgical disease of the dog and the cat. Includes laboratories of advanced surgical techniques.
<b>8423</b>	<b>COMPARATIVE ARTHROLOGY (3)</b> Lectures and discussion covering anatomy, physiology, biomechanics, pathophysiology and clinical aspects of mammalian diarthrodial joints.
<b>8425</b>	<b>ADVANCED VETERINARY SURGERY: EQUINE SURGERY (2-4)</b> Current concepts in the pathophysiology, diagnosis and management of surgical disorders of the horse. Taught yearly as sections A, B, C. Repeatable to a maximum of 10 credit hours (individual sections may be taken once).
<b>8426</b>	<b>ADVANCED VETERINARY SURGERY-OPHTHALMIC SURGERY (2-4)</b> Surgery labs consisting of two-to-four hours of surgical instruction per week. Prerequisite: DVM or equivalent degree and acceptance into the ophthalmology residency program. Graded on A-F basis only.
<b>8431</b>	<b>RESEARCH METHODS AND DATA ANALYSIS (2-4)</b> A consideration of research methods, data analysis, and practical approaches to analyzing data sets derived from veterinary and biomedical studies. (Same as Veterinary Pathobiology 8431)
<b>8435</b>	<b>VETERINARY CLINICAL SCIENCES: CLINICAL IMMUNOLOGY (2)</b> Advanced concepts in veterinary immunology and immunopathology.
<b>8436</b>	<b>VETERINARY CLINICAL SCIENCES: CLINICAL PHARMACOLOGY (1)</b> Advanced concepts in veterinary clinical pharmacology, pharmacokinetics, and anesthesiology.
<b>8437</b>	<b>ADVANCED TOPICS IN VETERINARY MEDICINE (Nuclear Medicine) (1)</b> An in-depth review of veterinary nuclear medicine. Includes the physics of nuclear medicine, common imaging techniques, common radiopharmaceuticals, radiopharmaceutical kinetic evaluation, and some common physiological applications. Graduate standing required.

<b>8439</b>	<b>ADVANCED VETERINARY ULTRASONOGRAPHY (2-3)</b> Advanced concepts in veterinary ultrasonography; including ultrasound and Doppler physics, instrumentation, examination methodology, and interpretation of studies.
<b>8440</b>	<b>ADVANCED VETERINARY CLINICAL SCIENCES-ADVANCED CLINICAL OPHTHALMOLOGY (1-3)</b> Case-based discussion course. Prerequisite: DVM or equivalent degree and acceptance into the ophthalmology residency program. Graded on A-F basis only.
<b>8445</b>	<b>VETERINARY CRITICAL CARE AND EMERGENCY MEDICINE (2-3)</b> Advanced study of veterinary critical care and emergency medicine and surgery focusing on current research and literature as well as clinical application
<b>8450</b>	<b>RESEARCH (cr. arr.) (Non-thesis.)</b> Open to graduate students with requisite preparation.
<b>8485</b>	<b>PROBLEMS IN VETERINARY CLINICAL SCIENCES (1-3)</b> Supervised individual studies arranged with a faculty member and approved by the advisory committee.
<b>8487</b>	<b>NUCLEAR MEDICINE (3)</b> Principles of radiation detection instrumentation, monitoring radiological safety, and diagnostic procedures used in veterinary nuclear medicine. Prerequisite: one year college physics, DVM degree and departmental consent.
<b>8488</b>	<b>RADIATION THERAPY (3)</b> Prerequisite: one year college physics, DVM degree, and departmental consent.
<b>8489</b>	<b>VETERINARY RADIOGRAPHIC PHYSICS (1)</b> In-depth review of fundamental principles of radiographic physics, with an emphasis on preparation for the American College of Veterinary Radiology Board examination. Prerequisites: DVM and graduate school enrollment (or permission of instructor) Graded on S/U. Fall semester.

Note: 5000-6000 level courses are restricted to veterinary medical students. Graduate standing required for all 8000 level courses.



**BIOMEDICAL SCIENCES****Department Administration**

**Neil C. Olson**, DVM, PhD, College of Veterinary Medicine dean

**M. Harold Laughlin**, PhD, professor and chair; professor, Department of Physiology, School of Medicine; research investigator, Dalton Cardiovascular Research Center (DCRC)

**Ronald L. Terjung**, PhD, professor and associate chair; associate dean for research and post-graduate affairs; professor, Department of Physiology, Medicine; research investigator, DCRC

**Faculty**

**Chris Baines**, PhD, assistant professor and research investigator

**Frank Booth**, PhD, professor; research investigator, DCRC; professor, Department of Physiology, School of Medicine

**Douglas K. Bowles**, PhD, assistant professor; research investigator, DCRC, director of Graduate Studies

**Lane L. Clarke**, DVM, PhD, associate professor; director of Graduate Studies; research investigator, DCRC

**Gheorghe M. Constantinescu**, DVM, PhD, Dr.h.c., professor

**Ileana A. Constantinescu**, DVM, MS, clinical assistant professor

**John R. Dodam**, DVM, MS, PhD, Diplomate-ACVA

**Brian L. Frappier**, DVM, PhD, clinical associate professor

**Venkataseshu K. Ganjam**, B.S., DVM, PhD, professor; research investigator, DCRC

**Marc T. Hamilton**, PhD, associate professor

**Eileen M. Hasser**, PhD, professor; research investigator, DCRC

**Cheryl M. Heesch**, PhD, professor; research investigator, DCRC

**Salman M. Hyder**, PhD, professor; research investigator, DCRC

**David Kline**, PhD, assistant professor

**Cathleen Kovarik**, DVM, PhD, assistant professor

**Richard McAllister**, PhD, research associate professor

**Pat Porter**, MS, clinical instructor

**Chada S. Reddy**, BVSc., PhD, associate professor

**Cheryl Rosenfeld**, DVM, PhD, associate professor; research investigator

**Leona J. Rubin**, PhD, associate professor; research investigator, DCRC

**James C. Schadt**, PhD, associate professor; research investigator, DCRC

**Simon H. Slight**, PhD, research assistant professor

**Richard W. Tsika**, PhD, professor; research investigator, DCRC; associate professor, Department of Biochemistry

**Wade V. Welshons**, PhD, associate professor

**Steve HT Yang**, PhD, research associate professor

**Adjunct Faculty**

**C. Trenton Boyd**, BS, MA, librarian; adjunct assistant professor

**Marybeth Brown**, PT, PhD, professor

**Virginia H. Huxley**, PhD, adjunct professor; professor, Department of Physiology, School of Medicine

**George E. Rottinghaus**, PhD, adjunct associate professor; associate professor, Veterinary Medical Diagnostic Laboratory

**Gary Johnson**, DVM, PhD, assistant professor, College of Veterinary Medicine

**Steven Segal**, PhD, professor, Department of Medical Pharmacology and Physiology

**Emeriti Faculty**

**Esther M. Brown**, PhD, professor emeritus

**Roger E. Brown**, PhD, professor emeritus

**Homer E. Dale**, DVM, PhD, professor emeritus

**Robert McClure**, DVM, PhD, professor emeritus

**VETERINARY MEDICINE AND SURGERY****Department Administration**

**John R. Dodam**, DVM, MS, PhD, Diplomate-ACVA, department chair and associate professor; with joint appointment in Veterinary Biomedical Sciences

**Leah A. Cohn**, DVM, PhD, Diplomate-ACVIM (small-animal internal medicine), associate department chair and professor; director of VMS Graduate Studies

**Hospital Administration**

**David A. Wilson**, DVM, MS, Diplomate-ACVS, director of the Veterinary Medical Teaching Hospital; professor

**Zac March**, MS, administrator of the Veterinary Medical Teaching Hospital; director of Information Technology for the College of Veterinary Medicine

**Faculty**

**Robert C. Backus**, MS, DVM, PhD, Diplomate-ACVN, assistant professor, director of the Nestle-Purina Program in Small-Animal Nutrition

**David A. Bommarito**, DVM, Diplomate-ACVR, clinical instructor

**Keith R. Branson**, DVM, MS, Diplomate-ACVA, clinical assistant professor

**Lisa Britt**, DVM, MS, Diplomate-ACVR, assistant teaching professor

**Claud B. Chastain**, DVM, MS, Diplomate-ACVIM (small-animal internal medicine), professor, and director of the Undergraduate Degree Program in Biomedical Science Education for the College of Veterinary Medicine

**Joan R. Coates**, DVM, MS, Diplomate-ACVIM (neurology), associate professor

**Cristi R. Cook**, DVM, MS, Diplomate-ACVR, assistant teaching professor

**James L. Cook**, DVM, PhD, Diplomate, ACVS, associate professor, director of the Comparative Orthopaedic Laboratory

**Ron Cott**, DVM, assistant teaching professor, associate dean for Student and Alumni Affairs, and director of Development

**Ross P. Cowart**, DVM, MS, Diplomate-ABVP (food-animal practice), associate professor

**Craig Datz**, DVM, Diplomate-ABVP (canine and feline practice), assistant teaching professor

**Amy E. DeClue**, DVM, MS, Diplomate-ACVIM (small-animal internal medicine), assistant professor

**Stephanie C. Essman**, DVM, MS, Diplomate-ACVR, assistant professor

**Deborah M. Fine**, DVM, MS, Diplomate-ACVIM (cardiology), assistant professor

**Derek B. Fox**, DVM, PhD, Diplomate-ACVS, assistant professor, associate director of the Comparative Orthopaedic Laboratory

**Venkataseshu Ganjam**, DVM, MS, PhD, Member-AAVP, professor, primary appointment in Veterinary Biomedical Sciences

**Elizabeth A. Giuliano**, DVM, MS, Diplomate-ACVO, assistant professor

**Carolyn J. Henry**, DVM, MS, Diplomate-ACVIM (oncology), professor; director of the Tom and Betty Scott Endowed Program in Veterinary Oncology; with joint appointment in Division of Hematology/Oncology, School of Medicine

**Philip J. Johnson**, BVSc, MS, MRCVS, Diplomate-ACVIM (equine internal medicine), professor

**Rebecca A. Johnson**, PhD, RN, FAAN, associate professor; director of Research Center for Human-Animal Interaction; with primary appointment in Sinclair School of Nursing; Milsap Professor of Gerontological Nursing and Public Policy

**Kevin G. Keegan**, DVM, MS, Diplomate-ACVS, professor; director of E. Paige Laurie Endowed Program in Equine Lameness

**Marie E. Kerl**, DVM, Diplomate-ACVIM (small-animal internal medicine), and Diplomate-ACVECC, associate teaching professor

**Jackie Kleypas**, DVM, clinical instructor

**Joanne Kramer**, DVM, Diplomate-ACVS, assistant teaching professor

**Alison LaCarrubba**, DVM, clinical instructor

**Jimmy C. Lattimer**, DVM, MS, Diplomate-ACVR, associate professor

**Stacey B. Leach**, DVM, clinical instructor

**Bo Lei**, MD, MSc, PhD, assistant professor

**Michael R. Lewis**, MS, PhD, associate professor

**F.A. (Tony) Mann**, DVM, MS, Diplomate-ACVS, ACVECC, professor, and director of Small-Animal Emergency and Critical Care Service

**Tessa S. Marshall**, BVSc, MS, Diplomate-ABVP (dairy practice), assistant teaching professor

**Richard L. Meadows**, DVM, Diplomate-ABVP (canine and feline practice), associate teaching professor

**Nat T. Messer**, DVM, Diplomate-ABVP (equine practice), professor

**John R. Middleton**, DVM, PhD, Diplomate-ACVIM (large-animal internal medicine), associate professor

**Robert B. Miller**, DVM, MS, PhD, Diplomate-ABVP (food-animal practice); director of the Missouri Institute for Cattle

**Rajiv Mohan**, PhD, associate professor; with primary appointment in Department of Ophthalmology, School of Medicine

**Cecil P. Moore**, DVM, MS, Diplomate-ACVO, professor

**Dusty W. Nagy**, DVM, MS, PhD, Diplomate-ACVIM (large-animal internal medicine), assistant professor

**Jesse K. Nagy**, DVM, MS, Diplomate-ACVR, assistant teaching professor

**Kristina Narfström**, DVM, PhD, Diplomate-ECVO, the Ruth M. Kraeuchi Missouri Endowed Professor in Veterinary Ophthalmology

**Dennis P. O'Brien**, DVM, MS, PhD, Diplomate-ACVIM (neurology), professor, Director of the Comparative Neurology Program in the College of Veterinary Medicine, Chancellor's Chair of Excellence in Comparative Neurology

**Jacqueline Pearce**, DVM, Diplomate-ACVO, assistant teaching professor

**Shannon K. Reed**, DVM, Diplomate-ACVS, clinical instructor

**Carol R. Reinero**, DVM, PhD, Diplomate-ACVIM (small-animal internal medicine), assistant professor

**Loren G. Schultz**, DVM, MS, Diplomate-ACVPM, clinical assistant professor

**Kimberly A. Selting**, DVM, MS, Diplomate-ACVIM (oncology), assistant professor

**Carlos Souza**, DVM, MS, Diplomate-ACVIM (oncology), assistant teaching professor

**Aaron M. Stoker**, MS, PhD, research assistant professor, Comparative Orthopaedic Laboratory

**James L. Tomlinson**, DVM, MVSci, Diplomate-ACVS, professor, and emeritus director of the Comparative Orthopaedic Laboratory

**Jeff W. Tyler**, DVM, MPVM, PhD, Diplomate-ACVIM (large-animal internal medicine), professor and director of Strategic Program Initiatives for the College of Veterinary Medicine

**Dawna L. Voelkl**, DVM, Diplomate-ACT, assistant teaching professor

**Dietrich H. Volkmann**, BVSc, MedVet, Diplomate-ACT, teaching professor

**Robert S. Youngquist**, DVM, Diplomate-ACT, professor, and associate dean for Academic Affairs

#### Adjunct Faculty

**Thomas J. Fangman**, DVM, MS, Diplomate-ABVP (swine health management), adjunct associate teaching professor

**Eugene H. Hinds**, DVM, adjunct professor

**Debra F. Horwitz**, DVM, Diplomate-ACVB, adjunct assistant professor

**Brent D. Jones**, DVM, adjunct associate professor

**Randall E. Junge**, DVM, MS, Diplomate-ACZM, adjunct assistant professor

**George Keller**, DVM, MS, Diplomate-ACVR, adjunct instructor

**Charles A. Martin**, DVM, MS, adjunct assistant professor



**Robert E. Miller**, DVM, adjunct assistant professor, Diplomate-ACZM

**David A. Senter**, DVM, Diplomate-DACVD, adjunct clinical assistant professor

**Wm. Kirk Suedmeyer**, DVM, Diplomate-ACZM, adjunct assistant professor

**Ronald Tessman**, DVM, PhD, Diplomate-ACVIM (large-animal internal medicine), adjunct assistant professor

**Debrah L. Turner**, DVM, adjunct instructor

#### Consultants

**Michael Karagiannis**, DVM, Diplomate-ACVECC, consultant

**Rebecca Greer**, DVM, MS, Diplomate-ACVECC, consultant

## VETERINARY PATHOBIOLOGY

### Department Administration

**George Stewart**, PhD, department chair, professor, McKee Endowed Professor

### Faculty

**Cansu Agca**, PhD, research scientist

**Yuksel Agca**, DVM, PhD, assistant professor

**Deborah Anderson**, PhD, assistant professor

**Paul Anderson**, PhD, Regional Biocontainment Laboratory facility manager

**Beth Bauer**, DVM, PhD, clinical assistant professor

**Brenda T. Beerntsen**, PhD, associate professor

**Linda Berent**, DVM, PhD, clinical assistant professor

**Alex J. Bermudez**, DVM, MS, associate professor, director of VMDL

**Cynthia Besch-Williford**, DVM, PhD, associate professor

**Charles Brown**, PhD, associate professor

**Elizabeth Bryda**, PhD, associate professor

**Michael Calcutt**, PhD, associate professor

**C. Andrew Carson**, VMD, PhD, professor

**Stan W. Casteel**, DVM, PhD, professor

**Zi-Jiang Chen**, PhD, research assistant professor

**John Critser**, PhD, Gilbreath-McLorn Professor of Comparative Medicine

**Timothy J. Evans**, DVM, PhD, assistant professor

**William H. Fales**, PhD, professor

**Craig Franklin**, DVM; PhD; associate professor; director of Graduate Studies Laboratory-Animal Medicine (comparative medicine)

**Daniel Hassett**, PhD, assistant professor

**Gary S. Johnson**, DVM; PhD; associate professor

**Gayle C. Johnson**, DVM, PhD, professor

**Dae Young Kim**, DVM, PhD, clinical assistant professor

**Keiichi Kuroki**, DVM, PhD, assistant professor

**Robert Livingston**, DVM, PhD, clinical associate professor

**Christian Lorson**, PhD, associate professor

**Monique Lorson**, PhD, research assistant professor

**Zachary March**, MS, instructor, director CVM Information Technology

**Hongsheng Men**, PhD, research assistant professor

**William J. Mitchell Jr.**, DVM, PhD, associate professor

**Matthew Myles**, PhD, research assistant professor

**Alpana Ray**, PhD, research associate professor

**Bimal K. Ray**, PhD, professor

**Thomas Reilly**, PhD, clinical assistant professor

**Lela K. Riley**, PhD, professor, director of RADIL

**Audrey Rottinghaus**, MS, clinical instructor

**Heide Schatten**, PhD, professor

**Susan Schommer**, DVM, PhD, assistant professor

**Daniel P. Shaw**, DVM, PhD, professor

**Earl K. Steffen**, PhD, research assistant professor

**Bill Stich**, MS, PhD, associate professor

**Catherine Vogelweid**, DVM, PhD, clinical associate professor, director of Graduate Studies VPB and Area Pathobiology

**Eric Walters**, PhD, research assistant professor

**Marlyn Whitney**, DVM, PhD, clinical associate professor

**Charles Wiedemeyer**, DVM, PhD, assistant professor

**Fred Williams III**, DVM, clinical instructor

**Guoquan Zhang**, DVM, PhD, assistant professor

**Guolu Zheng**, PhD, research assistant professor

### Emeriti Faculty

**Hans K. Adldinger**, DVM, PhD, professor emeritus

**John N. Berg**, DVM, PhD, professor emeritus

**Harry H. Berrier**, DVM, MS, associate professor emeritus

**Gerald M. Buening**, DVM, PhD, professor emeritus

**Harvey S. Gosser**, DVM, PhD, professor emeritus

**Theodore Green**, PhD, associate professor emeritus

**Reuel R. Hook**, PhD, professor emeritus

**Robert Kahrs**, DVM, PhD, professor and dean emeritus

**Ronald McLaughlin**, DVM, MS, professor emeritus

**Lawrence G. Morehouse**, DVM, PhD, professor emeritus

**LeRoy D. Olson**, DVM, PhD, professor emeritus

**Donald Rodabaugh**, DVM, MS, professor emeritus

**Bruce D. Rosenquist**, DVM, PhD, professor emeritus

**Donald A. Schmidt**, DVM, PhD, professor emeritus

**Robert F. Solorzano**, MS, PhD, professor emeritus

**James G. Thorne**, DVM, PhD, MPVM, professor emeritus



Being admitted to the profession of veterinary medicine, I solemnly swear to use my scientific knowledge and skills for the benefit of society through the protection of animal health, the relief of animal suffering, the conservation of animal resources, the promotion of public health, and the advancement of medical knowledge.

I will practice my profession conscientiously, with dignity, and in keeping with the principles of veterinary medical ethics.

I accept as a lifelong obligation the continual improvement of my professional knowledge and competence.

*Adopted by the House of Delegates, July 1969*

*Amended by the Executive Board, November 1999*

