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Course Symbols

---The comma, used in prerequisite listings, means "and."

§...Credit will not be granted if credit has been received for the course listed after this symbol.

#.....Approval of the instructor is required for registration.

A......Approval of the college offering the course is required for registration.

DGS..Director of Graduate Studies.

NGA..No grade associated. Course may be taken A-F or S-N.

A prerequisite course listed by number only (e.g., prereq 5246) is in the same department as the course being described.

A class rank prerequisite (e.g., 3rd yr) states the minimum class standing a student must hold to register for a course without special permission from the Academic Standing Committee.

---Veterinary Medicine (CVM)

CVM 1000. Introduction to Veterinary Medicine. (1 cr; S-N only)
History of veterinary profession, careers within the profession, employment trends. Information about admission to DVM. Veterinary technology programs.

CVM 6000. Orientation to Veterinary Medicine. (3 cr; S-N only.
Prereq-CVM 1st yr or CVM transfer) Introduction to academic and professional skills necessary for success in the veterinary curriculum and profession. Three-day pre-class orientation. Peer and faculty mentorship network.

CVM 6011. Professional Skills I. (2 cr; A-F only. Prereq-DVM 1st yr) Integrates subjects in veterinary professional curriculum. Introduction to and practice of professional skills. Communication, ethics, teamwork, leadership.

CVM 6012. Professional Skills II. (2 cr; A-F only. Prereq-DVM 1st yr or #) Integrates subjects in veterinary professional curriculum. Introduction to and practice of professional skills. Communication, ethics, teamwork, leadership.

CVM 6013. Professional Skills III. (2 cr; A-F only. Prereq-DVM 2nd yr or #) Integrates subjects in veterinary professional curriculum. Introduction to and practice of professional skills. Communication, ethics, teamwork, leadership.

CVM 6014. Professional Skills IV. (2 cr; A-F only. Prereq-DVM 2nd yr or #) Integrates subjects in veterinary professional curriculum. Introduction to and practice of professional skills. Communication, ethics, teamwork, leadership.

CVM 6021. Overview of Animal Populations I. (1 cr; S-N only.
Prereq-DVM 1st yr or #) Introduction to U.S. production animal agriculture at individual producer level and to roles veterinarians play.

CVM 6022. Overview of Animal Populations II. (1 cr. Prereq-DVM 1st yr or #) Introduction to U.S. production animal agriculture at individual producer level and to roles veterinarians play.

CVM 6028. Large Animal Hospital Practicum. (4 cr [max 12 cr]; S-N only. Prereq-3rd or 4th yr DVM or #) Experience in team leadership in procedures/policies involved in after hours care of hospitalized/emergency cases in large-animal hospital.

CVM 6029. Small Animal Intensive Care Practicum. (1 cr [max 2 cr]; S-N only. Prereq-DVM 3rd or 4th yr or #) Management of dogs/cats requiring urgent medical care, intensive medical management. Provide primary case care and service support through patient evaluation, problem solving, health care delivery, equipment operation. Practicum is served in Small Animal Intensive Care Unit.


CVM 6031. International Animal Diseases. (1 cr; S-N only.
Prereq-DVM, [CVM grad student or #]) Epidemiology, clinical signs, differential diagnoses, pathology, economic effect of diseases not currently or intermittently present in the United States. International role of veterinarians in controlling disease, increasing food production, facilitating trade.

CVM 6042. Practice Management/Law and Ethics. (2 cr; S-N only.
Prereq-DVM or #) Economic, marketing, personnel management, accounting issues in veterinary practice management. Legal/ethical parameters for veterinary practice. Attendance required.

CVM 6045. Private Practice Preparedness. (2 cr [max 6 cr]; A-F only.
Prereq-3rd or 4th yr DVM or #) Pet wellness, human resources, supervision, finance, customer service, conflict management, marketing.

CVM 6046. Practice Readiness I. (2 cr [max 8 cr]; S-N only.
Prereq-3rd or 4th yr DVM or #) Well pet care, practice options, teamwork, economic impact. Preventive care for all life stages, including pet selection, dental prophylaxis/immunizations. Wellness concept, framework for euthanasia appointment, customer service, veterinary/team roles. Lengthening well lives of pets. Legislative process: how veterinary/professional organizations can be involved. Selecting a practice. Resume, interview skills. Professional dress code.


CVM 6051. Human-Companion Animal Bond: Attachments and Losses, Communications, Ethics, and Service. (1 cr; S-N only.
Prereq-1st or 2nd yr DVM or #) Human-Companion animal bond activities/services. Emphasizes helping clients, particularly at time of actual or anticipated death of companion animals. Communication/counseling skills.

“The University of Minnesota’s program is one-of-a-kind. I’ll be earning two degrees in four years (D.V.M./M.P.H.), which will help my career immensely. I am truly glad I chose the U of M for my veterinary education.”

Heather, Class of 2006
Chicago Heights, IL

CVM 6052. Grief, Human Animal Bond, Communication Elective. (1 cr; S-N only. Prereq-DVM or #) Veterinarians’ role in recognizing/managing aspects of human-animal bond. Grief management, client present euthanasia, closure, staff relations, work-life balance, communicating in special situations. Communicating with co-workers/staff in practice setting.
“My experience during the program was wonderful. I think dedication, motivation, enthusiasm, and a participative adviser are all important keys for a successful project and these were all present in my program.”

Sandra, DVM, VMed Graduate Student
Brazil

CVM 6100. Veterinary Gross Anatomy. (5 cr; A-F only. Prereq–DVM 1st yr or #) Gross anatomy of domesticated mammals, including development anatomy. Carnivore portion features dog as a model animal and comparatively the cat. Ungulate portion focuses on basic equine anatomy and includes clinically important ruminant/swine anatomy.

CVM 6101. Normal Radiographic Anatomy. (1 cr; A-F only. Prereq–1st yr DVM or #) Introduction to radiological principles. Emphasizes mastery of normal radiographic anatomy. How cells associate to perform specialized functions. Lectures, guided laboratory exercises.

CVM 6102. Veterinary Imaging Part 1. (2 cr; A-F only. Prereq–[6100, 6101, 2nd yr DVM] or #) Introduction to physics of radiology: Radiographic principles/techniques. Cardiopulmonary/
Urogenital systems. Emphasizes interpretation of radiographs (film or digital) germane to common animal diseases. Clinical applications. Lectures, lab exercises using body systems approach to imaging (primarily radiographic) of large/small animals.

CVM 6103. Veterinary Imaging Part 2. (2 cr; A-F only. Prereq–[6100, 6101, 6102, 3rd yr DVM] or #) Musculoskeletal, general abdomen, and alimentary tract systems. Emphasizes interpretation of radiographs (film or digital) germane to common animal diseases. Clinical applications. Lectures, lab exercises using body systems approach to imaging (primarily radiographic) of large/small animals.

CVM 6104. Small Animal Special Procedures in Radiology: Advanced Block. (1 cr; S-N only. Prereq–[3rd or 4th] yr DVM or #) Common contrast studies used in small animal practice.

CVM 6110. Veterinary Biochemistry. (3 cr; A-F only. Prereq–DVM 1st yr or grad student in biological or biomedical sciences) Structure/function of cells/tissues. Mechanisms by which animals digest, absorb, and metabolize carbohydrate, protein, lipid, and nucleic acids. Use of absorbed molecules to derive energy and maintain physiological processes. How end products are created/delimited. Role of hormones and metabolically active tissues. Metabolic abnormalities. Recombinant DNA applications. Molecular aspects of growth/regulation of gene expression.

CVM 6111. Cells and Tissues. (3 cr; A-F only. Prereq–DVM 1st yr or #) Introduction to light/electron microscopic structure of cells, tissues, and certain organs. How cells associate to perform specialized functions. How organized groups of cells (i.e., tissues) are arranged to form organ systems of the body.

CVM 6112. Organology. (3 cr; A-F only. Prereq–[6111, DVM 1st yr] or #) Microscopic/ultrastructural morphology of organ systems (cardiovascular, gastrointestinal, respiratory, urinary, endocrine) in mammalian domestic species.

CVM 6120. Veterinary Neurobiology. (2 cr; A-F only. Prereq–DVM 1st yr or #) Anatomy and physiology of central nervous system (brain, spinal cord) and special senses (eye, ear, olfaction, taste).

CVM 6130. Veterinary Physiology. (4 cr; A-F only. Prereq–DVM 1st yr or #) Fundamental principles of systemic physiology. Relationships between forces and flows in biological systems. Overview of control system theory as it relates to neurohormonal regulation. Survey of major organ systems.

CVM 6132. Reproductive Biology. (3 cr; A-F only. Prereq–DVM 2nd yr or #) Physiology of reproduction, including lactation.

CVM 6134. Principles of Veterinary Nutrition. (1 cr; A-F only. Prereq–DVM 1st yr or #) Introduction to principles of nutrition. Basic applications and food sources for major domestic species.

CVM 6136. Small Animal Nutrition: Advanced Block. (2.5 cr. Prereq–3rd yr DVM or #) Nutritional considerations in health, treatment of disease in small animals.

CVM 6137. Small Animal Clinical Nutrition. (2 cr [max 6 cr]; S-N only. Prereq–3rd or 4th yr DVM or #) Students manage nutritional needs of patients, perform nutritional assessments of all ICU patients, perform nutritional consults, and see outpatient appointments.

CVM 6141. General Veterinary Pharmacology. (2 cr; A-F only. Prereq–DVM 1st yr or #) Principles of drug action, disposition, and clinical applications in animal patients. Therapeutic uses of drugs affecting autonomic nervous system, cardiovascular system, respiratory/digestive tracts, and kidneys. Therapeutic uses of anti-allergic/anti-inflammatory drugs.

CVM 6142. Veterinary Neuropharmacology. (1 cr; A-F only. Prereq–DVM or #) Pharmacology of drugs that have a major effect on the central nervous system: absorption, distribution, metabolism, and excretion; major mechanisms of action; clinical usefulness; side effects; drug interactions.

CVM 6195. Veterinary Toxicology. (3 cr; A-F only. Prereq–3rd yr DVM or #) Toxicology of minerals, pesticides, venoms, and various toxins. Identification of poisonous plants. Recognition, diagnosis, and treatment of animal poisons.

CVM 6201. Host Defenses. (3 cr; A-F only. Prereq–DVM 1st yr or #) Introduction to classification, morphology, reproductive cycle, and epidemiology of infectious microbial agents of veterinary importance; properties of disinfectants; therapeutic uses of chemicals and drugs for sterilization, control, and treatment.

CVM 6202. Infectious Agents: Parasitology. (4 cr; A-F only. Prereq–DVM 2nd yr or #) Systematic and biologic study of protozoan, arthropod, and helminth parasites of animals. Emphasizes relationships to diseases and principles of parasite control.

CVM 6203. Infectious Agents: Bacteriology. (3.5 cr; A-F only. Prereq–DVM 2nd yr or #) Veterinary medical microbiology/mycology. Mechanisms of pathogenesis, clinical presentations, diagnostic approaches, host responses to infectious challenge. Prevention, treatments. Laboratory exercises are used to test students’ ability to isolate/define potential bacterial pathogens.

CVM 6204. Infectious Agents: Virology. (1.5 cr; A-F only. Prereq–DVM 2nd yr or #) How virus and host factors interact. How these interactions lead to disease or recovery. Applications to prevention/management of disease.

CVM 6211. Applied Veterinary Genetics. (1 cr; A-F only. Prereq–1st yr DVM or #) Overview of general, molecular, and cytogenetics relevant to animal health, disease, breeding, and production. Emphasizes how genetic information is acquired/used in veterinary medicine and animal agriculture.

CVM 6220. Clinical Epidemiology. (2 cr; A-F only. Prereq–DVM 2nd yr or #) Statistical and epidemiological concepts applied to veterinary medicine.

CVM 6300. Veterinary Pathology. (7 cr; A-F only. Prereq–DVM 2nd yr or #) Reactions of cells and tissues to injury and disease, including reversible and irreversible cell injury, disturbances of circulation, blood coagulation, and alterations of cell growth and multiplication. Pathology of body systems, emphasizing reactions of specific organs.

CVM 6301. Clinical Skills I. (1 cr; A-F only. Prereq–DVM 1st yr or #) Domestic animal behavior. Basic animal handling/management skills. Clerk duty in both large- and small-animal hospitals is required. First of five-part series.

CVM 6302. Clinical Skills II. (1 cr; A-F only. Prereq–DVM 1st yr or #) Domestic animal behavior. Basic animal handling/management skills. Introduction to hospitals. Both small- and large-animal clerk duty is required.

CVM 6303. Clinical Skills III. (1 cr; S-N only. Prereq–DVM 2nd yr or #) Domestic animal behavior. Basic animal handling and management skills.

CVM 6304. Clinical Skills IV. (1 cr; S-N only. Prereq–DVM 2nd yr or #) Domestic animal behavior. Basic animal handling and management skills.

CVM 6305. Clinical Skills V. (1 cr; S-N only. Prereq–DVM 3rd yr or #) Domestic animal behavior. Basic animal handling/management skills. Small-animal clerk duty is required. Using an IV/syringe pump, setting up ICU order sheets, using glucometer/centrifuge to perform “big 4” daily ICUC tests.

CVM 6306. Small Animal Clinical Skills: Advanced Block. (1 cr; S-N only. Prereq–[3rd or 4th] yr DVM or #) Advanced clinical skills used by small animal practitioners in private practice.

CVM 6307. Clinical Skills Elective. (1 cr; S-N only. Prereq–[6301, 6302] or #) Hands-on clinical skills. History taking, physical exam, basic/intermediate technical procedures on small animals. Skills are practiced at several approved locations.

CVM 6312. Veterinary Dental Rotation. (2 cr [max 12 cr]; S-N only. Prereq–DVM 3rd or 4th yr student or #) Routine/complex dental problems. Students diagnose and formulate treatment plans. Hands-on training. Basic periodontal procedures, single/multi-rooted extractions, dental radiographic techniques, instrument/equipment care, dental charting.

CVM 6321. Surgery, Anesthesiology, Critical Care. (4 cr; A-F only. Prereq–DVM 2nd yr or #) Introduction to principles/techniques for conducting surgical procedures, managing uncomplicated anesthesia, and providing critical care for common situations in large/small animal species.

CVM 6400. Skin and Adnexa. (3 cr; A-F only. Prereq–DVM 2nd yr or #) Normal form and function, histopathologic reaction patterns, wound healing, and clinical disease states of the skin and adnexa (horns, mammary glands) of common domestic species.

CVM 6404. Small Animal Dermatology: Advanced Block. (1 cr; A-F only. Prereq–[3rd or 4th] yr DVM or #) Diagnostic/therapeutic considerations in small animal dermatology beyond core in preparation for clinical rotations.

CVM 6410. Digestive System. (5 cr; A-F only. Prereq–DVM 2nd yr or #) Pathophysiology, diagnostic methods, therapeutic procedures, and preventative/management protocols for common disorders of the oral cavity and digestive tract in major domestic species.

CVM 6414. Small Animal Liver/Pancreas Disorders: Advanced Block. (1 cr; A-F only. Prereq–[3rd or 4th] yr DVM or #) Complicated diabetes mellitus, feline pancreatitis, and hepatic encephalopathy in dogs/cats. Lectures, small-group exercises.

CVM 6416. Small Animal Gastrointestinal Endoscopy. (5 cr; Prereq–[3rd or 4th] yr DVM or #) Endoscopic diagnosis/treatment of small animal diseases.

CVM 6420. Musculoskeletal System Diseases. (2 cr; A-F only. Prereq–DVM 3rd yr or #) Presentation, pathophysiology, diagnostic, and therapeutic/management approaches for common disorders of locomotion.

CVM 6424. Small Animal Orthopedic: Advanced Block. (1 cr; A-F only. Prereq–[3rd or 4th] yr DVM or #; non-track students may audit lectures, but labs must be taken for grade) Dog/cat pediatric, adult orthopedic problems frequently seen in clinical practice. For comparative information, selected human orthopedic problems are presented by guest lecturers. Attendance/participation required for grade.

CVM 6430. Cardiopulmonary System Disorders. (4 cr; A-F only. Prereq–DVM or #) Pathophysiology, presentation, diagnostic presentation, therapeutic approaches, and management protocols for common disorders of the cardiovascular and pulmonary systems.

CVM 6433. Hematology Elective. (1 cr; S-N only. Prereq–3rd yr DVM or #) Case-based experience in interpreting/using hematology/chemistry results for small animals.

CVM 6436. Small Animal Cardiology: Advanced Block. (1 cr; A-F only. Prereq–[3rd or 4th] yr DVM or #). Diagnostic/therapeutic considerations related to small animal cardiovascular disorders beyond core in preparation for clinical rotations.

CVM 6440. Nervous System Disorders. (2 cr; A-F only. Prereq–DVM 3rd yr or #). Pathophysiology, presentation, diagnostic approach, therapeutic approach, and management protocol for common neurologic/ophthalmologic disorders in domestic species.

CVM 6441. Behavior Core. (2 cr; A-F only. Prereq–3rd yr DVM student or #). Ethology, small/large animal behavior, human-animal bond, behavior medicine, psychopharmacology, behavior genetics, learning theory, behavior modification.

CVM 6442. Animal Behavior Elective: Advanced Block. (1 cr; S-N only. Prereq–[3rd or 4th] yr DVM or #). Introduction to abnormal/undesired animal behavior, diagnostic procedures, and behavioral/pharmacological modifications.

CVM 6443. Preparing and Teaching Puppy Classes. (1.5 cr [max 2 cr]; S-N only. Prereq–DVM 1st or 2nd yr or #). Commitment to teach at least 5 Wed nights following completion of course; prev dog training experience recommended. Prepares students to teach in CVM puppy classes offered to public. Puppy socialization, reward-based training, pitfalls of using punishment, canine learning principles. Management of common puppy problems during ages 7 to 20 weeks. Students observe puppy classes and practice presentations. Lecture, lab.

CVM 6444. Ophthalmology. (2 cr; A-F only. Prereq–[3rd or 4th yr] DVM or #). Common procedures for evaluation, diagnosis, treatment of eye disorders in domestic species.

CVM 6451. Metabolic Disorders. (3 cr; A-F only. Prereq–DVM 2nd yr or #). Endocrine/metabolic diseases of all species. Unique metabolic problems of large animals. Pediatrics/geriatrics of companion animals. Oncological diseases of companion/large animals.

CVM 6452. Metabolic Disorders II. (3 cr; A-F only. Prereq–DVM 3rd yr or #). Pathophysiology, clinical presentation, diagnostic approach, therapeutic options, and management protocols for metabolic and endocrine based disorders of domestic species.

CVM 6460. Urinary System Disorders. (2 cr; A-F only. Prereq–2nd yr DVM or #). Pathophysiology, clinical presentation, diagnostic approach, therapeutic options, and management protocol for common disorders of the urinary system in domestic species.

CVM 6461. A Clinician’s Analysis of Urinalysis. (1 cr; S-N only. Prereq–3rd yr DVM or #). Informal, case-based, interactive, in-depth approach to evaluation of urinalyses of clinical cases recently admitted to Veterinary Teaching Hospitals. Improving observational/interpretation skills. Recognizing in vitro factors that may alter results of urinalyses.

CVM 6464. Small Animal Urinary System Disorders: Case Based Discussion. (1 cr; S-N only. Prereq–[3rd or 4th] yr DVM or #). Expands on disorders of small animal urinary system. Introduction to core/additional disorders.

CVM 6470. Multisystemic Diseases. (3 cr; A-F only. Prereq–DVM 3rd yr or #). Pathophysiology, clinical presentation, diagnostic approach, therapeutic options, and management protocol of disorders of the immunologic and hematologic systems and of multisystemic infectious diseases.

CVM 6480. Obstetrics. (1 cr; A-F only. Prereq–2nd yr DVM or #). Diagnosis/management of reproductive diseases.

CVM 6481. Obstetrics Lab. (1 cr; A-F only). Techniques for pregnancy diagnosis, obstetric manipulation in large animal species.

CVM 6482. Reproductive Diseases of Small Animals. (1-2 cr [max 2 cr]; A-F only. Prereq–3rd yr DVM or #). Physiology/pathology of reproduction, artificial insemination, abortive diseases, postpartum injuries, and breeding management in small animals, horses, and small ruminants. Students focus on 1-3 species. At least 10 hours per credit.

CVM 6483. Reproductive Diagnostic Techniques. (1 cr; A-F only. Prereq–3rd yr DVM or #). Obstetric manipulation in domestic species.

CVM 6494. Small Animal Anesthesia Advanced Block Core. (1 cr. Prereq–3rd yr DVM or #). Sedative techniques, combination injectable anesthesia, pediatric/geriatric small animal anesthesia, pain control, regional techniques, anesthesia in trauma cases, complications in anesthesia, ventilator use.

CVM 6495. Non-Traditional Pet Care. (1 cr; A-F only. Prereq–3rd yr DVM or #). General/reproductive biology, behavior, husbandry, nutrition, handling, restraint, anesthesia. Common diseases, their treatments. Research animal issues. Special considerations of species commonly encountered in small/mixed animal practices (mice, rats, hamsters, gerbils, guinea pigs, chinchillas, rabbits, ferrets, basic aquatic species).


CVM 6498. Food Animal and Exotic Large Animal Anesthesia. (5 cr; A-F only. Prereq–[3rd or 4th yr] DVM or #). Restraint, sedation, immobilization of ruminants/pigs. Regional techniques, special considerations for anesthesia. Injectable food animal anesthesia, anesthesia of llamas, ostriches, elk, other exotic large animal species.

20 Course Descriptions
CVM 6500. Veterinary Public Health. (1 cr [max 6 cr]; S-N only. Prereq—DVM 3rd or 4th yr or #) Interacting with public health, regulatory, and community activities. Roles in food industry. Public/occupational health, environmental problems. Zoonotic disease problems, food safety, occupational safety/health, euthanasia, carcass disposal, reporting, epidemiologic investigations, animal transportation/control, emergency preparedness, USDA accreditation. Students select clinical case, prepare oral response to hypothetical questions, conduct occupational safety/hazard review, present findings.

CVM 6501. Advanced Veterinary Public Health: Food Systems. (1 cr [max 4 cr]; A-F only. Prereq—DVM or MPH or grad student or #) Systems used to raise livestock/poultry, deliver through markets to slaughter or processing facilities, and deliver to consumers. Methods to assess/mitigate risks. Emphasizes public health/food safety issues. Field trips, problem solving, assignments.

CVM 6502. Necropsy. (2 cr [max 40 cr]; S-N only. Prereq—DVM 3rd or 4th yr or #) Students perform necropsies, collect tissues for laboratory analysis, interpret clinicopathologic findings, prepare reports on animals submitted to Veterinary Diagnostic Laboratory, apply basic/clinical science to diseases for individual animals and populations of animals. Students may participate in history taking. Case findings discussed daily. Student groups present case reports in PowerPoint format at one-weekly departmental seminar.

CVM 6503. Topics. (1-8 cr [max 40 cr]. Prereq—#) New or one-time-only course.

CVM 6504. Directed Studies in Large Animal Medicine. (2 cr [max 40 cr]; S-N only. Prereq—DVM 4th yr or #) Students, under guidance of a faculty member, conduct special project addressing an issue in large animal medicine. Project proposals include hypothesis, objectives, plan of study, and product for evaluation by adviser and approval by CVM’s curriculum committee.

CVM 6505. Directed Studies in Small Animal Medicine. (2 cr [max 40 cr]; S-N only. Prereq—DVM 4th yr or #) Students, under guidance of a faculty member, conduct special project addressing an issue in small animal medicine. Project proposals include hypothesis, objectives, plan of study, and product for evaluation by adviser and approval by CVM’s curriculum committee.

CVM 6506. Directed Studies in Pathobiology. (2 cr [max 40 cr]; S-N only. Prereq—DVM 4th yr or #) Students, under guidance of a faculty member, conduct special project addressing an issue in veterinary pathobiology. Project proposals include hypothesis, objectives, plan of study, and product for evaluation by adviser and approval by CVM’s curriculum committee.

CVM 6507. Directed Studies in Diagnostic Medicine. (2 cr [max 40 cr]; S-N only. Prereq—DVM 4th yr or #) Students, under guidance of a faculty member, conduct special project addressing an issue in diagnostic medicine. Project proposals include hypothesis, objectives, plan of study, and product for evaluation by faculty adviser and approval by CVM’s curriculum committee.

CVM 6508. Master’s Project: Public Health Practice. (2 cr [max 9 cr]; S-N only. Prereq—DVM student or #) Cytology; hematology, clinical chemistry, urinalysis, clinical microbiology, endocrinology, virology, parasitology, immunology. Sample submission, laboratory test methodology. Covers all veterinary species. Emphasizes comparative laboratory medicine. Case-based learning, small group discussions, didactic teaching, microscopy.

CVM 6509. Externship. (2 cr [max 24 cr]; S-N only. Prereq—DVM 3rd or 4th yr or #) Students spend two weeks/rotation in a practice or other professional setting.

CVM 6510. Externship in Public Health Practice. (1-3 cr [max 9 cr]; S-N only. Prereq—DVM student or #) Directed field experience or clinical rotation/practicum in selected community or public health agencies/institutions. Integration of knowledge/skills in population science for public health.

CVM 6511. External Rotation in Public Veterinary Practice. (2 cr [max 6 cr]; S-N only. Prereq—DVM 1st or 2nd or 3rd or 4th yr or MPH student or #) Directed field experience or clinical rotation/practicum in selected public veterinary agencies/institutions. Integration of knowledge/skills in population science for public veterinary practice.

CVM 6512. Public Policy. (1-2 cr [max 6 cr]; S-N only. Prereq—DVM 1st or 2nd or 3rd or 4th yr or MPH student or grad student or [jr or sr] animal sci student or #) Directed experiential learning in public policy making at state, national, or international level. Integration of knowledge/skills in animal health, public health, and food safety policy development. Travel may be required. Some financial support may be available. Occurs 1st or 2nd week of January or over summer. Faculty are oversee students.

CVM 6513. Labs: Clinical Hematology, Cytology, and Microbiology. (2 cr [max 4 cr]; S-N only. Prereq—DVM 3rd or 4th yr or #) Cytology, hematology, clinical chemistry, urinalysis, clinical microbiology, endocrinology, virology, parasitology, immunology. Sample submission, laboratory test methodology. Covers all veterinary species. Emphasizes comparative laboratory medicine. Case-based learning, small group discussions, didactic teaching, microscopy.

CVM 6514. Advanced Veterinary Toxicology. (2 cr [max 40 cr]; S-N only. Prereq—DVM 3rd or 4th yr or #) In-depth examination of toxins. Clinical, diagnostic, mechanistic, and therapeutic aspects of biotoxins, organic, and inorganic toxins that affect livestock, poultry, wildlife, and companion animals or that threaten public health.

CVM 6515. Introduction to Regulatory Medicine. (2-4 cr; A-F only. §Txcl 6545. Prereq—DVM or #) Explanation of products requiring pre-market approval and those that may be marketed without approval. Post-market surveillance. Adverse reactions, removal of product from market.

“The faculty is extremely supportive of their students. The University of Minnesota allows veterinary students multiple opportunities to conduct or assist in research projects.”

Amanda, Class of 2005
Grand Meadow, MN

Course Descriptions
A key factor in my decision to apply solely to the University of Minnesota was the potential to complete a combined D.V.M./Ph.D. program. In hindsight, I am astounded that I took such an incredible risk, one that I would eagerly take again.

Lisa, Class of 2005
Winnipeg, Manitoba Canada

CVM 6601. Small Animal Internal Medicine. (2 cr; S-N only. Prereq–DVM 3rd or 4th yr or #) Primary case responsibility for a wide range of clinical diseases. History taking, physical examination, problem definition, diagnostic/therapeutic plans on assigned cases. Cases typically relate to gastrointestinal, urology/nephrology, oncology, neurology, immunology, and cardiology. Daily rounds. Students present case discussion topics and interpret lab data, radiographic evaluations, and biopsy information. Emphasizes effective communications with clients and with referring veterinarians.

CVM 6602. Small Animal Internal Medicine. (2 cr [max 52 cr]; S-N only. Prereq–6601, DVM 3rd or 4th yr or #) Problem-solving skills, clinical skills, communication skills, record keeping, ethical issues in referral cases. Methods of knowledge acquisition, including computerized searches and diagnostic programs. Small group rounds discussions. Students assist clinicians in management of referral/emergency cases. Cases typically related to gastrointestinal, nephrology, urology, oncology, nutrition, neurology, and cardiology.

CVM 6603. Small Animal Internal Medicine. (2 cr [max 8 cr]; S-N only. Prereq–6601, 6602, 3rd or 4th yr DVM, small animal track) or #) Students work with internal medicine clinical specialists in VTH, assisting with receiving, patient care, work-ups, and client communication. Students provide patient care on evenings/weekends for hospitalized patients, similar to cases assigned in SAM. High volume rotation designed to provide high quality service to referring community.

CVM 6606. Emergency Rotation. (2 cr [max 40 cr]; S-N only. Prereq–DVM or #) Evening/weekend ER service. Medical/surgical emergency/traumatic cases. Students assist staff clinicians/ interns in diagnosis and case management. Triage, history taking, physical examination, clinical problem solving, patient management. Students give presentation on a case they were involved in within rotation.

CVM 6608. Critical Care. (2 cr [max 20 cr]; S-N only. Prereq–3rd or 4th yr DVM or #) Primary case care for ICU patients. Some emergency receiving. Daily rounds, including case discussion and critical care topics. Limited case care responsibility, including SOAPs and treatment orders on existing patients. Students present a short rounds discussion on critical care topic of their choice.

CVM 6630. Behavior. (2 cr [max 16 cr]; S-N only. Prereq–DVM [3rd or 4th yr] or grad student or #) Students participate in behavior consultations: history taking, diagnosis, outline of treatment protocols, sample collection, demonstration of training techniques, writing of treatment plans, case follow-up. Students present one case, prepare one topic of their choice for presentation during rounds. Daily rounds include discussion of cases, review of behavior-related articles, discussion of problem complexes.

CVM 6632. Dermatology. (2 cr [max 40 cr]; S-N only. Prereq–DVM 3rd or 4th yr or #) Routine dermatologic problems in companion animal practice. History taking, clinical diagnosis, patient management, client education. Students participate in all phases of diagnosis/management of cases. Small-group discussions.

CVM 6634. Comparative Ophthalmology. (2 cr [max 40 cr]; S-N only. Prereq–DVM 3rd or 4th yr or #) Entry-level ophthalmology: Diagnosis, treatment. Outside readings, review papers, final essay exam.

CVM 6636. Cardiology. (2 cr [max 40 cr]; S-N only. Prereq–DVM 4th yr or CVM grad or #) Clinical problem solving. Cases of cardiopulmonary disease, including canine/feline congenital heart disease, acquired valvular/myocardial disease, dirofilariasis, arrhythmias, pulmonary disorders. Hands-on experience in conducting physical exams, reading electrocardiograms/echocardiograms, and reading thoracic radiographs. Group discussions, rounds.


CVM 6644. Community Practice. (2 cr [max 40 cr]; S-N only. Prereq–DVM 3rd or 4th yr or #) Companion animal preventative health care, behavior, and husbandry. Emphasizes client communication/euthanasia issues. Work with community practice veterinarian on non-referred cases within Veterinary Medical Center. Daily rounds focusing on immunizations, behavior, infectious diseases, human-animal bond, and communication.

CVM 6645. Business Aspects of Veterinary Practice. (2 cr; S-N only. Prereq–3rd or 4th yr DVM or #) Human resources issues, supervision, use of Myers-Briggs, finance, customer service, conflict management, marketing. Real-world studies. Case studies, primarily from Veterinary Medical Center. Lectures, small group work.

CVM 6648. Advanced Clinical Oncology Rotation. (2 cr; S-N only. Prereq–DVM 3rd or 4th yr or grad student or #) Case management, self-directed research. Students receive oncology referrals, work with emergency cases and special procedures, assist in treatment decisions and therapeutic options for new cases, and manage ongoing chemotherapy/radiation therapy patients. Emphasizes principles of oncology and patient care.
Companion Animals.

Post-operative care of animals supplied by Humane Society for anesthesia induction/maintenance, surgical procedure, and two-student teams are responsible for pre-surgical evaluation, ovariohysterectomies, neuters, and declaws for small animals. Only. Prereq–DVM 3rd or 4th yr or #)

Communication, problem solving, and surgical techniques. Of surgical patients. History taking, physical examination, formulation of anesthetic plans, management of patients under protocols/techniques are used in healthy normal clinical cases and adapted for high risk cases. Emphasizes problem solving in anesthesia, team work, and pain management.


Neurology. (2 cr [max 4 cr]; S-N only. Prereq–3rd or 4th yr DVM or #) Medical/surgical neurology. Providing complete neurological service for clients, patients, and hospital. Integration into all aspects of service, including receiving, work up, surgery, care, communications, and discharges.

Comparative Anesthesiology. (2 cr [max 4 cr]; S-N only. Prereq–DVM 3rd or 4th yr) Practical experience in sedating/anesthetizing routine clinical cases. Previously taught lab protocols/techniques are used in healthy normal clinical cases and adapted for high risk cases. Emphasizes problem solving in formulation of anesthetic plans, management of patients under anesthesia, teamwork, and pain management.

Small Animal Surgery. (2 cr [max 4 cr]; S-N only. Prereq–DVM 3rd or 4th yr or #) Diagnostic/therapeutic management of surgical patients. History taking, physical examination, communication, problem solving, and surgical techniques. Economic issues. Students work as part of a surgical service team with faculty member, resident, and intern.

Elective Small Animal Surgery. (2 cr [max 20 cr]; S-N only. Prereq–DVM 3rd or 4th yr or #) Elective surgeries such as ovariohysterectomies, neuters, and declaws for small animals. Two-student teams are responsible for pre-surgical evaluation, anesthesia induction/maintenance, surgical procedure, and post-operative care of animals supplied by Humane Society for Companion Animals.

Course Descriptions
CVM 6714. Large Animal Surgery. (2 cr [max 40 cr]; S-N only. Prereq–DVM 3rd or 4th yr or #) General surgery, lameness cases. Emphasizes horses. Some cattle, small ruminants/camelids. Diagnostic/therapeutic management in hospital setting. Cases, rounds, exercises. Students work as part of surgical team in cases ranging from routine to those requiring intensive management or advanced diagnostic/therapeutic techniques available in a referral setting.

CVM 6716. Large Animal Anesthesia. (2 cr [max 4 cr]; S-N only. Prereq–DVM 3rd or 4th yr or #) Anesthesiologists and students work as a team to determine proper anesthetic management and monitoring of events during general anesthesia. Local-anesthetic techniques. Problem solving in formulation of anesthetic plans. Management of patients under anesthesia. Emphasizes team work and pain management.


CVM 6718. Large Animal Community Based Practice Mentoring. (1 cr; S-N only. Prereq–2nd yr DVM or #) Large animal veterinary practice. Opportunity to practice new clinical skills with a veterinarian who may serve as a mentor. Students visit the practice four times.

CVM 6720. Problem Solving in Equine Medicine. (1 cr; A-F only. Prereq–DVM 1st or 2nd or 3rd yr or #) Diagnosis of a case. Students are given a clinical sign or laboratory finding each week. Generation of differential diagnosis list, diagnostic plan.

CVM 6721. Neuroradiology. (1-2 cr; S-N only) Instruction, emergency duty, and practical application of principles in evaluating and treating sick equine neonates. Seasonal participation in clinically managing hospitalized foals and periodically reviewing past cases.

CVM 6722. Clinical Anatomy of the Equine Limb. (1-2 cr; S-N only. Prereq–#; limited regist—1st yr DVM students have priority) Principles and techniques for evaluating and treating equine limb anatomy. Clinical cases, common surgical procedures. Special diagnostic techniques such as radiology, nerve blocks, joint injections, and ultrasound.

CVM 6723. Colic Management. (1 cr; S-N only. Prereq–DVM 1st yr) Principles and techniques for evaluating and treating equine colic cases.

CVM 6724. Equine Colic Team. (1 cr; S-N only. Prereq–6723, DVM) Clinically managing equine colic cases and periodically reviewing past cases, success rates, and topics in related fields.

CVM 6725. Advanced Colic Team. (1 cr [max 2 cr]; S-N only. Prereq–6724, DVM or #) Clinically managing cases and periodically reviewing past cases, success rates, and topics in related fields. Students act as team leaders during clinical management and assist in lab exercises for 6723.

CVM 6727. Equine Palpation. (1 cr; A-F only. Prereq–DVM or #) Hands-on clinical experience in evaluation of equine reproductive status and reproductive disorders.

CVM 6728. Reproductive Diseases of the Horse. (1 cr; A-F only. Prereq–3rd yr DVM or #) Reproduction patterns, breeding practices, management, artificial insemination, economics of reproductive performance, and infertility in horses.

CVM 6730. Advanced Equine Practice Elective. (2 cr; S-N only. Prereq–3rd or 4th yr DVM or #) Intensive course on equine medicine. Theriogenology content/skills beyond core.

CVM 6731. Advanced Equine Practice Elective: Surgical Supplement. (2 cr; S-N only. Prereq–3rd or 4th yr DVM or #) Equine medicine, surgery, theriogenology content/skills beyond core, necessary for entering predominately equine practice. Intensive lab.


CVM 6734. Equine Surgery. (2 cr [max 16 cr]; S-N only. Prereq–DVM 3rd or 4th yr or #) Concepts of equine podiatry. Anatomy and physiology of hoof and hoof. Labs to provide experience supporting lessons learned in lectures. Disease seminars and discussion of actual practice. Labs introducing basic techniques and methods of treatment for injuries.


CVM 6748. Equine Theriogenology Advanced. (2 cr [max 8 cr]; S-N only. Prereq–DVM 3rd or 4th yr or #) Students are in charge of breeding management decisions: select mares from teaching herd, use palpation and ultrasound/pharmacologic aids to ensure timely breeding to frozen semen, which was frozen/assessed by students. Students participate in equine theriogenology cases admitted to Veterinary Medical Center.

CVM 6790. Advanced Small Ruminant Practice. (1 cr; A-F only. Prereq–DVM 3rd or 4th yr) Training beyond core in practice of small ruminants. Lecture.

CVM 6791. Advanced Small Ruminant Practice: Laboratory Block. (1 cr [max 4 cr]; S-N only. Prereq–3rd yr or 4th yr DVM or #) Common diagnostic/therapeutic procedures used in treating small ruminants.

CVM 6792. Small Ruminant Health and Production Rotation. (2 cr [max 4 cr]; S-N only. Prereq–DVM 3rd or 4th yr or #) Sheep, goat, llama, farmed-deer production, medicine, and health. Nutrition/health management, new stock, facility maintenance, husbandry, diagnosis, record keeping, zoonosis, necropsy. Reproductive management. Breeding soundness, body condition, vasectomy, ultrasound, castration, tail docking, disbudding, dehorning, vaccination, parasites, restraint/handling, venipuncture, foot trimming, tuberculosis testing. Farm visits.


CVM 6795. Herd Health. (2 cr; S-N only. Prereq–1st yr DVM or #) Herd health programs for dairy/beef cattle, sheep, and dairy goats. Components that constitute a herd health program, their costs/timing. Farm tours demonstrate need/method of applying herd health programs in commercial production settings. Five day, Intersession course.


CVM 6797. Cow-Calf Herd Health and Production. (2 cr [max 4 cr]; S-N only. Prereq–DVM 3rd or 4th yr or #) Cow-calf production, medicine, health management. Seasonal health management, purchasing/introducing new stock, facility requirements/design, husbandry, field diagnostics, reproductive management, vaccine protocols, record keeping, zoonosis. Breeding soundness, dystocia management, body condition scoring, ultrasound, castration, dehorning, venipuncture/parasite control. Field trips to cow-calf operations. Marketing system orientations.

CVM 6800. Bovine Palpation. (1 cr; A-F only. Prereq–DVM or #) Practice in diagnostic evaluation of bovine reproductive tract.

CVM 6801. Advanced Dairy Production Medicine. (1 cr; S-N only. Prereq–3rd yr DVM or #) Designed to give veterinary students more in-depth coverage of topics in dairy production medicine at the management, preventive, and herd level.

CVM 6802. Advanced Large Ruminant Clinical Elective. (3 cr; S-N only. Prereq–DVM 3rd or 4th yr or #) Topics in cattle health/production medicine not included in core. More extensive discussion of conditions introduced in core.

CVM 6803. Advanced Bovine Practice: Laboratory Block. (2 cr; S-N only. Prereq–[6802, DVM 3rd or 4th yr]) or #) Cattle health, production medicine. Topics not included in core, more extensive discussion of conditions introduced in core.


CVM 6805. Food Animal and Exotic Animal Anesthesia. (.5 cr; S-N only. Prereq–5321 or equiv) Techniques/complications of sedation, local anesthesia, and general anesthesia in ruminants, pigs, and some large exotic species. Cases demonstrate anesthetic management of clinical problems common in veterinary practice.

“The best thing about this program is that it is within the College of Veterinary Medicine. Graduate students have the opportunity to design their programs in such a way as to take advantage of the countless opportunities available here.”

Eran, B.Sc.Agr., M.S., VMed Graduate Student Israel

CVM 6811. Dairy Theriogenology Palpation. (2 cr [max 20 cr]; S-N only. Prereq–DVM 3rd or 4th yr or #) Palpating the reproductive tract of the cow per rectum. On-farm reproductive record systems. Evaluating dairy herd reproductive performance through DHI reports. Dairy Comp 305 and DairyCHAMP reports. Farm visits, case discussions, laboratories, student presentations.


CVM 6813. Farm Animal Reproduction and Delivery Management. (2 cr [max 4 cr]; S-N only. Prereq–3rd or 4th yr DVM or #) Two week rotation associated with MVMA’s reproduction booth (Birthing Center) at Minnesota State Fair. Students participate in delivery of calves, lambs, and piglets, and assist in public education about processes related to large animal delivery and veterinary care.

Course Descriptions 25
Additionally, it has strengthened the association of my clinical knowledge in the basic sciences. “The Vet Med Program has provided a great opportunity to deepen my understanding of veterinary sciences and the mechanisms of animal diseases. Additionally, it has strengthened the association of my clinical knowledge in the basic sciences.”

Geisa, DVM, VMed Graduate Student
Brazil

CVM 6814. Mastitis, Milking Machines, and Milk Quality. (2 cr [max 4 cr]; S-N only. Prereq–DVM 3rd or 4th yr or #) Provide tools to evaluate herd mastitis problems, recommendations for solutions, develop mastitis controls programs, evaluate adequacy of milking system function, field surgery of mammary gland and teats, provide therapy for clinical mastitis. Milking equipment, microbiology, mastitis, pharmacology, residue avoidance, records analysis, stray voltage testing, surgery, mastitis control techniques. Decision case studies, labs, and farm visits.

CVM 6815. Dairy Ruminant Nutrition. (2 cr [max 4 cr]; S-N only. Prereq–DVM 3rd or 4th yr or #) Basic principles of nutritional management of ruminant, including digestive physiology, nutrient requirements, common feed stuffs, feeding management, processing and storage systems, laboratory analysis of nutrient composition of feed stuffs, feeding management systems, and nutrition-related health disorders. Develop skills using different techniques (e.g. spreadsheet analysis, Spartan ration balancing software program, DairyComp yr production and health records) to evaluate nutritional management programs. On-farm investigations include assessment of forage quality, feeding management, environment, facilities, cow comfort, dry matter intakes, ration effective fiber, ration moisture content, urine pHs, body condition scoring, and production records review. Discussion of unique aspects of nutritional management of beef cattle and small ruminants. Highly recommended for students interested in dairy or beef practice. Prerequisite for students considering later enrolling in Applied Dairy Nutrition.


CVM 6821. Transition Dairy Cow Management and Clinical Care. (2 cr [max 12 cr]; S-N only. Prereq–3rd or 4th yr DVM student or #) Students assist in all aspects of routine day-to-day management of facility, write detailed report on practical delivery of standard therapeutic or management protocol. Students live in facility during most of rotation. Care of newborn calf, calving cow, later (first two weeks fresh) post-partum cow. Research projects, housekeeping, miscellaneous duties.


CVM 6840. Swine Core. (2 cr. Prereq–DVM or #) Swine medicine, production, and health management.

CVM 6841. Swine Behavior. (5 cr. Prereq–[3rd or 4th yr] DVM or #) Common considerations in swine behavior.

CVM 6842. Swine Disease Diagnostics, Therapeutics, and Prevention. (2 cr [max 4 cr]; S-N only. Prereq–DVM 3rd or 4th yr or #) Major diseases and high-health technologies. Field trips of high-/low-health farms, abattoir for slaughter check. Problem solving, discussion of on-farm disease cases. In-clinic diagnostic techniques.

CVM 6843. Understanding PRRS: A Problem-Based Approach. (3 cr; A-F only. Prereq–3rd or 4th yr DVM or grad student or practitioner) Students experience real-time cases of Porcine Reproduction and Respiratory Syndrome (PRRS) and devise diagnostic plans/intervention strategies, receiving actual diagnostic/production data to monitor progress. Course is all on-line.

CVM 6844. Swine Production Systems. (2 cr [max 4 cr]; S-N only. Prereq–DVM 3rd or 4th yr or #) Alternative systems of swine production. Didactic lectures, labs, special projects. Information management systems, building and equipment designs, health, genetics nutritional systems, marketing alternatives. Influence of production systems on biological and financial endpoints. Upon completion, present project completed on design of various components of integrated swine production system.

CVM 6845. Swine Production Training. (2 cr [max 8 cr]; S-N only. Prereq–3rd or 4th yr DVM or #) Day-to-day management of modern swine farm. Students assist with all techniques, protocols, and practices encountered daily in swine unit, conduct any necessary necropsies or surgical techniques, investigate production/health problems. On final day of rotation, students lead herd visit, summarize findings with producer and course coordinator, and write a herd report.

CVM 6848. Swine Economics, Financial Management, and Marketing. (2 cr [max 8 cr]; S-N only. Prereq–DVM 3rd or 4th yr or #) Basic accounting and financial skills to help analyze simple agricultural problems and communicate findings. Financial statement, budgeting, partial and capital budgets, time value of money, methods for assessing return on investment. Most of examples from pork production, but other scenarios welcome. Second emphasis on gaining understanding on becoming personally financially independent.

CVM 6850. Swine Records. (2 cr [max 8 cr]; S-N only. Prereq–DVM 3rd or 4th yr or #) How to interpret performance measures, monitor productivity, capture data, and generate reports in managing production in swine industry. Using records to troubleshoot problems and manage production.

CVM 6852. Swine Virology. (2 cr [max 8 cr]; S-N only. Prereq–DVM 3rd or 4th yr or #) Lab techniques for diagnostic virology, serology, and immunology. Research techniques for use of fluorescent antibodies, determination of classes of immunoglobulins, and immunostimulation of lymphocytes.

CVM 6880. Avian Core. (2-4 cr; A-F only. Prereq–DVM or #) Avian nutrition, physiology, anatomy, and disease.

CVM 6882. Companion Birds. (2 cr; S-N only. Prereq–DVM 3rd or 4th yr or #) Avian medicine/surgery relating to companion birds. Hands-on experience in local avaries and breeding facilities. Acquisition of basic avian clinical skills in the Raptor Center.

CVM 6883. Raptor Center. (2 cr; S-N only. Prereq–DVM 6497, DVM 3rd or 4th yr or #) Students participate in all aspects of raptor medicine, surgery, and rehabilitation and gain avian experience. Conservation medicine.

CVM 6884. Biosecurity in the Poultry Industries. (2 cr [max 16 cr]; S-N only. Prereq–DVM 3rd or 4th yr or #) Broiler, layer, and turkey industries, performance analysis, disease diagnosis, management techniques for prevention/control of disease and food safety problems. Emphasizes disease prevention and food safety. Classroom presentations, discussions, on-farm evaluations.

CVM 6930. Medical Management of Zoo Animals. (1 cr; S-N only. Prereq–3rd yr DVM or #) Zoo animal handling techniques, including physical/chemical restraint, commonly seen diseases, preventative medicine programs. Adaptation to standard medical practice/management techniques for zoos. Lectures.

CVM 6931. Diseases of Zoo Animals and Exotic Pets. (1 cr; S-N only. Prereq–DVM or grad or #) Diseases of and management procedures for zoo animals and exotic pets. Restraint procedures, medication, diagnosis.

CVM 6932. Advanced Zoo Animal Medicine. (1 cr; S-N only. Prereq–[6931, DVM 3rd or 4th yr] or #) Adapting existing veterinary techniques/principles to zoo animal medicine. Animal management and preventive medicine programs.

CVM 6933. Zoological Medicine. (2 cr [max 20 cr]; S-N only. Prereq–DVM 3rd or 4th yr or #) Introduction to all aspects of health care of zoo animals. Housing, nutrition, preventative health programs. Students assist zoo veterinarians with immobilizations, examinations, necropsies, laboratory work, records keeping.

CVM 6934. Selected Topics in Zoo Animal Medicine. (5 cr [max 10 cr]; A-F only. Prereq–DVM 1st or 2nd yr or #) Year-long course. Overview of expertise needed by a zoo veterinarian, applications to specific captive species. Students participate in managing an animal problem or animal group problem, develop diagnostic/management/therapeutic recommendations, research three topics on an assigned species, build reference materials for case care, present findings to keepers at a selected zoo, and develop an item for public education.


CVM 6950. Introduction to Aquaculture Medicine. (5 cr [max 1 cr]; S-N only. Prereq–DVM or #) General introduction to aquatic medicine. Epidemiology of bacterial, viral, fungal, and parasitic diseases in farmed fish. Emphasizes farmed fish husbandry practices.

Clinical and Population Sciences (CAPS)

Molecular Veterinary Bioscience (MVB)

MVB 5200. Statistical Genetics and Genomics. (4 cr; A-F only) Statistical issues in genomics. Gene detection, including statistical analysis/designs for linkage study and for mapping quantitative trait loci. Linkage analysis using pedigree data for codominant/dominant markers. Using radiation hybrid mapping/single cell typing. Design issues in linkage analysis, parentage testing, and marker polymorphism.

MVB 5594. Directed Research in Molecular Veterinary Biosciences. (1-4 cr [max 4 cr]; A-F only. Prereq–1st yr MVB grad student) Special project, addressing specific issue in veterinary medicine, under guidance of faculty member.

MVB 8100. Research Rotation in Molecular Veterinary Biosciences. (4 cr [max 8 cr]; A-F only. Prereq–1st yr MVB grad student) Directed research laboratory rotations. Experimentation, supplemental reading, research presentations under guidance of faculty member who is potential thesis adviser. Taught by program faculty.

MVB 8134. Ethical Conduct of Animal Research. (2 cr; A-F only. Prereq–Grad or professional school student or #) Ethical considerations in the use of animal subjects in agricultural, veterinary, and biomedical research. Federal, state, and University guidelines relating to proper conduct for acquisition/use of animals for laboratory, observational, epidemiological, and clinical research. Regulatory requirements. Bases for proper conduct. Societal impact on scientific investigations utilizing animal subjects.


MVB 8202. Mechanisms of Animal Health and Disease II. (3 cr. Prereq–8201) Multi-perspective approach to critically evaluating journal articles, as done for peer-reviewed journals. Aspects of host/pathogen interactions, including molecular/genetic mechanisms of host resistance and pathogenesis.

MVB 8333. FTE: Master’s. (1 cr; NGA. Prereq–Master’s student, adviser and DGS consent)

MVB 8335. Molecular Biology Techniques. (3 cr. Prereq–Biol 5001, Biol 5003 or equiv or #) Basic theory and current methodologies of molecular biology and recombinant DNA technology. Lab work includes DNA and RNA hybridization, gene transfer, and polymerase chain reaction techniques. Primarily for students with limited exposure to molecular biology.

Small Animal Clinical Sciences (SACS)

Veterinary Diagnostic Medicine (VDM)

VDM 5532. Hematology, Cytology, and Microbiology Labs. (2-4 cr [max 40 cr]; S-N only. Prereq—Grad student or #) Two-week intensive rotation in veterinary clinical laboratory medicine. Cytology (masses, body fluids, lymph nodes), hematology, clinical chemistry, urinalysis, clinical microbiology, endocrinology, virology, parasitology, immunology. Sample submission, laboratory test methodology. Case-based learning, didactic teaching, microscopy.

Veterinary Medicine, Graduate (VMed)

VMed 5080. Problems in Veterinary Epidemiology and Public Health. (1-3 cr; A-F only. Prereq—#) Individual study on problem of interest to epidemiology or public health student.

VMed 5090. Seminar: Veterinary Epidemiology. (1 cr [max 3 cr]; S-N only. Prereq—Veterinary Medicine grad student) Each student leads at least one seminar. Reviews of current research, literature reviews, and technique development. Students and participating faculty participate in presentation, discussion, and administration of the seminars.

VMed 5093. Directed Studies in Population Medicine. (1-4 cr [max 8 cr]; A-F only. Prereq—Grad student, #) Directed studies arranged between student and instructor.

VMed 5165. Monitoring and Surveillance of Disease and Production. (2 cr; A-F only. Prereq—#) Seminars/discussion on techniques to monitor animal disease/production. Distance course format.


VMed 5210. Advanced Large Animal Physiology I. (1-3 cr [max 6 cr]) Review of large animal physiology at level needed for specialty board certification or beginning research. Students present topics in physiology and supplement reading with clinical case material or journal articles.

VMed 5211. Advanced Large Animal Physiology II. (1-3 cr [max 6 cr]; A-F only. Prereq—#) Review of large animal physiology at level needed for specialty board certification or beginning research. Students present topics in physiology and supplement reading with clinical case material or journal articles.

VMed 5212. Large Animal Diagnostic Ultrasonography. (1 cr; A-F only. Prereq—#) Fundamentals of diagnostic ultrasound in large animal patient. Ultrasonography of the equine limbs/joints, large animal abdomen/thorax. Lectures, lab.

VMed 5232. Comparative Clinical Veterinary Dermatologic Pathology. (1 cr; A-F only. Prereq—Grad student, #) Microscopic pathology of basic dermatologic reactions and of variable disease states.

VMed 5274. Diseases of the Urinary System. (1 cr; A-F only. Prereq—#) Expands on disorders of small animal urinary system. Introduction to core and to additional disorders.

VMed 5291. Independent Study in Veterinary Medicine. (2 cr. Prereq—DVM, #) Arranged independent study in a clinical area of veterinary medicine.

VMed 5293. Directed Studies in Comparative Medicine and Pathology. (1-4 cr [max 8 cr]; A-F only. Prereq—Grad student, #) Directed studies arranged between student and instructor.

VMed 5295. Problems in Large Animal Clinical Medicine/Surgery and Theriogenology. (1 cr [max 3 cr]; A-F only. Prereq—VMed grad student, possess DVM) Hospital cases using standardized format, audiovisual aids. Review literature pertaining to case. One or two cases presented by enrolled participants per month.

VMed 5493. Directed Studies in Infectious Disease. (1-4 cr [max 8 cr]; A-F only. Prereq—Grad student, #) Directed studies arranged between student and instructor.

VMed 5596. Swine Diseases and Diagnostics. (2-3 cr) Review of recent advances in swine diseases; farm visits for on-farm disease diagnostics and control programs.


VMed 5691. Independent Research in Veterinary Anesthesiology. (1-6 cr; A-F only. Prereq—[Biology major or prevet or vet grad student, #] Independent research supervised by faculty member.

VMed 5693. Directed Studies in Surgery/Radiology/Anesthesiology. (1-4 cr [max 8 cr]; A-F only. Prereq—Grad student, #) Directed studies arranged between student and instructor.

VMed 5720. Small Animal Orthopedic Radiology. (2 cr. Prereq—#) Roentgen signs of common bone diseases of small animals.

VMed 5722. Large Animal Orthopedic Radiology. (1-2 cr. Prereq—#) Roentgen signs of common bone diseases of large animals. Emphasizes the horse.

“My reason for coming to Minnesota’s vet school was because my father and I thought it the hidden jewel of the Midwest.”

Sarah, Class of 2007
Albany, NY

VMed 5893. Directed Studies in Theriogenology. (1-4 cr [max 8 cr]; A-F only. Prereq—Grad student, #) Directed studies arranged between student and instructor.

VMed 7706. Advanced Epidemiology and Biostatistics. (2 cr. Prereq—Grad or IV track) Describing data and using statistical testing techniques. Strengths and limitations of statistical methodologies.


VMed 7842. Advanced Swine Diseases. (2 cr. Prereq—Grad) Lectures and discussion on advances in diseases of swine.


VMed 7850. Advanced Swine Records. (2 cr. Prereq–Grad or IV track) How to interpret data from computer health management program.

VMed 8090. Epidemiology of Zoonoses and Diseases Common to Animals and Humans. (1-4 cr; A-F only. Prereq–Epidemiology and infectious disease course or #) Major human zoonotic diseases, methods of transmission, diagnosis, control, and prevention.

VMed 8134. Ethical Conduct of Animal Research. (2 cr; A-F only. Prereq–[Grad or professional school] student or #) Ethical considerations in use of animal subjects in agricultural, veterinary, and biomedical research. Federal, state, and University guidelines relating to proper conduct for acquisition/use of animals for laboratory, observational, epidemiological, and clinical research. Regulatory requirements. Bases for proper conduct. Societal impact on scientific investigations utilizing animal subjects.

VMed 8195. Pre-Harvest Food Safety and Public Health Aspects of Food Animal Production. (1-3 cr. Prereq–#) Includes presentations and discussions on on-farm HACCP principles and prudent use of antibiotics.

VMed 8201. Advanced Small Animal Veterinary Medicine. (1-5 cr; A-F only. Prereq–#) Discussions of diseases of organs or systems in animals, including degenerative, psychological, anomalous, metabolic, nutritional, neoplastic, immune, inflammatory, toxic, and traumatic disorders.

VMed 8202. Internal Medicine in Small Companion Animals. (1-3 cr; A-F only. Prereq–#) Lectures, assigned readings, and discussions on internal medical problems of dogs and cats.

VMed 8203. Advanced Diagnosis and Therapeutics of Animal Disease. (1-2 cr; A-F only. Prereq–#) Detailed examination, treatment, and discussions of naturally occurring disease in patients admitted to Veterinary Teaching Hospital.

VMed 8210. Seminar: Veterinary Medicine. (1 cr. Prereq–#) Participation and presentations of regularly scheduled seminars about internal medicine.

VMed 8220. Advanced Nephrology/Urology Clinics. (1-3 cr. Prereq–#) Clinical investigation of naturally occurring urinary diseases in patients admitted to Veterinary Teaching Hospital.

VMed 8230. Medical Conference. (1-3 cr. Prereq–#) Participation in weekly conference about internal medical disorders.

VMed 8250. Problems in Acid-base, Electrolyte, and Fluid Metabolism. (2-4 cr; A-F only) Clinical problems and physiology of acid-base, electrolyte, and fluid disorders of dogs and cats.

VMed 8293. Advanced Studies in Nephrology and Urology. (1-3 cr; A-F only) Studies of urinary tract disease with goal of generating new knowledge.


VMed 8296. Advanced Large Animal Veterinary Medicine. (1-3 cr [max 6 cr]; A-F only. Prereq–DVM, grad vet med major, CAPS 7801, #) Discussions of diseases of organs or systems in animals in a clinical setting.

VMed 8333. FTE: Master’s. (1 cr; NGA. Prereq–Master’s student, adviser and DGS consent)

VMed 8360. Evidence-based Medicine. (2 cr; A-F only) Use of medicine literature in clinical problem solving.

VMed 8393. Medical Conference. (1-3 cr [max 6 cr]; A-F only. Prereq–#) Medical, surgical, or obstetrical cases supported by anatomic, bacteriologic, pathologic, physiologic, pharmacologic, and radiologic evaluations whenever applicable.

VMed 8394. Research in Veterinary Medicine. (1-3 cr. Prereq–#) Research problems relating to any aspect of internal medicine or to the various systems in animals.

VMed 8396. Diagnostic and Therapeutic Techniques of Animal Diseases. (1-3 cr [max 6 cr]. Prereq–CAPS 7801, DVM, grad vet med major, #) Detailed examination, discussions, and treatments of cases of animal diseases in a clinical setting.

VMed 8444. FTE: Doctoral. (1 cr; NGA. Prereq–Doctoral student, adviser and DGS consent)


VMed 8494. Research in Infectious Diseases. (1-3 cr) Directed research.

VMed 8495. Problems in Infectious Diseases. (1-3 cr) In-depth discussion on specific problems for various infectious diseases of farm animals.

VMed 8520. Advanced Immunology. (2 cr) Lectures and case presentations.

VMed 8530. Advanced Swine Diseases. (2 cr) Lectures and discussion on advances.

VMed 8592. Infectious Disease Journals: Critical Thinking. (1 cr) Reading and critical discussion of journal articles.

VMed 8593. Advanced Veterinary Virology and Serology. (1-3 cr) Discussion and laboratory practice.

VMed 8666. Doctoral Pre-Thesis Credits. (1-18 cr [max 60 cr]; NGA. Prereq–Max 18 cr per semester or summer; doctoral student who has not passed prelim oral)


VMed 8682. Advanced Large Animal Surgery. (1-3 cr [max 6 cr]; A-F only. Prereq–DVM or equiv degree. #) Surgery of various systems in large animals, with preoperative and postoperative evaluation and management.

VMed 8683. Surgery of the Gastrointestinal System. (2-4 cr; A-F only) Advanced techniques and problems.

VMed 8684. Surgical Physiology. (1-3 cr) Discussions on pathophysiology of surgical diseases in dogs and cats.


VMed 8686. Thoracic and Cardiovascular Surgery. (2-4 cr; A-F only) Advanced thoracic and cardiovascular diseases of small animals amenable to surgical treatment.

VMed 8687. Plastic and Reconstructive Surgery. (2-3 cr; A-F only) Advanced techniques in conditions of small animals.

VMed 8688. New Techniques in Large Animal Surgery. (1-6 cr [max 6 cr]; A-F only. Prereq–DVM or equiv degree, #)


VMed 8691. Research in Large Animal Surgery. (1-6 cr; A-F only. Prereq–DVM or equiv degree, #) Independent research projects.
VMed 8692. Seminar: Small Animal Surgery. (1 cr; A-F only)
Discussions of problems and case analysis.


VMed 8694. Research in Small Animal Surgery. (1-3 cr; S-N only)

VMed 8695. Problems in Large Animal Surgery. (1-3 cr [max 6 cr]; A-F only. Prereq–DVM or equiv degree, #) New techniques and procedures in large animal orthopedic surgery.

VMed 8696. Research in Critical Care/Emergency Medicine. (1-3 cr. Prereq–DVM or equiv degree) Special problems course. Controlled study; prospective and retrospective models of evaluation are defined, critiqued, and used for experimental design and data collection to validate research methods.

VMed 8777. Thesis Credits: Master’s. (1-18 cr [max 50 cr]; NGA. Prereq–Max 18 cr per semester or summer; 10 cr total required [Plan A only])

VMed 8780. Advanced Avian Critical Care: Principles and Procedures. (2 cr; A-F only. Prereq–Course in vet pathology, physiology, pharmacology, anatomy, small animal anesthesiology and critical care) Procedures and protocols for managing avian medical emergencies such as starvation, toxicities, respiratory failure, and massive trauma.

VMed 8781. Seminar: Advanced Veterinary Anesthesiology. (1-3 cr; A-F only. Prereq–[CVM 6321, CVM 6322] or equiv, grad student) Active interaction around topics of advanced anesthesiology in veterinary species.

VMed 8782. Advanced Veterinary Abdominal Imaging. (1-3 cr) Applications and discussion of basic principles through emerging techniques.

VMed 8783. Advanced Veterinary Thoracic Imaging. (1-3 cr) Application and discussion of basic principles through emerging techniques.

VMed 8784. Veterinary Therapeutic Radiology. (2-3 cr [max 6 cr]) In-depth discussion of principles, practice, techniques, and complications.

VMed 8785. Veterinary Nuclear Medicine. (1-3 cr [max 6 cr]) In-depth discussion of principles, practice, techniques, and complications.

VMed 8788. Thesis Credits: Doctoral. (1-24 cr [max 100 cr]; NGA. Prereq–Max 18 cr per semester or summer; 24 cr required)

VMed 8794. Research in Veterinary Radiology. (1-3 cr) Research into an application, development of an application, or prospective/retrospective study of any aspect of veterinary imaging or veterinary radiotherapy.

VMed 8795. Problems: Veterinary Radiology. (1-3 cr [max 6 cr]) Discussion of problems associated with veterinary imaging or radiation therapy.

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