

VETERINARY CLINICAL STUDIES - NEW BOLTON CENTER (VCSN)

VCSN 6300 Equine Neonatology & Intensive Care Medicine

The objectives of this course are to: (1) Introduce students to neonatal physiology and behavior as it applies to the foal; (2) Acquaint students with the clinical signs and pathophysiologic mechanisms of diseases in neonates; and (3) Provide students experience in the neonatal intensive care unit learning monitoring techniques (e.g. noninvasive blood pressure measurements, PCV, TP, stall side blood glucose, etc.) Observing normal and abnormal neonatal behavior and neonatal/maternal interactions, learning techniques of neonatal restraint, and assisting with diagnostic and therapeutic procedures as well as general nursing. Lectures will focus on foal diseases, intensive care therapies, periparturient problems, ventilatory support, musculoskeletal disorders, pharmacology and the neonate. Seminars will be used to apply lecture and reading material to clinical case discussions. A set of clinically-oriented problems covering case presentations, blood gas analysis, nutrition formulations, fluid therapy, nursing care protocols and periparturient events will be completed during the fourth quarter. The course grade will be based upon evaluation of clinical case problems, seminar participation, and mastering clinical skills (monitoring techniques, etc.) learned during foal-sitting. Enrollment requires approval of the course organizer and satisfactory academic standing.

4 Credit Hours

VCSN 6320 Diseases & Management of Sheep & Goats

This course is an introduction to small ruminant medicine and surgery. Flock and herd health programs involve control of infectious, parasitic, reproductive and metabolic disorders and provision of proper housing, feeding and reproductive management systems. Prevalent diseases and management systems of the Eastern U.S. will receive emphasis.

3 Credit Hours

VCSN 6330 Animal Health Economics

An introduction to a variety of economic concepts and decision making techniques that relate to the business of an agricultural enterprise and to the impact of veterinary services on that enterprise. Discussion of the role of production medicine in the overall profitability of animal agriculture.

2 Credit Hours

VCSN 6340 Clinical Biostatistics

This course presents a unified approach to the analysis and interpretation of clinical data. We start with a discussion of general linear models and show the types of problems to which they apply, and then move to generalized linear models, to survival models, and finally to general estimating equations. Our goal is to acquaint participants with a fairly comprehensive array of approaches to data analysis and, most particularly, to circumstances to which they apply. The objective is to prepare students for research activities, either as a career, or as a step towards "Board Certification" enabling them to plan studies, analyze data ensuing from studies, and to critically read articles in their area of interest.

2 Credit Hours

VCSN 6350 Equine & Farm Animal Anesthesia

This course will discuss sedation and intravenous or inhalant anesthesia of equine, food animal and camelid patients. The lectures will review the clinical pharmacology of the commonly used anesthetic drugs and the anatomic and physiologic differences among the species and their relevance to anesthetic management. Patient preparation, drug selection, induction and intubation techniques, intra-operative monitoring and management of cardiovascular and respiratory abnormalities, post-operative analgesia and recovery complications will also be discussed. Three case-based problems with multiple questions related to various aspects of anesthesia care will be distributed during the course. The problems are take-home, open-book and students may work alone or in pairs. Time will be spent discussing the cases after the written answers are turned in.

2 Credit Hours

VCSN 6360 Clinical Applications of Pharmacology

This course is focused on the clinical pharmacological management of the major problems in veterinary practice. The vast majority of lectures directly apply to companion animals but when necessary, to emphasize a drug group or specific clinical problem, there are also several large animal lectures. This is an extension of core pharmacology and not an expanded version. The lectures will be given by the clinical and basic sciences faculty in their areas of expertise. Emphasis will be on the clinical aspects of drug therapy such as dosage range, duration of therapy, evaluation of therapy, and problems encountered with current drug therapy. Pharmacological therapy in the following areas of medicine and surgery are covered: antibiotics, cardiovascular, neurology, respiratory, urinary, gastrointestinal, endocrine, emergency medicine, ophthalmology, chemotherapeutic agents, fluid therapy, anti-inflammatory, pain medications and other topics as needed for the most comprehensive clinical overview. Emphasis is on case-based approaches to drug therapy. The major objectives of this course are: (1) Provide practical information on rational drug therapy before entering the clinics and the real world of veterinary practice. (2) Provide a sound basis for rationally evaluating the presently available drugs and the drugs of the future. The course grade is based on a weekly quiz and/or mid-term/final.

4 Credit Hours

VCSN 6370 Animal Production Systems

This elective course provides an overview of : (i) management and operational basics of food animal production systems (dairy, beef, swine, poultry, and aquaculture), (ii) contemporary issues concerning current practice and sustainable future of animal production systems, e.g., food safety & biosecurity, antibiotics & antimicrobial resistance, nutrient management & environmental regulations, and animal welfare & public concerns. Students will work in teams on debates from pre-arranged topics, and will complete periodic assignments. Course grades will be based on class participation (40%), homework assignments (30%), and team debate performance (30%).

2 Credit Hours

VCSN 6380 Introduction to Animal Welfare

This course will cover the basic principles, history, and application of animal welfare science for multiple species. Over a series of lectures, the complex issue of assessing good versus poor welfare will be addressed. The first few lectures will provide students with the background of this field, as well as key terms which define the assessment methods of animal welfare science. The multifaceted issue of poor versus good welfare will be addressed in a lecture on ethics and sociology. The background lectures will also cover the disparity in the assessment of pain, pleasure, stress, and suffering based on applying physiological versus behavioral measurements. Given the tools provided by the background lectures, the students will then learn about species-specific welfare issues in the subsequent lectures to include swine, poultry, bovine, equine, aquaculture, exotic/zoo animals, lab animals, shelter animals, companion animals and current events. Following each one-hour lecture, the students will engage in an hour of hands-on activities, and debates concerning that week's topic. Students will also participate in one wet lab where they will have the opportunity to apply methods of welfare assessment that they have learned in class.

4 Credit Hours

VCSN 6390 Animal Welfare Science

This course is a foundational course for students enrolling in the Animal Welfare Certificate Program. This course covers the basic principles, history, and application of animal welfare science. Over a series of video modules, online discussions, assignments, and quizzes, this course will teach students to assess the welfare of animals in a variety of settings using science-based methods and reasoning. Students will learn current welfare issues by species. This class will engage in activities that build the skills to find and assess scientific sources of information. Finally, the link between science and ethics will be explored such that students understand various ethical frameworks and how they relate to animal welfare. The objective of the course is to provide students with the background and tools to apply animal welfare science in order to facilitate students' ability to successfully engage in welfare deliberations and welfare science in a variety of fields.

6 Credit Hours

VCSN 6400 Large Animal Medicine - NBC

The course is comprised of advanced lectures and discussions on medical diseases of large domestic animals. Laboratory sessions will include "hands-on" experience in performing the more common diagnostic procedures in large animal medicine, including: urethral catheterization of horses; rectal examination; ophthalmic examinations; epidural anesthesia (bovine); nasolacrimal duct flushing; cardiovascular examinations; use of ultrasound equipment; venipuncture in cattle and horses; intravenous injections in cattle, balling gun procedure for cattle; TB testing in cattle and endoscopy of the horse. Two in-course Progressive examinations and a course Final examination will be given.

7 Credit Hours

VCSN 6410 Advanced Poultry Medicine - NBC

This lecture/laboratory course is designed to provide students with a working knowledge of the recognition and diagnosis of selected diseases of poultry. Lectures will include discussion of the clinical, post-mortem and technical aspects of the diagnosis of selected avian diseases. The laboratory will provide each student with an opportunity to necropsy birds. Field visits to local poultry farms may be taken. The course grade will be based on weekly quizzes and a group project.

2 Credit Hours

VCSN 6420 Dairy Cattle Nutrition - NBC

The complexity of evaluating and balancing rations requires computer models. CPM-Dairy - developed at Cornell University, The University of Pennsylvania and The William H. Miner Agricultural Research Institute - evaluates and formulates rations according to a modified National Research Council (NRC) model and according to The Cornell Net Carbohydrate and Protein System (CNCPS). CPM-Dairy will be used to describe nutrient requirements, supplies and utilization. Environmental effects on nutritional requirements will be demonstrated. The dynamics of ruminal fermentation and microbial growth will be illustrated in terms of how they affect nutrient supply. "Hands on Computer Sessions" will lead participants through ration formulation.

3 Credit Hours

VCSN 6430 Large Animal Reproduction - NBC

This course covers in-depth reproductive management of cattle, horses, swine and small ruminants. Emphasis is placed on the herd or flock as a unit rather than on the individual animal. This course is the same course as VCSN644 but with one-half of the laboratory time. The course is intended for those students who intend to pursue a career that will be exclusively or predominantly companion animal. A three-hour canine reproduction laboratory is included. The Laboratories include demonstrations by clinicians and hands-on practical experience for students in evaluating the male and the female reproductive status: PATH F - female pathology, PATH M - male pathology, OB1 - obstetrics, B&R - bull and ram breeding soundness examination, DOG - dog breeding soundness examination, vaginal cytology of the bitch, MARE1 - palpation of the genital tract per rectum of mare, COW1 - physical exam of the bovine genital tract, ULTRA - ultrasonography of the genital tract of animals.

3 Credit Hours

VCSN 6440 Large Animal Reproduction - NBC

The course covers in-depth reproductive management of cattle, horses, swine, sheep and small ruminants. Emphasis is placed on the herd or flock as a unit rather than on the individual animal. Laboratories include demonstrations by clinicians and hands-on practical experience for students in evaluating the male and the female reproductive status of dogs and large domestic animals. Therapeutic information will be covered in problem-based cases that will be solved and formally presented by small student groups. Grades will be based on the therapeutic presentations, laboratory participation, mid-term exam and a comprehensive final examination. In addition to the laboratories listed in VCSN643 are the following eight laboratories: OB2- fetomy, STALL - stallion breeding soundness examination SWINE - boar semen evaluation, heat detection and AI of sows, MARE2 - mare breeding soundness examination, palpation, MARE3 - using breeding soundness examination to solve infertility case, palpation, COW2 - bovine estrous cycle, palpation, COW3 - pregnancy diagnosis, palpation, COW4 - therapeutics, palpation.

4 Credit Hours

VCSN 6450 Large Animal Surgery & Surgical Exercises - NBC

Lectures given in this course will cover common surgical problems of the respiratory, the gastrointestinal, the musculoskeletal, and the urogenital systems of horses and of the gastrointestinal system of domestic ruminants. Lecture material will cover the procedures to be done in each laboratory beforehand so that ample opportunity is allowed for preoperative preparation. Lectures are given on anesthesia with special emphasis on drugs to be used during the laboratory sessions. The surgical exercises and related laboratory procedures are designed to teach surgical techniques and principles, surgical anatomy, and basic surgical procedures in horses and domestic ruminants. Students will administer general anesthetics and apply the principles and techniques of physiologic monitoring of anesthetized large animals. The importance and the application of preoperative and postoperative management will be emphasized and students take full responsibility for their patient's progress throughout the course. The course grade is derived from performance in the laboratories, quality of patient care, participation in conferences, and one final exam.

4 Credit Hours

VCSN 6460 Equine Lameness - NBC

This course covers the principles of lameness diagnosis and treatment in horses. The course features didactic lectures, actual lameness examinations, video tape viewing, computer aided learning and a diagnostic nerve block laboratory using cadaver specimens.

4 Credit Hours

VCSN 6470 Equine Orthopedics - NBC

The course reviews specific techniques in equine orthopaedics, and emphasizes understanding orthopaedic principles that are applicable to all species. Topics include more detailed information on internal fixation, relevant first-aid techniques, osteochondrosis and orthopedic sepsis.

1 Credit Hour

VCSN 6480 Equine Sports Medicine - NBC

This seminar course concerns the clinical application of basic physiologic and pathologic principles as they relate to the diagnosis and management of exercise-related diseases in the horse. Material will be presented in light of the demands of specific types of athletic activity. Laboratory demonstrations using the high-speed treadmill will be provided. Hands-on sessions are also provided to demonstrate the collection of arterial blood gas samples and upper airway endoscopy. Paper or oral presentation required.

3 Credit Hours

VCSN 6490 Large Animal Diagnostic Imaging - NBC

The course consists of a series of lectures, a radiographic positioning laboratory and an ultrasound/anatomy laboratory. Plain film radiography comprises the majority of the lectures but ultrasound, scintigraphy and prepurchase examination are included. A brief introduction to CT & MRI is also presented. Strong emphasis is placed on the equine species but incorporates radiography of other large animals. The course is designed to cover the basic principles of the different imaging techniques, radiographic and sonographic anatomy, and the basic interpretation of the imaging modalities.

3 Credit Hours

VCSN 6500 Applied Animal Welfare and Behavior

This course aims to provide students with practical skills helpful in the study of animal welfare and in the future offer a bridge to our proposed master's program. Students will be exposed to critical reading of the scientific literature, development and testing of hypothesis as well as examining experimental paradigms used commonly to probe animal welfare and behavior. The goal of the course is for each student to conceive, develop, write, and present a research proposal on a question of interest in animal welfare that could provide the foundation for a future capstone project. Student assignments will include selected readings, synchronous and asynchronous online discussion of relevant course materials, and an oral presentation and written description of their research proposal.

6 Credit Hours

VCSN 6520 Regulations and Animal Welfare

This course will focus on regulations in the United States that have an impact on animal welfare. It will also look at oversight of research, clinical trials and informed consent in veterinary medicine. Over a series of video modules, online discussions, assignments and quizzes, this course will teach students the history and tenets of the current regulatory framework. Each week a synchronous session will explore the implications of regulations on animal welfare.

3 Credit Hours

VCSN 6530 Capstone in Animal Welfare and Behavior

This online course follows directly from the MSc Proseminar course (VPTH 637) where students developed their research questions, hypotheses, methods and piloted their approach to an investigation that could either be the product of original literature analysis and synthesis of new ideas or the result of investigative work that involves data collection and analysis*. Through structured meetings with mentors, peers and other AWB faculty, this semester long (6 credit) capstone course will provide Penn Vet MSc students with the guidance required to gather and interpret their data and communicate their results in written and oral form. Students will provide weekly updates on their research progress and will discuss and troubleshoot their projects with their peers and advisors in weekly synchronous sessions. Students will generate a formal protocol for their research approach, maintain online records of raw data, give a public oral presentation of their results and generate a paper describing their results in a format appropriate for publication.

Fall or Spring

6 Credit Hours

VCSN 6540 Animal Welfare in the Shelter and Community

Millions of cats and dogs enter shelters in the United States each year, where they can face increased stress, reduced quality of life, and, in some cases, an elevated risk of euthanasia. Developing a complex understanding of shelter management/structure and the environmental, behavioral, and physical factors that impact animal welfare are critical to developing constructive, evidence-based, and humane decisions and programs for both shelters and the community. Particular emphasis will be placed on behavioral problems and assessments as behavior is a leading risk factor for the relinquishment of dogs and cats and can drastically impact animal welfare. Shelters and welfare organizations are also striving to improve animal welfare in the community through public health type programming including addressing concepts like access to care and harm reduction. In this course, students will learn about key factors that impact animal welfare in the shelter and community and understand the utility of welfare assessments and scientifically informed policy. Students will discuss the multi-faceted role of animal shelters in the community in the context of One Welfare. They will also critically evaluate programs and policies designed to improve animal welfare using current scientific literature. In their final project, students will utilize this knowledge to recommend a protocol/policy to implement in a specific shelter or community setting. They will create a scientific policy paper targeted at the academic/scientific audience and then translate that information and present it to a lay audience via recorded PowerPoint. Prerequisite: VCSP 6330 AND VCSN 6390 AND VCSP 6390 AND VCSN 6500

6 Credit Hours

VCSN 6570 One Health & Global Food Security

By 2050 can the world sustain a population of over 9 billion people in the face of climate change, limited water and other natural resources, pollution, urbanization, political and income inequality, conflict, changing diets and patterns of disease? An interdisciplinary group of faculty will explore this complex question through six broad trends that affect global food sustainability and environmental health; 1) nutritional needs; 2) changing patterns of communicable and non-communicable diseases of humans and all types of animals; 3) natural resource inventory and management; 4) production technologies (intensive/extensive systems); 5) societal changes impacting production and food demand; 6) food distribution systems and access to food. The course is open to graduate and undergraduate students and will involve student participation and research.

Spring

4 Credit Hours

VCSN 6580 Evolution of Animal Welfare

This course addresses how changing societal expectations about animal use impact animal welfare expectations.

3 Credit Hours

VCSN 6590 Contemporary Issues in Animal Welfare

This course covers contemporary animal welfare issues and some of their ethical implications

3 Credit Hours

VCSN 6600 Animal Welfare Assessment

This course is intended to cover the animal welfare assessment requirements as outlined in the ACAW guidelines for board certification but also allows any students pursuing the master's program to improve their welfare assessment abilities. Students must participate in assessment of Companion animals, Poultry production, Hooved stock production, Equids, Laboratory animals and Zoo animals. They must also choose at least 2 to assess from the following: Aquatic animals, aquaculture/fisheries, Wildlife/exotic animals, Animals in exhibitions/entertainment, Animals in education, and Working/assistant animals. Students will work on 3 assessments per week for a total of 9 assessments. The final week of the course will be dedicated to working on case studies from the student's own experience. This will include identification of a situation where welfare would need to be assessed, determination of how to assess the welfare of the animal(s) and a written report of the assessment, including recommendations for steps that could be instituted so that the welfare could be improved. Each week a video and reading assignments will familiarize students with assessment techniques and tools.

3 Credit Hours

VCSN 6610 Swine Neonatology - NBC

This is an introductory course for students who want to learn more about swine production and swine medicine. It aims to familiarize 2nd and 3rd year veterinary students with several important aspects of swine neonatology/farrowing room management that includes periparturient physiology and behavior of both the sow and the piglet, baby pig processing, and sow dystocia. All students will be required to attend the four hours of lecture, and four laboratory shifts. Each laboratory shift is 7 hours and available nights and weekends. Students will be required to monitor the farrowing house for sows in labor and attend the farrowings as needed to critically assess animal well-being. Students will be expected to provide appropriate sow or piglet interventions when indicated. Students will also assist with any routine management tasks such as piglet processing and vaccination. Students will be graded on their participation and success in meeting the course objectives.

1 Credit Hour

VCSN 6620 Applied Small Animal Behavior: Dog and Cat

Behavior problems are the most frequent reasons for surrender and euthanasia of pets. In this course, we will discuss the normal behavior and the most common behavior problems of dogs and cats with an emphasis on management including safety recommendations, environmental modification, and behavior modification. Expected outcomes, welfare and legal implications (for example, in case of dog aggression) will be discussed. Attention will also be paid to the thought process used in working up and/or preventing behavioral disorders.

Prerequisite: VCSP 6330 AND VCSN 6390 AND VCSP 6390 AND VCSN 6500

6 Credit Hours

VCSN 6630 Professional Portfolio Development

This course will be the forum for students to organize portfolios and for students to meet and give peer feedback. The graduating cohort will be responsible for organizing peer review and the presentation of the portfolios. Any professional track student may participate in the ongoing Canvas community for the professional track development course and will be encouraged to do so. The student cohort that is graduating will enroll in the official course and organize weekly synchronous meetings for working on portfolio development and getting feedback. They will also be responsible for organizing presentations for each student to present their portfolio to the larger community. Two faculty advisors will be available as needed to facilitate.

Prerequisite: VCSP 6330 AND VCSP 6390 AND VCSN 6390 AND VCSN 6500

6 Credit Hours

VCSN 7005 Large Animal Medicine -Foundation - NBC

Students in this rotation will assist clinicians in history taking, examinations and the medical management of large animal patients presented to the hospital at New Bolton Center. Students will participate in daily ward and Medicine teaching rounds, Radiology rounds and Pathology rounds. All students, whether in core or elective, will be expected to participate in night and weekend duty on a rotating basis. All students will prepare and present one clinical case discussion for Grand Rounds. Time commitment: at least 8 hours per day plus night and weekend duty.

6 Credit Hours

VCSN 7015 Large Animal Emergency/Critical Care - Foundation Rotation - NBC

This rotation is designed to teach students basic principles of large animal emergency medicine and surgery as well as the daily management of critically ill equine patients. Students will be involved in a variety of large animal emergency admissions including diagnostic procedures and surgery as well as post-operative or post-admission case management of horses with gastrointestinal disease. Students will attend regular 8 am morning rounds (see course description for Large Animal Surgery, VCSN 800), followed by morning case-based discussion rounds. The day will be spent either on emergency admissions or procedures and management of in-house patients. Daily afternoon rounds will be topic-based, and may be selected from the following topics: Laceration Repair, Emergency Stabilization of Fractures, Acute Abdomen (colic), Diarrhea, Fluid Therapy, Respiratory Distress, Acute Blood Loss/Hemorrhagic Shock, Food Animal Emergencies, Blood Gas Interpretation, Acute Neurologic Patient, Monitoring the Critically Ill Patient, Reproductive Emergencies, Management of Rectal Tears, Critical Care Journal Club.

6 Credit Hours

VCSN 7125 Food Animal Reproduction - NBC

The course is designed for those students anticipating entering large animal or mixed practice. Students will participate in the diagnosis and treatment of clinical reproductive cases in the hospital. Students will be responsible for the daily treatment and examination of all hospitalized cases at the Hofmann Center. Students will also assist in the management of reproductive problems of Widener Hospital patients. Exposure will vary due to fluctuations in case load. Additional "hands-on" practice of reproductive procedures will occur by the use of teaching animals. Organized laboratories will allow the student to become comfortable with diagnostic techniques of large animal species. On-call, weekend, and night duty are required. Students will be required to give a 15 minute presentation during the rotation and prepare two case letters/discharge instructions on animals they evaluated during the rotation. If student interest and time permit, students may go on field trips to breeding farms.

3 Credit Hours

VCSN 7135 Field Service - NBC

Students in this rotation will assist staff doctors in history taking, physical examinations, and the medical management of patients seen on the Field Service activities of the School's large animal practice. The student is required to attend the appropriate 8:00 a.m. daily rounds at New Bolton Center. The remainder of the day will be spent on field calls. The student will be required to be on night and weekend duty. Night duty will be divided equally among field service students in the rotation. Students on emergency duty are required to be within 15 minutes from New Bolton Center while on duty. Case presentations will be given by students on the second Wednesday of the rotation. Boots and coveralls are essential for this rotation.

6 Credit Hours

VCSN 7155 Diagnostic Ultrasound in Large Animals - NBC

This rotation will provide students with experience in the diagnosis and treatment of large animal cardiac diseases and the use of M-mode, 2-dimensional real-time, pulsed wave, color flow and continuous wave Doppler echocardiography and exercising electrocardiography. Students will also gain experience in the use of diagnostic ultrasonography in the evaluation of tendon and ligament injuries, diseases of the thorax and abdomen, and the evaluation of masses, swellings, neonates and high-risk pregnancies. Students will also gain experience in patient preparation; obtaining a quality ultrasonographic or echocardiographic image and cardiac Doppler studies; and in interpretation of these images and studies with staff and faculty supervision. Students will be responsible for patient care of animals presented to the Heart Station/ Ultrasound Service during the rotation. Prerequisite: Core Medicine and Surgery

Also Offered As: VCSN 7755

5 Credit Hours

VCSN 7165 Ultrasonography in Large Animals - NBC

For full course description see VCSN 7150. Prerequisite: Core Medicine and Surgery

Also Offered As: VCSN 7765

2 Credit Hours

VCSN 7705 Large Animal Medicine -Foundation - NBC

Students in this rotation will assist clinicians in history taking, examinations and the medical management of large animal patients presented to the hospital at New Bolton Center. Students will participate in daily ward and Medicine teaching rounds, Radiology rounds and Pathology rounds. All students, whether in core or elective, will be expected to participate in night and weekend duty on a rotating basis. All students will prepare and present one clinical case discussion for Grand Rounds. Time commitment: at least 8 hours per day plus night and weekend duty.

6 Credit Hours

VCSN 7725 Food Animal Reproduction - NBC

The course is designed for those students anticipating entering large animal or mixed practice. Students will participate in the diagnosis and treatment of clinical reproductive cases in the hospital. Students will be responsible for the daily treatment and examination of all hospitalized cases at the Hofmann Center. Students will also assist in the management of reproductive problems of Widener Hospital patients. Exposure will vary due to fluctuations in case load. Additional "hands-on" practice of reproductive procedures will occur by the use of teaching animals. Organized laboratories will allow the student to become comfortable with diagnostic techniques of large animal species. On-call, weekend, and night duty are required. Students will be required to give a 15 minute presentation during the rotation and prepare two case letters/discharge instructions on animals they evaluated during the rotation. If student interest and time permit, students may go on field trips to breeding farms.

3 Credit Hours

VCSN 7735 Field Service - NBC

Students in this rotation will assist staff doctors in history taking, physical examinations, and the medical management of patients seen on the Field Service activities of the School's large animal practice. The student is required to attend the appropriate 8:00 a.m. daily rounds at New Bolton Center. The remainder of the day will be spent on field calls. The student will be required to be on night and weekend duty. Night duty will be divided equally among field service students in the rotation. Students on emergency duty are required to be within 15 minutes from New Bolton Center while on duty. Case presentations will be given by students on the second Wednesday of the rotation. Boots and coveralls are essential for this rotation.

6 Credit Hours

VCSN 7745 Large Animal Clinical Reproduction - NBC

The course is designed for those students anticipating entering large animal or mixed practice. Students will participate in the diagnosis and treatment of clinical reproductive cases in the hospital. Students will be responsible for the daily treatment and examination of all hospitalized cases at the Hofmann Center. Students will also assist in the management of reproductive problems of Widener Hospital patients. Exposure will vary due to fluctuations in case load. Additional "hands-on" practice of reproductive procedures will occur by the use of teaching animals. Organized laboratories will allow the student to become comfortable with diagnostic techniques of large animal species. On-call, weekend, and night duty are required. Students will be required to give a 15 minute presentation during the rotation and prepare two case letters/discharge instructions on animals they evaluated during the rotation. If student interest and time permit, students may go on field trips to breeding farms.

6 Credit Hours

VCSN 7755 Diagnostic Ultrasound in Large Animals - NBC

This rotation will provide students with experience in the diagnosis and treatment of large animal cardiac diseases and the use of M-mode, 2-dimensional real-time, pulsed wave, color flow and continuous wave Doppler echocardiography and exercising electrocardiography. Students will also gain experience in the use of diagnostic ultrasonography in the evaluation of tendon and ligament injuries, diseases of the thorax and abdomen, and the evaluation of masses, swellings, neonates and high-risk pregnancies. Students will also gain experience in patient preparation; obtaining a quality ultrasonographic or echocardiographic image and cardiac Doppler studies; and in interpretation of these images and studies with staff and faculty supervision. Students will be responsible for patient care of animals presented to the Heart Station/ Ultrasound Service during the rotation. Prerequisite: Core Medicine and Surgery

Also Offered As: VCSN 7155

5 Credit Hours

VCSN 7765 Ultrasonography in Large Animals - NBC

For full course description see VCSN 7150. Prerequisite: Core Medicine and Surgery

Also Offered As: VCSN 7165

2 Credit Hours

VCSN 7775 Large Animal Neonatal Intensive Care Rotation - NBC

This elective provides students with experience in the management of critically ill large animal neonates and dams with periparturient complications. Daily rounds emphasize the use of monitoring techniques (e.g. capnography, ECG, BP monitor, fetal and neonatal ultrasonography), and various treatment modalities (e.g. parenteral nutrition, positive pressure ventilation, and fluid therapy) required in the management of critically ill neonatal foals and late-term pregnant mares. Students will have the opportunity to master the following manual and theoretical skills: arterial puncture and arterial blood gas analysis, calculation and application of parenteral and enteral nutrition formulations, catheterization techniques for veins and bladder, principles of fluid therapy as applied to patients with septic shock and patients requiring maintenance fluids, radiographic interpretation of neonatal thoracic and musculoskeletal disease, interpretation of fetal and neonatal sonograms, familiarity with different types of respiratory support and resuscitation protocols, and a working knowledge of a wide variety of pharmacologic agents including antibiotics, anticonvulsives, sedatives, analgesics, pressors and inotropic agents.

6 Credit Hours

VCSN 7785 Equine Welfare Clinical Elective

This 2-week clinical elective would be open to all fourth year veterinary students, and would be offered once per year, in rotation 1. The enrollment limit is 6 students, and is limited to students who have taken either of the two welfare courses (Applied Animal Welfare and Behavior, Dr. Parsons; Animal Welfare Science, Dr. Pierdon), and then to equine majors if there are any remaining places. Course goals: To provide a comprehensive and nuanced examination of the issues and concerns regarding equine welfare in the US.

5 Credit Hours

VCSN 7805 Ration Evaluation and Formulation - NBC

This course is intended to provide students with practical experience in evaluating dairy feeding programs and formulation of rations. Students will visit dairy farms, inspect feed storage and delivery systems, obtain representative samples of feedstuffs for analysis, examine production records, and assess animal body condition. Students will then evaluate the nutritional and economic adequacy of the whole feeding program, suggest recommendations for its improvement and prepare producer reports for discussion with faculty prior to implementation.

6 Credit Hours

VCSN 8005 Large Animal Surgery-Foundation - NBC

Students rotating through Large Animal Surgery at NBC will participate in all aspects of examination and diagnosis, including lameness evaluation and endoscopy, medical and surgical treatment and daily patient care of large animals. During one week of the two-week rotation, each student will be assigned to treat cattle, other domestic farm animals and horses, and during the other week, horses only. Night, weekend and holiday assignments, including treatments and emergency service, will be made according to the requirements of the overall hospital operation during a given session. Students usually are exposed to various surgical procedures (general soft tissue, abdominal, orthopedic, etc.) during any one rotation. During the rotation, students may gain experience with horses being examined on the High Speed Treadmill or undergoing imaging in the Nuclear Scintigraphy Unit. Students will also participate in a variety of didactic teaching rounds, barn rounds and teaching laboratories as described: Monday, Tuesday, Wednesday, Friday 4-5 pm - Surgery Teaching Rounds. Thursday 3-5 pm - Surgery Teaching Laboratory (Wet labs). Monday 8-9 am Radiology Rounds (case-based discussion led by surgery faculty). Tuesday 8-9 am - Lameness Rounds (case-based discussion led by Sports Medicine faculty). Wednesday 8-9 am - Radiology Rounds (case-based discussion led by radiology faculty). Thursday 8-9 am - Grand Rounds (Student case presentations). Friday 8-9 am - Medicine Teaching Rounds (case-based discussion with Medicine faculty and house officers).

6 Credit Hours

VCSN 8125 Sports Medicine/Imaging - NBC

Goals of this rotation are to provide the students with the opportunity to obtain diagnostic skills through the use of different modalities and to incorporate these techniques into the decision-making process during the diagnosis and treatment of horses with performance problems. Students in this rotation will take more responsibility for their cases and follow them through the different specialties without being drawn away to the next case in their assigned area. Each student will spend his/her time in the following areas: 1 week - Ultrasound/Cardiology. 1 week - Nuclear Scintigraphy/Radiology/MRI. 1 week - Treadmill/Podology. 1 week - Poor performance clinic (lameness)

10 Credit Hours

VCSN 8145 Large Animal Radiology - NBC

In this rotation, students will gain experience in making and interpreting large animal radiographic examinations. They will assist the radiology technicians in taking and processing routine radiographs, attend film reading sessions, daily hospital rounds and review large animal radiographs independently and under supervision. Students will be required to write radiology reports.

5 Credit Hours

VCSN 8155 Large Animal Anesthesiology Service - NBC

During the Large Animal Anesthesia Service Rotation, students will gain experience in: (1) anesthetizing equine and other farm animal patients for elective and emergency procedures; (2) alleviating pain in animals; (3) maintaining adequate vital functions during anesthesia and (4) managing fluid, electrolyte and acid-base disturbances in the perioperative period. In addition, the course offers the opportunity to apply the clinical pharmacology of perianesthetic drugs in various farm animal species. Students are requested to attend Anesthesia Service rounds on Mondays and Fridays (8-9:00 am) during their clinical rotation, which will also offer the opportunity to discuss anesthesia cases. Night and weekend emergency duty is mandatory and shared with veterinary technician students. The maximum emergency duty is 4 weekday nights and one 24-hour weekend day. Students are expected to report to the Sports Medicine Conference Room or Anesthesia Office promptly at 8:00 am on the first Monday morning of the 2-week rotation with scrubs, stethoscope and calculator. Students are requested to review the information contained in the class notes of the following courses for appropriate sections prior to entering the rotation: General Pharmacology and Toxicology (VBMS 607), Animal Physiology (VBMS 606), Anesthesia (VSUR 604), and the Equine and Farm Animal Anesthesia Elective (VCSN 635). Students should also be familiar with dosages of commonly used drugs and their clinical pharmacology and technical aspects of the practice of large animal anesthesia.

6 Credit Hours

VCSN 8165 Food Animal Anesthesiology Service - NBC

In this rotation, students will gain experience in planning and performing sedation and anesthesia in small ruminants, swine and camelids. Specific clinical objectives during the five-day rotation include physical and chemical restraint, regional and general anesthesia techniques in various food and fiber producing animals, and operation and use of various anesthetic monitoring devices. Emphasis is on techniques and drugs commonly used in the field. Students will formulate plans for sedation and/or short term anesthesia in sheep/goats, pigs and camelids and will then carry them out on teaching animals. Techniques for regional anesthesia for flank surgery in the bovine will be performed at Marshak Dairy.

3 Credit Hours

VCSN 8705 Large Animal Surgery-Foundation - NBC

Students rotating through Large Animal Surgery at NBC will participate in all aspects of examination and diagnosis, including lameness evaluation and endoscopy, medical and surgical treatment and daily patient care of large animals. During one week of the two-week rotation, each student will be assigned to treat cattle, other domestic farm animals and horses, and during the other week, horses only. Night, weekend and holiday assignments, including treatments and emergency service, will be made according to the requirements of the overall hospital operation during a given session. Students usually are exposed to various surgical procedures (general soft tissue, abdominal, orthopedic, etc.) during any one rotation. During the rotation, students may gain experience with horses being examined on the High Speed Treadmill or undergoing imaging in the Nuclear Scintigraphy Unit. Students will also participate in a variety of didactic teaching rounds, barn rounds and teaching laboratories as described: Monday, Tuesday, Wednesday, Friday 4-5 pm - Surgery Teaching Rounds. Thursday 3-5 pm - Surgery Teaching Laboratory (Wet labs). Monday 8-9 am Radiology Rounds (case-based discussion led by surgery faculty). Tuesday 8-9 am - Lameness Rounds (case-based discussion led by Sports Medicine faculty). Wednesday 8-9 am - Radiology Rounds (case-based discussion led by radiology faculty). Thursday 8-9 am - Grand Rounds (Student case presentations). Friday 8-9 am - Medicine Teaching Rounds (case-based discussion with Medicine faculty and house officers).

6 Credit Hours

VCSN 8715 Equine Surgery Clinic - NBC

This elective is specifically designed to provide students interested in equine practice after graduation with additional exposure to a variety of orthopedic and soft tissue surgical problems of horses. Students will actively participate in all aspects of lameness and soft tissue diagnosis, treatment, surgery and patient care. Teaching rounds will involve daily barn rounds, daily didactic presentations and/or wet labs covering surgical topics. Laboratories include internal fixation of fractures, wound repair, arthroscopy, intestinal surgical techniques, laser surgery, head and neck surgery, video analysis of lameness and field anesthesia. Every effort is made to have students in this course perform field castrations with local veterinarians. Students will be expected to participate in after-hours treatments and surgical emergencies of horses; however, students will not be assigned to food animal patients during this rotation.

6 Credit Hours

VCSN 8725 Sports Medicine/Imaging - NBC

Goals of this rotation are to provide the students with the opportunity to obtain diagnostic skills through the use of different modalities and to incorporate these techniques into the decision-making process during the diagnosis and treatment of horses with performance problems. Students in this rotation will take more responsibility for their cases and follow them through the different specialties without being drawn away to the next case in their assigned area. Each student will spend his/her time in the following areas: 1 week - Ultrasound/Cardiology. 1 week - Nuclear Scintigraphy/Radiology/MRI. 1 week - Treadmill/Podology. 1 week - Poor performance clinic (lameness)

10 Credit Hours

VCSN 8735 Large Animal Emergency/Critical Care - Foundation Rotation - NBC

This rotation is designed to teach students basic principles of large animal emergency medicine and surgery as well as the daily management of critically ill equine patients. Students will be involved in a variety of large animal emergency admissions including diagnostic procedures and surgery as well as post-operative or post-admission case management of horses with gastrointestinal disease. Students will attend regular 8 am morning rounds (see course description for Large Animal Surgery, VCSN 800), followed by morning case-based discussion rounds. The day will be spent either on emergency admissions or procedures and management of in-house patients. Daily afternoon rounds will be topic-based, and may be selected from the following topics: Laceration Repair, Emergency Stabilization of Fractures, Acute Abdomen (colic), Diarrhea, Fluid Therapy, Respiratory Distress, Acute Blood Loss/Hemorrhagic Shock, Food Animal Emergencies, Blood Gas Interpretation, Acute Neurologic Patient, Monitoring the Critically Ill Patient, Reproductive Emergencies, Management of Rectal Tears, Critical Care Journal Club.

6 Credit Hours

VCSN 8745 Large Animal Radiology - NBC

In this rotation, students will gain experience in making and interpreting large animal radiographic examinations. They will assist the radiology technicians in taking and processing routine radiographs, attend film reading sessions, daily hospital rounds and review large animal radiographs independently and under supervision. Students will be required to write radiology reports.

5 Credit Hours

VCSN 8755 Large Animal Anesthesiology Service - NBC

During the Large Animal Anesthesia Service Rotation, students will gain experience in: (1) anesthetizing equine and other farm animal patients for elective and emergency procedures; (2) alleviating pain in animals; (3) maintaining adequate vital functions during anesthesia and (4) managing fluid, electrolyte and acid-base disturbances in the perioperative period. In addition, the course offers the opportunity to apply the clinical pharmacology of perianesthetic drugs in various farm animal species. Students are requested to attend Anesthesia Service rounds on Mondays and Fridays (8-9:00 am) during their clinical rotation, which will also offer the opportunity to discuss anesthesia cases. Night and weekend emergency duty is mandatory and shared with veterinary technician students. The maximum emergency duty is 4 weekday nights and one 24-hour weekend day. Students are expected to report to the Sports Medicine Conference Room or Anesthesia Office promptly at 8:00 am on the first Monday morning of the 2-week rotation with scrubs, stethoscope and calculator. Students are requested to review the information contained in the class notes of the following courses for appropriate sections prior to entering the rotation: General Pharmacology and Toxicology (VBMS 607), Animal Physiology (VBMS 606), Anesthesia (VSUR 604), and the Equine and Farm Animal Anesthesia Elective (VCSN 635). Students should also be familiar with dosages of commonly used drugs and their clinical pharmacology and technical aspects of the practice of large animal anesthesia.

6 Credit Hours

VCSN 8765 Food Animal Anesthesiology Service - NBC

In this rotation, students will gain experience in planning and performing sedation and anesthesia in small ruminants, swine and camelids. Specific clinical objectives during the five-day rotation include physical and chemical restraint, regional and general anesthesia techniques in various food and fiber producing animals, and operation and use of various anesthetic monitoring devices. Emphasis is on techniques and drugs commonly used in the field. Students will formulate plans for sedation and/or short term anesthesia in sheep/goats, pigs and camelids and will then carry them out on teaching animals. Techniques for regional anesthesia for flank surgery in the bovine will be performed at Marshak Dairy.

3 Credit Hours

VCSN 8775 Food Animal Medicine and Surgery Clinic - NBC

This elective rotation is designed to provide additional experience in food animal medicine and surgery to students who are likely to pursue bovine practice following graduation. Students will participate in the diagnosis and treatment of food animal (primarily dairy cattle) medical and surgical diseases. Teaching rounds will involve daily barn rounds, didactic presentations and wet labs covering medical and surgical topics. The emphasis will be on individual animal (as opposed to herd health) problems. Students will be responsible for after-hours treatments and emergencies of food animals only; students will not work with equine patients during this rotation. Each student will have three weeknights and one 24-hour weekend shift during the rotation (based on 8 students enrolled). Note: students that desire further experience in medical or surgical problems of all large animal species should elect either VCSN 7705 or VCSN 8705.

9 Credit Hours

VCSN 8785 Sports Medicine Clinic - NBC

The Sports Medicine Clinic provides exposure to many types of problems facing the equine practitioner, concentrating on lameness and performance evaluations. While part of the course stresses traditional lameness evaluation and clinical diagnoses, high-speed treadmill evaluations and nuclear scintigraphy enable the student to participate in more intricate problems affecting sport horses. The course will provide students with the opportunity to develop techniques of examination and diagnosis, and permit direct contact with clients. Students are expected to perform in all areas and participate to the maximum of their ability. Duties may include care and SOAPs of in patients and may include care over a weekend. There is NO emergency duty. In order to participate students are required to have satisfactorily completed the prerequisite courses.

5 Credit Hours

VCSN 8795 Equine Podology - NBC

This course covers the principles of both normal and corrective shoeing as well as examining the current theories of hoofcare. The student will: attend surgery rounds beginning in radiology each morning; and work with the resident farrier and equine clinicians on the various lameness problems presented to the clinic. Foot anatomy and physiology will be stressed. While the students will not be required or expected to manually make or nail on a shoe, they will be required to participate in and observe the procedures utilized. Procedures expected of Equine veterinarians such as removing shoes and debriding the sole will be covered in detail. Additional specialties such as the application of extensions to foal hooves can be incorporated into the rotation if requested.

2 Credit Hours

VCSN 8805 Dairy Production Medicine Clinic - NBC

This program is an integrated curriculum sponsored by the Sections of CAHP, Field Service and Reproduction as a part of the Food Animal Majors Program of the School of Veterinary Medicine. Curriculum begins with an overview of the "Economic Reality" of dairy production progressing through "Quantitative Skills" - T test, Chi Square, and Proportions; "Semen Selection" - visit stud, concepts in genetics semen selection and allocation and linear programming approaches; "Heifer Rearing" - systems view of heifer rearing, evaluation of heifer weight gain and evaluation of heifer reproduction; "Dairy Herd" - vaccination programs through body condition scoring; "Milk Quality" - principles of milking machine, procedures evaluation, mastitis control programs, DHIA, SCC monitoring programs, microbiology and quality assurance Reproduction - traditional programs, new programs and evaluation and interpretation of infertility and pregnancy loss; "Monitoring Reproduction" - current measures, heat detection, breeding intervals, developing a heat detection program; "Record Systems" - DHIA records, paper records, DAIRY COMP 305 (down loading data); "Dairy Nutrition" - ration evaluation using Spantan, interaction with reproduction, MUN interpretations; "Culling" - basic economic concepts and sample applications; "Facilities Evaluation" - ventilation and free stalls; "Computer Data Bases" - DairyL, AABPL, Merck Diagnostic Program, Cornell Diagnostic Program and Internet sites; "Laboratories" - obstetrics/fetotomy, special procedures, follow the estrus cycle in a cow (2 students/cow), milk progesterone kits and breeding soundness examination; "Herd visits with private practitioners"

24 Credit Hours

VCSN 8815 Food Safety and Quality Assurance - NBC

The purpose of this course is to prepare the student to: 1) Identify human health hazards in food of animal origin. 2) Define some of the roles of the veterinarian in preventing/reducing the introduction of biohazards into the food chain. 3) Discuss the principles of safe food practices for both animals and humans. 4) Recognize and describe where laboratory studies (microbiology, toxicology, chemistry) would help define real or potential problems. 5) Define the appropriate times to utilize laboratory evaluations and become familiar with interpretive criteria. 6) Participate in field trips to learn about different practices and processes. Assess sites in terms of HACCP criteria. 7) Interact with representatives from local and federal agencies concerning policies, application of technology and recommendations concerning problem solving issues. 8) Discuss intervention actions that can be initiated during acts of bioagrorterrorism and/or naturally-occurring disasters (using recent events as models for discussion). Case studies will be introduced as problem solving activities.

8 Credit Hours

VCSN 8825 Swine Production Medicine - NBC

On-farm problem solving and client communications will be emphasized in this course. Students will be required to interact with producers. Students will write a follow-up report describing the findings and recommendations from the farm visit. Each student will also be assigned a case that will require collation of careful history taking, judicious performance of diagnostic tests and critical analysis of computerized production records to reach their diagnosis. Students will visit farms and other allied industries to survey production systems and collect data to be analyzed in the course. Various production systems and cycles will be reviewed, performance targets will be explained, and their elasticity and economic prioritization will be discussed. Records and data will be analyzed and students will learn how to identify significant production deficiencies and associate these with disease processes - either non-infectious, management-related, or infectious. Strategies for dealing with specific deficiencies will be outlined and the benefits of intervening to improve productivity will be compared to the costs of disease and used in developing a recommendation for action by the producer.
6 Credit Hours

VCSN 8835 Advanced Swine Production Medicine - NBC

A new role for swine veterinarians is emerging in large scale swine production. So-called "corporate veterinarians" are employed by a single company and have the challenge of overseeing the production and health care concerns of the animals owned or managed by their employer. This course provides students with the opportunity to gain exposure to this emerging discipline in swine veterinary medicine. Principles of epidemiology, economics and health care delivery systems and their application to optimizing swine health and production will be provided. Students will work closely with selected professionals who are in a leading role in defining the veterinarians place in large scale, vertically integrated swine production. This course extends the offerings in VCSN 8825. Students will be expected to complete a small project or investigation during their visit.
6 Credit Hours

VCSN 8845 Swine Production - NBC

Veterinarians today cannot make useful contributions to the swine industry without an intimate understanding of swine production. The successful practice of modern swine production medicine depends on the ability of the veterinarian to interweave their traditional training in medicine with the intricacies of swine husbandry. This course provides students with the opportunity to gain hands-on experience in modern swine production systems and/or swine production medicine practices. Students will learn through immersion the basic management, husbandry and/or production medicine practice by working with a practice or a farm in specific phases of swine production at a few selected, nationally recognized swine companies. Permission of instructors required.
9 Credit Hours

VCSN 8855 Equine Ophthalmology - NBC

This course is designed to provide students with ophthalmology experience to supplement what they obtain in the Large Animal Medicine foundation rotation, and, if taken, the Small Animal Ophthalmology elective. It is intended both for students with a special interest in ophthalmology, to broaden their exposure to include equine ophthalmology, and for equine students, to provide them with ophthalmology training that will benefit their equine patients in either general or speciality practice. This latter is particularly important given that most equine students do not take the Small Animal Ophthalmology elective and so graduate without clinical ophthalmology experience. Students will participate in the diagnosis and treatment of clinical ophthalmology cases in the hospital. Students will assist with evaluation of new cases, both inpatient and outpatient, and will be responsible for the daily treatment and examination of all hospitalized ophthalmology cases. Students will handle communication with clients and construct discharge summaries when appropriate. Exposure will vary due to fluctuations in case load. Organized laboratories in slit-lamp biomicroscopy, indirect ophthalmoscopy, and tonometry will allow the student to become comfortable with ophthalmic diagnostic techniques.
6 Credit Hours

VCSN 8900 Large Animal Medicine and Surgery Holiday Emergency Rotation - NBC

Students will assist emergency clinicians and house officers in history taking, examinations, and the medical and surgical management of large animal patients presented on an emergency basis to the hospital at New Bolton Center. Students will also be responsible for the care and treatment of medical and surgical patients hospitalized at New Bolton Center. This rotation will consist of two 12-hour shifts per day including the weekends and any holidays (example Christmas and New Years Day). All students will be expected to participate in night, weekend, and holiday duty on a rotating basis. Students in this rotation will be responsible for five 12-hour shifts each during the one-week rotation. Students are expected to be on the premises during their duty shifts. Rounds to acquaint students with the hospitalized patients will be held daily during each shift with the emergency clinician/house officer/nursing staff on duty, but no formal teaching or Grand Rounds will occur during this rotation.
3 Credit Hours