

# Principles of Disease in Veterinary Medicine, VETM\*3450

Fall/Winter 2016-2017

2.75 Credits

## Calendar Description

This course addresses several major topics, including principles of disease induction and transmission, host response to threat and injury, pathogenic mechanisms of infectious and toxic agents, and manipulation of disturbances in health. The interaction among host, environmental, and etiologic factors in the development of disease will be highlighted. Students will learn to recognize, describe, and evaluate disturbances of health and homeostasis at the level of the population, individual animal, organ system, tissue and cell using a variety of diagnostic modalities. The course is administered by the Department of Pathobiology.

## Course Coordinator

**Course Coordinator:** Patrick Boerlin, Pathobiology, ext 54647; email: pboerlin@uoguelph.ca

**Co-Coordinator:** Éva Nagy, Pathobiology, ext 54783; email: enagy@uoguelph.ca

## Instructors

John Barta, Karlyn Bland, Patrick Boerlin, Jeff Caswell, Janet MacInnes, Éva Nagy, Brandon Plattner, Laetitia Tatiersky, Scott Weese.

## Administrative Information

For questions regarding academic consideration, continuation of study, academic misconduct, safety, confidentiality, and experiential learning involving use of animals, please refer to the Phase information of the OVC website.

## Course Objectives

Principles of Disease in Veterinary Medicine (PODVM) integrates in one course material associated with the disciplines of general and clinical veterinary pathology, veterinary virology, veterinary bacteriology, veterinary parasitology and veterinary toxicology, with relevant content in the fields of immunology and pharmacology. The course will provide students with an opportunity for focused active learning, with continuous formative evaluation, ongoing review of knowledge and skills acquired earlier in the course, and integrated final or summative evaluation.

At the completion of this course, students will be able to:

- detect, recognize, describe and/or explain, using appropriate terminology, common abnormalities in form and function of tissues, organ systems, or of the animal as a whole, based on direct observation and using appropriate tests or procedures available in the field of veterinary

laboratory medicine, and interpret reports of laboratory findings.

- describe and/or explain fundamental mechanisms of transmission or acquisition, pathogenesis, and expression of disease in vertebrate animals associated with infectious, parasitic and toxic agents.
- list the species and age group susceptibility, body system(s) involved, disease(s) and presenting syndrome(s) caused by the major infectious, parasitic, physical and toxic agents affecting animals in North America, and indicate the general host range and importance of selected significant agents exotic to North America.
- describe general approaches to prevention and control of disease caused by the various agents, based on knowledge of their physical and biological characteristics.
- describe and explain the use of vaccines and vaccination in prevention and control of disease in animals.
- indicate whether an infectious or parasitic agent is zoonotic (transmissible from animals to people)
- indicate whether the disease caused by an infectious or parasitic agent is reportable to the Canadian Food Inspection Agency
- describe and explain the mode of action of drugs used to mitigate, treat, or control immunoinflammatory, infectious, parasitic, and toxic diseases, or to promote healing; describe the rationale for use of drugs in these contexts, and precautions that must be considered in their application in veterinary medicine.
- describe and explain, and select or carry out, appropriate tests and procedures using the tools of veterinary laboratory medicine to detect disease states and causes of sub-optimal production at the level of the individual animal (living or dead) and the population.
- describe and implement the diagnostic problem-solving process at an introductory level, in the individual animal (living or dead), selecting, applying and interpreting correctly appropriate laboratory tests and procedures.

## **Units of Study**

Principles of Disease in Veterinary Medicine is comprised of 7 Units of Study, 6 of which group together, making 52 learning modules that provide the opportunity to master material in the various domains of para-clinical veterinary medicine. The 7<sup>th</sup> Unit, Veterinary Laboratory Medicine, deals with concepts regarding observations, testing and measurement in veterinary laboratory medicine, provides an opportunity to carry out experiential learning in gross pathology, and reinforces integration of the knowledge and skills acquired throughout the remainder of the course.

Principles of Disease in Veterinary Medicine and its components are ‘objectives- or outcomes-driven’, and the course will assist students in meeting those objectives. The modular architecture of the course permits students: to focus on the topics at hand; to more clearly understand the objectives of their learning activity; to become actively engaged in the learning process; to

evaluate what they have learned at the time; and immediately to apply, practice and reinforce what they have learned. Faculty try to act more as ‘facilitators of learning’ through orchestration of the student experience within a module, rather than performing as ‘founts of knowledge’ in the more traditional lecture/lab format.

While the learning experience is intense and continuous, its design provides an opportunity to master blocks of material relatively undistracted by competing courses. What once were entire courses or parts of courses that ran in parallel in one semester have been converted into Units within PODVM, arranged in sequence over an academic year, with better integration of material among disciplines within the course. The design of the course promotes integrative ‘deep learning’ that builds on and incorporates understanding of concepts in a broad array of domains of veterinary medicine experienced throughout the year. **Students must evolve away from the typical pattern of short-term learning that follows bouts of cramming information that then is spilled out in mid-term examinations in first one course, then another, on a frequent basis, if they plan to be successful in this course. The need for cumulative, integrated study is a feature of the course.**

**Learning Modules** are comprised of four components designed to assist students to meet the objectives of the module. At an **introductory one hour class meeting** the topic of the module will be introduced and the objectives will be reviewed. Students then will engage in **directed active learning** as individuals or in groups over the next day or so, based on readings and other assignments addressing the objectives of the module. During the 2 hour **laboratory/tutorial**, students will, using case discussions and laboratory exercises, apply and reinforce knowledge, skills and attitudes learned during this and earlier modules. The time set aside in the schedule for each module is equivalent to that scheduled for the typical course with 3 lectures and 2 hours of lab per week, and students are expected to apply some additional **unscheduled** time to preparation for the laboratory/tutorial, as they would in reviewing traditional lecture notes or studying for midterm exams.

**Assignments** may be given to the class during the introductory session in each module. They are intended to help students, working individually or in groups, to actively engage the material dealt with in that module. Minimally, they will be comprised of reading to be completed in preparation for the laboratory/tutorial in that module. They also may involve small exercises or case studies to be completed by individuals or groups of students for discussion in the laboratory/tutorial.

The “**Veterinary Laboratory Medicine**”. It is comprised of a mini-module on observation, testing and measurement in veterinary laboratory medicine; a necropsy laboratory; 15 one-hour periods of gross anatomic pathology wet labs in the Fall semester designed to help students review, reinforce, practice and integrate knowledge and skills in veterinary laboratory medicine as the course progresses. In addition, students are encouraged to assemble a Differential Diagnosis Summary as the year progresses, in order to consolidate information supporting an approach to diagnosis on the basis of host/body system/presenting syndrome, in preparation for entry into Phase 3.

Evaluation in Principles of Disease in Veterinary Medicine is comprised of ongoing formative assessment worth 30% of the final grade, and summative examinations worth a total of 70%. The final summative examinations will be comprised of integrated questions related to all aspects of the course, designed to evaluate how well students have met the objectives set out for them.

The overall grade in Principles of Disease in Veterinary Medicine at the end of Phase 2 is weighted, based on the credit value of the course (2.75 credits) relative to other courses in Phase 2

(total credits for Phase 2 = 6.75). **Hence, Principles of Disease in Veterinary Medicine comprises a little over 40% of the weighted grade for Phase 2.** Although it comprises one course, **you should budget to spend at least 40% of your effort in Phase 2 (i.e. 20-22 hr/week) on PODVM,** due to its volume, complexity and credit weighting. This includes making effective use of the time kept open in the schedule for independent learning, and exploiting the opportunity to review current material in the laboratory/tutorials.

## **Formative Evaluation**

Ongoing formative evaluation is intended to encourage students to achieve the objectives set out for each module and unit, to reward them for so doing, and to provide feed-back to both students and faculty on how well students are progressing.

Formative evaluation in PODVM is ongoing throughout the year which contributes a total **30% of the final course grade.**

### **Short written Formative Tests (25%)**

These are written exams at intervals of 2-3 weeks as in the Phase 2 Schedule.

### **In-laboratory exercises or assignments or quizzes (5%)**

These are completed during laboratory/tutorial periods as scheduled and explained by the instructors.

Formative evaluation in PODVM is continuous and cumulative, as is the learning. Although the value of individual elements of the formative evaluation in PODVM may appear minor, the cumulative reward for continuous achievement, above and beyond the learning outcome, is relatively large. Because of the size of the course, **the weighted value of the formative evaluation in PODVM accounts for ~12.5% of the total academic credit achievable in the entire Phase 2 - more than the value of a 0.5 credit course.**

Seven **Formative Tests (FT)**, evaluating learning mainly related to specific Units or blocks of modules, but also assuming mastery of prior course content and objectives, are distributed at approximately 2-3 week intervals throughout the course. They will be administered during the time set aside for Formative Tests in Phase 2 courses, usually on Monday mornings at 0800 (see Phase 2 Schedule). Usually each test is a 30 minutes in duration, comprised of questions to which written responses will be required, totaling 25 marks. Questions will be discussed by the faculty member(s) involved, or model answers will be posted, after the tests have been handed in. A score of 15 (60%) must be achieved to pass; and all 7 tests must be passed to be eligible to complete the course. If the Formative Test is missed without medical or compassionate reasons, the test will be scored as 0 (0%). Other students failing to achieve a score of 15 will be offered a resit, and an opportunity to demonstrate competence in the area involved. The mark obtained on the original formative test however, will stand. The re-sit test is generally written on the following Wednesday (9 days after the original) and is also scheduled in the timetable. Re-sit tests missed for medical or compassionate reasons must be rescheduled with the coordinator; re-sits may be administered in written or oral format at the instructor's discretion. The cumulative score in these tests will be factored to 25% of the final course grade.

**In-laboratory evaluations** (quizzes, lab exercises, assignments, etc.), which in total comprise 5% of the final course grade, will be given during some laboratory/tutorial sessions. The format of in-laboratory evaluations may vary and will be explained in advance by the faculty members, usually at the beginning of their unit. In-laboratory exercise assignments, for example case

presentations, may be requested at the end of a laboratory period for marking. The total number of in-laboratory evaluations that count towards the 5% of the final grade will be determined early in the school year and communicated to the class by the course coordinator. **The in-laboratory evaluations are not necessarily of equal value. For example, the scores achieved in the gross pathology (wet lab) midterm will constitute 2.25% of the final mark.**

Students who do not achieve a satisfactory mark in an in-laboratory evaluation may be required to take another test, but will retain the mark from the first test. If a student misses a test for documented medical or compassionate reasons (with approval from the Dean's office), the grade for all completed in-laboratory evaluations will be adjusted, taking into account the marks for the missed test(s) in relation to the total marks for all tests. For example, if all tests total 150 marks (equivalent to 5% of the final grade), and lab tests worth 20 marks are missed for approved reasons, the student's total mark would be out of 130 and then adjusted by a factor of 150/130. If a test is missed for any reason not approved by the Dean's office, there will be no adjustment.

## **Final Examinations**

The final examinations in Principles of Disease in Veterinary Medicine are intended to be genuinely 'summative', i.e. to evaluate the student's capacity to meet the objectives of the course as a whole, prior to advancing to Phase 3 of the DVM Program. To achieve that end, they are comprised of two components.

The first is an **Evaluation of Gross Pathology** competence (5% of final grade). This is a practical 'wet lab' examination in gross anatomic pathology, comprised of several 'stations', at each of which students will be required to respond in writing to questions related to a particular gross specimen. Questions will evaluate whether students have met the objectives set out for this component of PODVM, which is highly integrative and may include material from other units of the course. This examination will be administered as scheduled in the Phase 2 timetable, and **a grade of 60% must be obtained on this section to pass the course**. Students who do not achieve 60% will be offered remediation that may require further study of the subject during the summer and a subsequent conditional exam (see Appendix 1).

The second component of the summative evaluation is comprised of **three 3-hour examinations** administered during the final examination period as scheduled in the Phase 2 timetable. The sum of the grades obtained on these examinations comprises 65% of the final grade. Questions based on all components of the course may be included in any of these examinations, and questions may cross disciplines or otherwise be integrated. Grades or portions of grades on a question are not attributed to individual course Units, scientific disciplines or faculty members, but rather are applied to the outcome of the course as a whole. All questions in each component of the final examinations must be answered.

Required answers may include longer essay and shorter written responses to questions based on case scenarios; multiple choice and short answer questions evaluating factual knowledge, conceptual understanding and problem-solving skills; and evaluation of practical skills in veterinary laboratory medicine; they may include illustrations. The first two 3-hour examination periods will be comprised of written responses to larger (typically 30 to 50-mark) questions; the third 3-hour examination will be comprised of multiple-choice or short-answer questions. There will be no requirement for a student to describe or interpret images of histological preparations, but interpretation of written gross and microscopic pathology, hematology and cytology reports, and

images of gross abnormalities in tissue, hematologic or cytologic preparations, adult or juvenile parasites, parasite-induced gross lesions or parasite eggs or cysts, microscopic microbiological preparations, or other visual, numeric or descriptive laboratory test outcomes, may form the basis for parts or all of individual questions.

Final examination questions will address the learning objectives of the course. Individual faculty may include sample questions relevant to their domain of activity with information made available in their unit or modules, and sample final examination questions covering the objectives of the entire course will be posted on the course web site. These questions will include some written final examination questions from previous years. **A minimum average grade of 60% on the first two of the three (3) final examinations and a minimum grade of 60% on the third multiple choice examination must be achieved in order to pass the course.** Students who do not achieve these conditions will be offered remediation that may require further study of the subject during the summer and a subsequent conditional exam. For course failure options and procedures, see Appendix 1.

### **Academic Integrity**

The Faculty and Administrative staff of the University of Guelph take a very serious view of academic misconduct. Cheating on examinations, plagiarism, misrepresentation, and submitting the same material in different courses without written permission are all examples of academic misconduct. Students are expected to be familiar with the section on academic misconduct in the Undergraduate Calendar, and should be aware that expulsion from the University is a possible penalty. Once you are in the DVM program, you also are bound by the codes of the profession.

### **Resources**

For each module, reference will be made to notes, illustrations and assignments provided by faculty that contain essential information relevant to successful completion of the module. Notes and assignments will be made available to students via the course web site. At the Course-link site for each module, relevant additional sources of information, such as Powerpoint files, references to journal articles or reviews, texts and book chapters, and links to internal or external web sites, and links to scanned microscope slide images will be available.

There will be no printed material provided other than worksheets required for some laboratory/tutorials. The cost of printing notes directly from the PODVM web site, or of burning personal CD-ROMs, is the responsibility of the student.

*Approved: September 1<sup>st</sup>, 2016*

## **Academic Regulations, Remediation and other Academic Assistance**

We draw your attention to the criteria for assignment of numerical grades in the Undergraduate Calendar. We also point out the regulations for Academic Consideration (Medical, Psychological, Compassionate grounds), and the Policy on Academic Misconduct. **This course operates under those regulations, which will guide any necessary decisions about academic matters.**

We strongly urge students with **academic questions or learning difficulties** to consult the relevant instructor or one of the Course Coordinators **as soon as a problem is perceived**. We should be able to solve it together, or by referral to a more appropriate source of assistance.

This course is demanding, and will require the student to keep current, in order to succeed. There are regular quizzes and written tests, the purpose of which is to encourage students to keep up with course material and to come to laboratory/tutorials prepared; to self-evaluate; and to reward them for so doing. **Students who are having difficulty in this regard should immediately contact the Course Coordinator, Patrick Boerlin, for assistance and remediation.**

The course coordinator will seek out students who are having difficulty on quizzes and tests to discuss the circumstances, and offer remedial assistance, if not approached by the student having difficulties. We operate on the well-founded assumption that all students are intellectually capable of succeeding in this course. You would not be here if you weren't. Faculty are here to help those who are not meeting their potential in the program, and students should ask for and take advantage of the assistance offered, not put it off or avoid it. While a few students have previously-unrecognized learning disabilities, the usual reasons for difficulty with PODVM relate to not working consistently to keep up with the course, and in a few instances by trying to memorize rather than to understand. You must summarize and master material as you go, and carry out periodic review. The material is cumulative, and earlier parts of the course help you understand later parts, but there is a large volume of new material to deal with in each module, and this continues to the end of the course. You cannot read over all the notes at the end, and you can't cram.

Students with **personal, psychological or medical problems** that may be impacting the quality of their academic activities or threatening their continuation of study should seek advice from the Associate Dean and/or University counseling or medical services **early in the course of their difficulties**. The University is very accommodating to those with such problems, but **you need to take the initiative to seek assistance**.

### **Program Continuation**

Failure of VETM\*3450 Principles of Disease in Veterinary Medicine will necessitate repeating Phase 2. See also Appendix 1.

### **University of Guelph Safety Notice**

Within the laboratory setting, serious accidents can occur if students do not act responsibly or (fail to) follow the appropriate procedures. To ensure the safety of all participants, students must at all times abide by the directions given by the instructor or assistant. Failure to do so could result in being dismissed from the lab or loss of any related academic credit.

## **Protective Clothing**

Certain common-sense regulations relating to use of protective clothing and general hygiene are in force to mitigate the risk that students, faculty or staff members, clients, or a client's animal will be exposed to an infectious agent or noxious chemical.

In any laboratory session in which living organisms (bacteria, viruses, parasites etc.), feces, blood, tissue from dead animals, or potentially irritant chemicals (such as formalin or other fixatives) is demonstrated or used, students shall provide and wear clean laboratory coats, or, if appropriate, clean coveralls. If students are handling such material, or potentially may come in contact with it, they shall wear protective gloves. Food or drink is not to be brought into or consumed in such laboratories at any time; these safety requirements are strictly enforced.

Students entering the Post Mortem Room must have been successfully immunized against rabies, and must wear appropriate protective clothing (clean laboratory coat or coveralls), and rubber boots, which they must supply. Boots shall be washed with a brush using disinfectant and removed prior to leaving the Post Mortem Room area. Boots will not be worn in the halls or locker rooms. Students should wash their hands thoroughly immediately after leaving any laboratories in which living organisms, feces and blood are used, and after participating in Gross Pathology Rounds or being in the Post Mortem Room.

## **Accidents**

Accident prevention is a prime goal. Students shall follow instructions given by faculty, graduate students and staff in the handling and use of any instruments, or in carrying out any procedure. They are expected to use common sense and care in engaging in any procedure, and if they do not understand any instructions or protocol, they should seek clarification before proceeding. It is the responsibility of each student to attend any session in which safety orientation is provided, and to become informed of protocols and instructions that are provided for their guidance. Students showing obvious lack of care or disregard for safety regulations, or lack of knowledge of technical procedures or protocols, may be asked to withdraw from the laboratory session involved.

Should an accident occur, no matter how inconsequential it may seem, it must be reported immediately to the responsible faculty member, graduate student or staff member, so that appropriate steps can be taken in response. Even a minor cut or needle stick can become infected with a potentially dangerous pathogen, and no such event should go unreported and unevaluated.

## **Course Schedule**

The **PODVM Course Schedule** lists the titles of Units and Modules, and faculty responsible for each. It further contains the schedule for the written Formative Tests.

## Appendix 1. Assessment in PODVM VETM\*3450, 2015-2016

	Summative					
	Formative Tests	In Lab Quizzes & Assignments	Final Gross Pathology Exam	Final Written Exam 1	Final Written Exam 2	Final MCQ Exam
<i>Number of tests/exams</i>	7	9-10	1	1	1	1
<i>Percent of final grade from this evaluation</i>	25	5	5	One third of 65	One third of 65	One third of 65
<i>Requirements to pass PODVM course</i>	≥15/25 in 7 of 7	≥60% in each test	≥60% in this test	≥60% in this test	≥60% in this test	≥60% in this test
<i>Options for repeating failed formative tests during course</i>	One re-sit as per schedule	See unit/lab instructor	* see 'Course Failure Options' below			
<i>Options for incomplete formative component before final exams</i>	See course coordinator	See course coordinator				
<i>Missed for medical or compassionate reasons</i>	Resit as per schedule	Grade scaled from other tests	See program regulations			

### \*\*Course Failure options

- If all formative requirements have not been met by the last day of classes, you will not be eligible to write the final exams and will have to meet with the course coordinator to determine how this requirement will be completed.
- If the overall course grade, including both formative and summative components, is <50%, you will have failed the course and your grade will be submitted to academic review.
- If the overall course grade is ≥50%, but an average grade of <60% is obtained in the first two of the three final examinations and/or a grade of <60% is obtained in the third final examination, a grade of Incomplete (INC) will be assigned, and a conditional exam as determined by the course coordinator will be granted. Original grade will be assigned upon completion of conditional exam.
- If the conditional exam is passed, the original course grade will be assigned, and the course will be assessed as passed.
- If the conditional exam is failed (<60%), a course grade of 49 will be assigned and your grade will be submitted to the Academic Review Committee.