The course will contribute to students' achievement of greater depth in selected elements of graduating competency in the context of health management in species of their choice. The primary emphasis is directed towards developing species-specific skills, knowledge and attitudes that will permit the entry-level veterinarian to assess and advise on animal production and performance and evaluate the necessity for, and implementation of, health management programmes. The course is constructed as a series of species-based modules. Students will be required to take two of the modules for credit.

**Pre-Requisites:** All Phase 1 and Phase 2 courses

**Co-Requisites:** All Phase 3 courses

**Until January 1, 2018:** Dr. Paula Menzies, Population Medicine, pmenzies@uoguelph.ca Rm. 2541, Ext. 54043

**After January 1, 2018:** Dr. Jessica Gordon, Population Medicine, jgordo04@uoguelph.ca Rm. 2538, Ext. 58813

**HEALTH MANAGEMENT MODULES**

- **BEEF CATTLE**
- **COMPANION ANIMALS**
- **DAIRY CATTLE**
- **HORSES**
- **WILDLIFE**
- **LABORATORY ANIMALS**
- **POULTRY**
- **SMALL RUMINANTS**
- **SWINE**

**MODULE COORDINATORS**

- **Beef Cattle:** Dr. Jessica Gordon, jgordo04@uoguelph.ca Rm. OVCS 2538 Ext. 58813
- **Companion Animals:** Dr. Cathy Gartley, cgartley@uoguelph.ca Rm. OVCS 2544 Ext. 56304
- **Dairy Cattle:** Dr. Kerry Lissemore, klissem0@uoguelph.ca Rm. OVCS 2652 Ext. 54423
- **Horses:** Dr. Colleen Best, cbest@uoguelph.ca Rm. OVCS 2522 Ext. 53944
- **Laboratory Animals:** Dr. Pat Turner, pturner@uoguelph.ca Rm. PABL 3801 Ext. 54497
- **Poultry:** Dr. Leo Susta, lsusta@uoguelph.ca Rm. PABL 4800 Ext. 54323
- **Small Ruminants:** Dr. Paula Menzies, pmenzies@uoguelph.ca Rm. OVCS 2541 Ext. 54043
- **Swine:** Dr. Robert Friendship, rfriends@uoguelph.ca Rm. CR 103 Ext. 54022
- **Wildlife:** Dr. Nicole Nemeth, nnemeth@uoguelph.ca Rm. PABL 4839 Ext. 54625
- **Wildlife:** Dr. Claire Jardine, cjardi01@uoguelph.ca Rm. PABL 4842 Ext. 54656

**COURSE GOALS**

The goal of this course is to present information and concepts necessary for the student to be able understand and apply the principles of health management and to participate in and deliver health management programs in the species / industries of their choosing.
HEALTH MANAGEMENT: DEFINED

Health management is the **promotion of health and prevention of disease** in animals within the economic/business framework of the animal owner/industry, while recognizing the issues of animal welfare, human safety and environmental impact.

HEALTH MANAGEMENT: PRINCIPLES

- Promote optimal health.
- Accommodate business/economic realities.
- Promote animal welfare.
- Promote human and food safety.
- Consider potential environmental impact.

HEALTH MANAGEMENT: DELIVERY

Health Management is a dynamic process in which selected management areas of importance to the industry and the animal owner are identified and monitored. Decisions are made and plans are developed and implemented. The outcomes are then measured and evaluated. This process is called the *Health Management Cycle*.

<table>
<thead>
<tr>
<th>LEARNING OBJECTIVES COMMON TO ALL SPECIES / COMMODITIES:</th>
</tr>
</thead>
</table>

At the end of Phase 3, the student will be able to

**Animal Industries**

- Analyze health and production data accurately and systematically, at the herd / flock/colony level to relevant industry norms.
- Building on previous *Health Management* objectives delivered, be able to recognize when norms in animal husbandry, production and performance are not being met, in the Canadian context and within the context of that production system.
- Apply knowledge of the scope, structure and function of the relevant animal industries, including production norms, and inputs and outputs to the analysis of herd/flock/colony problems.

**Public Health**

- Recognize important zoonotic, environmental and food-borne issues and those *Health Management* practices that mitigate risk to animals and people (including prudent drug usage) for relevant animal industries.

**Animal Welfare**

- Recognize when intervention is required to meet industry, veterinary profession, and legal expectations with respect to the well being of relevant animals as it relates to current Codes of Practice and applicable legislation.
- Recognize what constitutes appropriate intervention.
- Explain how the principles of animal welfare for relevant species are incorporated into the development and application of health management programs.

**Animal Behaviour**

- Recognize, describe and advise on the interaction between the behavioural biology of the
relevant animal and the animal management practices common to Canada Identify and explain the differences between normal, abnormal, and problem behaviour

- Explain methods for prevention and treatment of related management practices that affect behaviour of relevant species.

### Evidence-Based Decision Making in the Promotion of Health and Prevention of Disease

- Describe potential factors that may account for deviations from norms of health and production objectives (e.g., management, environmental, behavioral, infectious, genetic, nutritional, and interactions) for the relevant species.
- Develop plausible hypotheses and list means to test hypotheses regarding deviations in health and productivity.
- Develop differential diagnoses, and identify and recommend appropriate strategies for promotion of health, and prevention and control or eradication of disease to correct deviations.
- Strategies may include the following health promotion measures: vaccination, metaphylactic or prophylactic medication, biosecurity, environmental management, nutritional management, housing and ventilation, nutrient management including deadstock management.
- Identify the variety of issues that affect the cost of optimizing health and production and where appropriate profitability.
- Identify key measures that will monitor outcomes or actions taken to correct deviations in health and productivity at the group level.
- Identify industry/government *Health Management* programs for individuals or groups that are available and effectively communicate recommendations to the client.

### TEACHING STRATEGIES:

The teaching / learning methods will vary depending on the module (see individual module descriptions).

### EVALUATION

The assessment and evaluation methods will vary depending on the module. Each module will have a final one-hour (summative) assessment, which will take place on the next module day after the conclusion of the instructional component of the module.

### USE OF TURNITIN SOFTWARE

In this course, some instructors in some modules will be using Turnitin, integrated with the CourseLink Dropbox tool, to detect possible plagiarism, unauthorized collaboration or copying as part of the ongoing efforts to maintain academic integrity at the University of Guelph.

All submitted assignments will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of the Turnitin.com service is subject to the Usage Policy posted on the Turnitin.com site.

A major benefit of using Turnitin is that students will be able to educate and empower themselves in preventing academic misconduct. In this course, you may screen your own assignments through Turnitin as many times as you wish before the due date. You will be able to see and print reports that show you exactly where you have properly and improperly referenced the outside sources and materials in your assignment.
REQUIREMENTS FOR SUCCESSFUL COMPLETION OF THE COURSE (CREDIT MODULES)

1. A passing grade of 50% or better in each of the two modules selected for Credit is required to pass this course. The final grade in the course will be the simple average of the grades from two modules that the student selected to take for credit.

2. In the case where a student passes one module and fails to achieve a grade of 50% in the other module, the student will receive a grade of 49%.

3. In the case of a student failing both modules, the student will receive a grade of 39%.

REQUIREMENTS FOR SUCCESSFUL COMPLETION OF AN AUDIT MODULE

- For successful completion of a module for Audit the student will demonstrate commitment by attendance, participation and successful completion of all assignment(s), assessment(s) and project(s) as detailed in the outline for specific module being taken for audit (see below).
- Module coordinators will determine whether Audit students are required to sit the final examination in that module.

REGISTRATION IN A MODULE – CREDIT OR AUDIT

- Students must register using the registration form provided by the course coordinator, and indicate whether the module is for Credit or Audit.
  - The course coordinator (not the module coordinator) will be the contact for all aspects of the registration process, which will occur before the conclusion of Phase II.

- To attend a given module, a student must be registered in that module at least 14 days prior to its start, either a Credit or Audit status, i.e. “sitting in for interest” will not be permitted.

- Each module is scheduled into 8 sessions of 2 concurrent lecture slots for a total of 16 hours of contact time. The examination for that module will take place at 8:00 am on the next module day.

- It is the student’s responsibility and part of expected professional conduct of a student in a professional program to record and know which modules he/she is enrolled in and to attend those modules. Students may register in (Audit) as many modules as their interests permit.

- It is expected that as a student in a professional program, that if signed up for a module he/she will attend and be an engaged learner.

DROP / ADD INFORMATION

IMPORTANT:

- A student may either drop or add a module up to 14 days in the academic calendar prior to the start of that module (see schedule below with applicable dates). The intent is to allow students whose career choices change over the summer, to adjust their module choices.

- All changes must be submitted to the course coordinator using the provided registration form.

- It is expected that few students will “drop / add” a module(s) after the start of the academic year.

WHAT IS NOT PERMITTED:

1. A module may not be dropped or added after the drop/add date has passed, regardless of whether the student is registered as a Credit or Audit.

2. A module’s Audit/Credit status may not be changed after the drop/add date has passed.
PREREQUISITES FOR PHASE 4 STREAM PRIORITY ROTATIONS / ELECTIVES

Successful completion (by either Credit or Audit) of certain modules is a prerequisite for some of the stream-priority rotation offerings in the Food Animal Stream in Phase 4. This also applies to students in other streams who take these SPRs as electives. No HM3 module is a pre-requisite for a core rotation although it is strongly recommended that for food animal core rotations, the corresponding module be taken for audit/credit.

SCHEDULE FOR LECTURES AND EXAMINATIONS BY MODULE

See Phase 3 Course Schedule for up-to-date times and dates for lectures.

<table>
<thead>
<tr>
<th>MODULE</th>
<th>LAST DROP / ADD DATE</th>
<th>START DATE</th>
<th>END DATE</th>
<th>EXAM DATE</th>
<th>COORDINATOR</th>
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<tbody>
<tr>
<td>1 COMPANION ANIMAL</td>
<td>Aug 23</td>
<td>Sep 6</td>
<td>Sep 22</td>
<td>Sep 25</td>
<td>Gartley</td>
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<td>2 SMALL RUMINANTS</td>
<td>Sep 13</td>
<td>Oct 6</td>
<td>Oct 20</td>
<td>Nov 6</td>
<td>Menzies</td>
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<td>3 DAIRY</td>
<td>Oct 27</td>
<td>Nov 10</td>
<td>Nov 27</td>
<td>Nov 29*</td>
<td>Friendship</td>
</tr>
<tr>
<td>4 SWINE</td>
<td>Oct 27</td>
<td>Nov 10</td>
<td>Nov 27</td>
<td>Nov 29*</td>
<td>Friendship</td>
</tr>
<tr>
<td>5 WILDLIFE</td>
<td>Oct 27</td>
<td>Nov 10</td>
<td>Nov 27</td>
<td>Nov 29*</td>
<td>Jardine/Nemeth</td>
</tr>
<tr>
<td>6 LABORATORY ANIMAL</td>
<td>Nov 15</td>
<td>Dec 13</td>
<td>Jan 5</td>
<td>Jan 24</td>
<td>Turner</td>
</tr>
<tr>
<td>7 HORSES</td>
<td>Jan 15</td>
<td>Jan 29</td>
<td>Feb 14</td>
<td>Feb 16</td>
<td>Susta</td>
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<td>8 POULTRY</td>
<td>Feb 12</td>
<td>Feb 26</td>
<td>Mar 14</td>
<td>Mar 16</td>
<td>Gordon</td>
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<td>9 BEEF</td>
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*The Swine & Wildlife exams and the Lab Animal module lecture 1 are on the same day – Nov 29, 2017

**The Lab Animal examination is on the last day of classes for the fall semester – Dec 15, 2017

Fall Semester 2017

Classes start: Tue September 5, 2017
Classes conclude: Fri December 15, 2017

No classes scheduled on:
Monday Oct 9, 2017: Thanksgiving
Tuesday Oct 10, 2017

Winter Semester 2018

Classes start: Tue January 2, 2018
Classes conclude: Thu March 29, 2018

No classes scheduled on:
Friday Jan 19, 2018: 2018 SCVMA meeting
Monday Feb 19 2018: Family Day
Feb 20-23, 2018: Winter Break
Friday Mar 30, 2018: Good Friday
Beef Cattle

MODULE COORDINATOR
Dr. Jessica Gordon jgordo04@uoguelph.ca Rm. 2538 Ext. 58813

MODULE DESCRIPTION
The beef cattle module will contribute to students’ achievement of selected Phase 3 health management learning objectives in the context of the cow calf and feedlot industries. The primary emphasis is directed towards developing the skills, knowledge and attitudes that will permit the entry-level veterinarian to assess and advise on animal production and performance and evaluate the necessity for, and implement health management programs.

Who should take this module: This module is intended for those students intending to enter a mixed or food animal practice.

NOTE: This module is a prerequisite (via credit or audit) for the Phase 4 Ruminant Health Management II Beef elective.

TEACHING STRATEGIES:
The prime modes of presentation will be lectures and several case-based discussions.

EVALUATION
The formative component of evaluation will comprise 30% of the final grade for the module and will consist of: (1) a multiple choice question midterm (session 6), (2) an evaluation of the quantity and quality of contributions to the case discussions and (3) a short assignment. Attendance at the 4 case discussions (sessions 3, 5, 7, 8) is mandatory. A summative examination on the content of the module will comprise 70% of the final grade for both Audit and Credit students.

RESOURCES
RECOMMENDED TEXT:
1. Herd Health - Food Animal Production Medicine (3rd ed.) Radostits
2. Veterinary Medicine (10th ed.) Radostits, Gay, Hinchcliff and Constable

OTHER RECOMMENDED RESOURCES: Web-based resources provided

LECTURE OUTLINE AND LEARNING OBJECTIVES
HOUR 1 & 2: Beef industry (cow calf and feedlot) overview
GOAL: To describe the Canadian beef industry and its component segments to provide the current context for discussion of health management programs.

OBJECTIVES:
The student will be able to describe:
• The relative importance of the beef industry to agriculture in various parts of Canada
• Production segments, size of operations, production inputs, sources of revenue, income per
animal marketed, number of beef producing units, production per unit

- The reason for small cow-calf operations and large feedlots and the implications in terms of health
- The beef marketing system and its implications on production decisions
- The changes in value of a calf over its lifetime and typical profit margins in the industry segments
- Current trends in the N. American industry


HOUR 3 & 4: Assessing health, productivity and profitability of the commercial cow/calf operation

GOAL: To describe the methods available to measure productivity and profitability of the commercial cow-calf operation.

OBJECTIVES:
The student will be able to describe the annual production cycle on a cow-calf operation and list the normal herd inventory.

For each of the following measures of productivity:

- Length of breeding season
- % Pregnant
- % Abortions
- % Stillbirths
- Birth weight, calving ease (classification)
- % Calf mortality
- % Calf crop
- Replacement rate (% first-calvers)
- Weaning weight (WW), adjusted WW (AWW), pre-weaning ADG, weaning index, yearling weight, post-weaning ADG, post-weaning gain index, AYW, composite index
- Post-weaning EPD, ABC, SC, fat cover, feed conversion

The student will be able to:

- State the source of information and how it is calculated.
- Explain how target values are established.
- Interpret each value with reference to normal reproductive physiology.
- Identify general problem areas by comparing values to industry norms and following lectures 5-8, be able to select additional tests to further define areas of concern.

The student will be able to list the costs of production for cow-calf operations in order of magnitude and to state the major determinants of profitability.


HOUR 5: Cow-calf case #1 (case method)

GOAL: To illustrate the parallels between the diagnostic process at the individual and at the herd level and to arrive at differential diagnoses by generating and testing hypotheses.

HOURS 6, 7, 8: Achieving health, productivity and profitability in the commercial cow-calf herd

GOAL: To describe the fundamental management and health procedures necessary to achieve the cow-calf production targets and the veterinarian's role in the program.

OBJECTIVES:
The student will be able to state the objectives and limitations to implementation of a cow-calf production medicine program.
The student will be able to describe:
- Reasons for, and implications of, 45 to 60 day breeding season
- Why heifers are bred to calve before cows and the strategies to achieve this objective
- How to assess and optimize nutrition
- Bull selection strategies and methods to maximize male fertility
- How to "process" calves during the spring/summer
- External and internal parasite control
- The reasons for, and expectations of, pregnancy examination
- Culling strategies
- Parasite control for cows vs. Calves
- The indications for BCS, early weaning, bunk adjustment
- Preconditioning vs. Prevaccination vs. Preweaning
- Nutritional management and how to monitor the response
- The appropriate choice of calving season
- Calving facility set-up and management
- Strategies to avoid dystocia
- How to increase specific and non-specific immunity and prepare a vaccination program
- Disease treatment protocols

The student will be able to organize and justify the above strategies into a production medicine program based on four visits per year.

HOUR 9: Cow-calf case #2 (case method)
GOAL: To illustrate the parallels between the diagnostic process at the individual and at the herd level and to arrive at differential diagnoses by generating and testing hypotheses.

HOUR 10: Assessing health, production and profitability in the feedlot
GOAL: To describe the feedlot process and the targets for production and disease.

OBJECTIVES:
The student will be able to describe:
- What a feedlot is, its function and challenges
- The different types of feedlots
- The flow of cattle and data collection in the feedlot
- Strengths and weaknesses of different classes of cattle purchased
- The components of a simple cost of production formula

The student will be able to explain the major involvement of the veterinarian at an individual and group level and be able to interpret the following measures of productivity and profitability:
- Feed efficiency
- Average daily gain
- Carcass quality
- Morbidity
- Mortality rate, case fatality rate
- Culling rate


HOURS 11 & 12: Achieving health, production and profitability in the feedlot.
MIDTERM - comprises 20% of module grade and written by both Credit and Audit students

GOAL: To describe the role of the veterinarian in the health and production management of a feedlot.

OBJECTIVES:
The student will be able to explain the:
• Association of management and production with the etiology of common feedlot health problems
• "Processing" or "induction" procedure
• Problems associated with starting animals on feed
• Veterinarian's role in humane practices and residue avoidance
• Implementation of the feedlot health management program

The student will be able to list and describe strategies to:
• Maximize feed efficiency
• Reduce morbidity, mortality and culling
• Optimize the use of biologicals (vaccination programs) and antimicrobials
• Evaluate employee performance


HOUR 13: Feedlot case #1 (case method)
GOAL: To illustrate the parallels between examining the individual and examining the herd and to arrive at differential diagnoses by generating and testing hypotheses.

HOUR 14: Achieving health, production and profitability in the feedlot (cont’d)
GOAL: To describe how disease and outbreaks are detected and managed.

OBJECTIVES:
The student will be able to:
• Describe the associated costs of UBRD
• Explain the use of epidemic curves and the wreck index to define an outbreak of respiratory disease
• Select possible action(s) including mass medication and identify guidelines for use
• Prepare a treatment protocol for UBRD and explain how to monitor its application and how to analyze the outcome


HOUR 15: Feedlot case #2 (case method)
GOAL: To illustrate the parallels between examining the individual and examining the herd and to arrive at differential diagnoses by generating and testing hypotheses.

HOUR 16: Managing other feedlot diseases (including chronic pneumonia and polyarthritis syndrome)
GOAL: To describe how other feedlot diseases and outbreaks are detected and managed.
Companion Animals

MODULE COORDINATOR
Dr. Cathy Gartley, cgartley@uoguelph.ca  Rm. 2544  Ext 56304

MODULE DESCRIPTION
The companion animal module will contribute to students’ achievement of selected DVM2000 elements of competency in the context of the maintenance of health of dogs and cats. The primary emphasis is directed towards developing the skills, knowledge and attitudes that will permit the entry-level veterinarian to assess and advise on health and performance and evaluate the necessity for, and implement health management programs.

Who should take this module: The student planning on a predominantly small or mixed animal practice career.

TEACHING STRATEGIES:
The prime mode of presentation will be lectures supplemented with case discussion and laboratory sessions.

EVALUATION
The assessment in this module will be based on an assignment (25%) and a final summative examination (75%). The examination will be short answer and multiple choice formats.

Audit students will not sit the summative examination but will submit the group assignment.

RESOURCES
RECOMMENDED TEXTS:
Websites and additional resources will be made available through Course-Link

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<thead>
<tr>
<th>DATE</th>
<th>TIME</th>
<th>SUBJECT</th>
<th>INSTRUCTOR</th>
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<tbody>
<tr>
<td>Wed Sep 6</td>
<td>8:30-9:20</td>
<td>Clinical Nutrition</td>
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<td>3:30-4:20</td>
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<td>Verbrugge</td>
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<td>Neonates</td>
<td>Abrams-Ogg</td>
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<td>4:30-5:20</td>
<td>Geriatrics</td>
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<td>8:30-9:20</td>
<td>Clinical Nutrition</td>
<td>Verbrugge</td>
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<td>9:30-10:20</td>
<td>Genetics / Brucella canis</td>
<td>Gartley</td>
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<tr>
<td>Mon Sep 18</td>
<td>3:30-4:20</td>
<td>Advanced Clinical Parasitology</td>
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<td>Wed Sep 20</td>
<td>3:30-4:20</td>
<td>Cat Overpopulation and Introduction to Shelter Medicine</td>
<td>Gartley</td>
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<tr>
<td>Mon Sep 25</td>
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<td>EXAM</td>
<td>1800 / 1810</td>
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<tr>
<td>Mon Oct 2</td>
<td>5:30</td>
<td>Group Assignment Due</td>
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</tbody>
</table>

**MODULE CONTENT SYNOPSIS**

More information on module content and learning objectives will be supplied in class.
The Dairy Module will contribute to students’ achievement of selected elements of competency in the context of the dairy industry. The primary emphasis is directed towards developing the skills, knowledge and attitudes that will permit the entry-level veterinarian to assess and advise on animal production and performance and evaluate the necessity for, and implement health management programs.

Who should take this module: This module is intended for those students intending to enter a rural (mixed species) or predominately dairy cattle practice.

NOTE: This module is a prerequisite (via credit or audit) for the Phase 4 Dairy electives

TEACHING STRATEGIES:
The prime mode of presentation will be lectures and case-based discussions.

EVALUATION
• The formative assessment in this course will comprise 30% of the final grade for the module. It will be based on two (2) in-class multiple choice quizzes.
• In order to receive an Audit designation, students must successfully complete (i.e. pass) the two formative assessments (quizzes).
• The summative exam will cover the content of the entire module and will be worth 70% of the final grade. The format of the summative exam will be multiple-choice questions.

RESOURCES
RECOMMENDED TEXTS:
• Herd Health - Food Animal Production Medicine (3rd ed.) Radostits
• Veterinary Medicine (10th ed.) Radostits, Gay, Hinchcliff and Constable

OTHER RECOMMENDED RESOURCES:
Web-based resources will be provided during the module.

LEARNING OBJECTIVES
The following learning objectives outline what a student should be able to know and do at the end of the Dairy Module:
In the context of the Canadian dairy industry, for each of the following management areas:
• Production (milk, fat and protein)
• Reproduction
• Udder health
• Replacements
• Infectious disease control
• Transition cows

**Animal Industries**

• Be able to analyze the health and production data of a herd.
• Be able to recognize when norms in animal husbandry, production and performance are not being met.

**Public Health**

• Recognize important zoonotic, and food-borne issues specific to the dairy industry and identify the *Health Management* practices that mitigate risk to animals and people (including prudent drug usage).

**Animal Welfare**

• Recognize the significant animal welfare issues in the dairy industry and be able to explain the role of the veterinarian in assisting clients to meet the industry, veterinary profession, and legal expectations.

**Animal Behaviour**

• Be able to identify abnormal behavior issues and explain relevant methods for prevention and treatment related to existing management practices.

**Evidence-Based Decision Making in the Promotion of Health and Prevention of Disease**

Evidence-based veterinary medicine serves as the basis for effective decision making in the promotion of health and prevention of disease.
• Develop differential diagnoses, and identify and recommend appropriate strategies to correct deviations from norms in production and health goals.
• Identify key measures that will be used to monitor outcomes.
• Identify and describe the role of industry programs as part of a health management program.

Please note – the order of these topics is subject to change.

<table>
<thead>
<tr>
<th>Session</th>
<th>Topic</th>
<th>Faculty</th>
</tr>
</thead>
</table>
| 1       | Dairy Industry Update Assessing Production  
• Measuring and assessing milk, fat, protein | Lissemore |
| 2       | Reproductive Health Management  
• Performance measures | Lissemore |
| 3       | Reproductive Health Management  
• Implementing & assessing herd programs | Lissemore |
| 4       | Quiz # 1 (material from sessions 1,2 and 3)  
Replacement Health Management  
• Calves  
• Heifers  
• Culling | LeBlanc |
| 5       | Udder Health Management  
• Epidemiology of pathogens  
• Diagnostic tests and monitoring tools | LeBlanc |
<table>
<thead>
<tr>
<th>Session</th>
<th>Topic</th>
<th>Faculty</th>
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</thead>
</table>
| 6       | Udder Health Management  
          • Principles of control programs Take up Quiz # 1 | LeBlanc |
| 7       | Quiz # 2 (material from sessions 4, 5 and 6)  
          Infectious Disease Control  
          • Biosecurity protocols  
          Transition Cow Management | Lissemore |
| 8       | Transition Cow Management  
          Take up Quiz #2 | Lissemore |
|         | Summative Assessment  
          • 1 Hour comprehensive examination |         |
Horses

MODULE COORDINATOR
Dr. Colleen Best  Room 2522 Stewart Building  Email: cbest@uoguelph.ca  Ext: 53944

MODULE DESCRIPTION
The horse module will contribute to students’ achievement of selected DVM2000 elements of competency in the context of horse industries. Primary emphasis is directed toward developing the skills, knowledge and attitudes that will permit the entry-level veterinarian to assess and advise on horse production and evaluate the necessity for, and implement health management programs.

**Who should take this module:** Candidates contemplating entry into full-time horse practice and those entering mixed practices in which a significant component of the caseload involves interaction with horses and the horse industry. **NOTE:** This module is highly recommended to students considering the Equine Stream in Phase 4.

TEACHING STRATEGIES:
The primary mode of presentation will be presentations and interactive discussions with each session focusing on specific, pre-announced topics. Self-study assignments will involve communication by participants with industry representatives. A summative evaluation will be based on the presentation and discussion material. For purposes of completing self-study assignments, participants self-identifying as having horse industry experience will be paired with those who identify themselves as having little experience.

EVALUATION
Evaluation will consist of two elements:

I. A written assignment worth 40% of the final module grade and based on self-study topics. Assignments will be detailed in the first module session and will be due by the end of the last (eighth) session, and will be worked on in groups of three students per assignment. This required assignment is to be completed by both Credit and Audit students.

II. A final examination worth 60% of the final module grade and based on the content of the module. The format of the examination, which is required for Credit students, will be multiple choice & an essay. The essay will emphasize broad understanding of the topics covered, and not the regurgitation of detail, and will require a response suitable for presentation to an informed, educated client.

III. Audit students will instead take a final multiple-choice quiz.

RESOURCES
**RECOMMENDED TEXT:**
Presentation material will be provided, augmented by specific readings from the refereed and lay literature.
OTHER RECOMMENDED RESOURCES:
The course will make particular use of lay information sources such as industry publications and Internet content.

LEARNING OBJECTIVES
Course content will encompass the relevant learning objectives as detailed on page 2 and 3 of this outline.

MODULE CONTENT SYNOPSIS
The modules will deal with the following topics for the entry-level veterinarian (order and content subject to change):
1. Horse industry overview and update (Best)
2. Practical info for equine practice (insurance, export papers, EIA testing, horse handling, farriery) (Best)
3. Life stage review and Nutrition (Best)
4. Broodmare preparation & reproductive management (Chenier)
5. Foaling & neonatal management; Emergencies (Best)
6. Parasite control (Peregrine)
7. Infectious disease control: Vaccinations & Biosecurity (Best)
8. Dental management; Performance medicine (Best)
Laboratory Animals

MODULE COORDINATOR
Dr. Pat Turner, pvturner@uoguelph.ca Rm. 3801 PBL/AHL, Ext 54497

MODULE DESCRIPTION
The Laboratory Animal Medicine Module will contribute to students’ achievement of selected Phase 3 Health Management learning objectives in the context of oversight and care of research animals. The primary emphasis is directed towards developing the skills, knowledge, and attitudes that will permit the entry-level veterinarian to assess and advise on research animal production and performance, and evaluate the necessity for, and implement health management programs.

Who should take this module: This module is intended for students interested in gaining a better understanding of the clinical veterinarian's role in research animal care and health management.

LEARNING OBJECTIVES
By the end of the module, students will be able to:

Animal Industries
- Describe the key components of the veterinary care program as it applies to research rodent care and use
- Evaluate the reproductive breeding performance of a rodent breeding colony
- Discuss the adequacy of husbandry practices for optimizing rodent colony health
- Discuss factors related to housing costs for research animals

Animal Welfare
- Recognize when intervention is required to meet public, federal, and legal expectations with respect to the well-being of research animals as it relates to current CCAC guidelines and the Ontario Animal’s for Research Act.
- Recognize what constitutes appropriate intervention, including development of humane endpoints, in a research setting
- Explain how the principles of animal welfare for research animals are incorporated into the development and application of health management programs

Animal Behaviour
- Recognize, describe and advise on the interaction between the behavioural biology of research rodents and rabbits and research animal management practices common to Canada
- Identify and explain the differences between normal, abnormal, and problem behaviour of rodents
- Explain methods for prevention and treatment of related management practices that affect behaviour of research rodents.
- Describe and evaluate appropriate environmental enrichment programs for research animals, including measures to assess behavioural, physiologic, and psychological well-being.
Evidence-Based Decision Making in Health Promotion and Prevention of Disease

- Describe potential factors (infectious and noninfectious, as well as internal and external) that may account for deviations from norms of health and production objectives for research rodents.
- Develop plausible hypotheses and list means to test hypotheses regarding deviations in health and productivity.
- Develop differential diagnoses, and identify and recommend appropriate strategies for promotion of health, and prevention and control or eradication of disease to correct deviations.
- Identify the variety of issues that affect the cost of optimizing health and production and where appropriate profitability.
- Develop a diagnostic health surveillance program for a rodent colony and describe key steps for coping with a disease outbreak.

Public Health

- Describe and evaluate potential occupational health and safety risks for staff and researchers associated with working with research rodents and rabbits.

TEACHING STRATEGIES

The material will be presented using a combination of lecture, group problem-solving exercises, student presentations, discussions, and research facility visits (University of Guelph).

EVALUATION

Students will be evaluated on a written assignment (10%) and presentation (20%), in-class quizzes (10%), and a final written examination (60%).

Credit and Audit students will write the final examination.

RESOURCES

There is no required text. Material will be available through the Laboratory Animal Health Management Module website.

MODULE CONTENT SYNOPSIS

1. Introduction - overview of research animal use in Canada
2. CALAM/ACMAL Standards of Veterinary Care – implications for the clinical veterinarian
3. Evaluating research animal behaviour and welfare
4. Role of the environmental enrichment program
5. Genetically engineered mice – production, nutrition, and breeding performance
6. Common diseases of research rodents and impact on research
7. Developing diagnostic surveillance programs for colony animals
8. Dealing with a disease outbreak in a rodent colony
9. Biosecurity, biosafety, and zoonoses in the laboratory animal facility
10. Assessing facility/environmental impact on colony health and well-being
11. Occupational health and safety risk assessments
12. Per diem setting and cost accounting in the research facility
The poultry module will contribute to students’ achievement of selected elements of competency in the context of the poultry industry. The primary emphasis is directed towards developing the skills, knowledge and attitudes that will permit the entry-level veterinarian to assess and advise on animal production and performance and evaluate the necessity for, and implement health management programs.

Who should take this module: This module is intended for those students intending to enter a rural (mixed species) or commercial poultry practice (private or industry).

NOTE: Successful completion of this module (via credit or audit) is a pre-requisite for the Phase 4 Poultry Health Management rotation.

TEACHING STRATEGIES:
The material will be presented using a combination of lectures (including guest lecturers and student presentations), discussions, and applied time spent in the post-mortem room and on-farm. Students will raise their own virtual flock of broiler chickens and solve a series of management and disease issues with their flock.

LEARNING OBJECTIVES
By the end of the course the student will be able to:
1. Describe the production cycle of broiler chickens
2. Diagnose the main diseases of broiler chickens (based on gross +/- microscopic pathological lesions)
3. Design and evaluate a health management program for commercial broilers
4. Plan and monitor a vaccination program for commercial poultry
5. Design a biosecurity program for commercial and backyard poultry
6. Understand the major welfare issues faced by the poultry industry

EVALUATION
Students will be evaluated on their attendance and participation (10%), their written assignment and presentation (20%), and on a final written summative examination (70%).

Audit students will not sit the summative examination.

RESOURCES
Students are not required to purchase a textbook for this module. Material will be presented in the
form of written and graphic material on the course website.

RECOMMENDED TEXTS:
- Diseases of Poultry (13th ed.) Swayne
- Poultry Diseases (6th ed.) Pattison

<table>
<thead>
<tr>
<th>MODULE CONTENT SYNOPSIS</th>
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<tr>
<td>1. Introduction to module and assignments</td>
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<td>2. Evaluating management practices and biosecurity protocols</td>
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<tr>
<td>1) Introduction to a systematic method of evaluation (FLAWSS concept)</td>
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<td>2) Farm visit</td>
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<td>3) Assignment</td>
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<td>3. Review of common diseases in relation to flock management</td>
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<tr>
<td>1) Necropsies on mortalities (broilers and/or turkeys)</td>
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<tr>
<td>2) Necropsies on carcass condemnations (broilers and/or layers)</td>
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<td>3) Disease review lecture</td>
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<td>4) Assignment</td>
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<tr>
<td>4. Review of welfare issues in the poultry industry</td>
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<td>5. Biosecurity for small flocks (overview and case scenario)</td>
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<td>6. Designing, delivering, and evaluating the efficacy of a vaccination program</td>
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<td>7. Evaluating production records</td>
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<td>1) Assignment</td>
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<tr>
<td>8. Developing a health management program for commercial broilers</td>
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<td>1) Assignment</td>
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Small Ruminants

MODULE COORDINATOR
Dr. Paula Menzies, pmenzies@uoguelph.ca  Rm. 2541 Ext. 54043

MODULE DESCRIPTION
The small ruminant module will contribute to students’ achievement of selected Phase 3 health management learning objectives in the context of the sheep and goat industries. The primary emphasis is directed towards developing the skills, knowledge and attitudes that will permit the entry- level veterinarian to assess and advise on sheep and goat production and performance and evaluate the necessity for, and implement health management programs.

Who should take this module: This module is intended for veterinary students planning to take either the Rural Community Practice or Food Animal streams. Sheep and goats are an increasingly larger part of the rural large animal practitioner’s caseload. With growing flock / herd sizes and increasing demands on productivity, both industries require educated veterinarians to assist them in maintaining health and improving productivity.

NOTE: Successful completion of this module is a prerequisite (via credit or audit) for the Phase 4, RHM II Small Ruminant and RHM II Lambing and Lamb Survival Stream Priority / Elective Rotations.

TEACHING STRATEGIES:
The prime mode of presentation will be lectures and case based discussions.

LEARNING OBJECTIVES BY LECTURE
For overall learning objectives, consult pages 2-3 of the course outline.

Self-Directed Learning (Outside Class)
Information will be provided in Course-Link to augment material learned in Health Management 1. It is important to have a solid understanding of the meat, dairy and fibre industries of both sheep and goats in order to provide health management programs. The student is expected to describe the structures of these major sheep and goat industries of Canada and Ontario, types of products marketed (i.e. revenue sources) and their value, how these products are marketed and factors affecting the value of these products. The student is expected to be able to identify by production system, the common breeds of sheep and goats of Canada.

The student is expected to:

Lecture 1: Sheep and Goat Management Systems (1 h)
- List factors that affect the type of management system used by producers in Canada.
- List the common sheep and goat “lifestyle” and “productive” farms that a Canadian veterinarian will be expected to service.
- Compare and contrast the different annual and accelerated lambing systems commonly used in Ontario, with respect to the different timing and frequency of production events.
- Describe three different types of management of dairy sheep with respect to lambing rearing.
- Describe how dairy goat producers can maintain even milk production from their herd year
Lecture 2 – 5. Reproductive Health Management (4 h)

Assessing Reproductive Performance of Sheep and Goats

- List and describe the parameters used to measure reproductive performance, how to calculate and potential sources of data.
- For each, describe an appropriate goal for a Canadian meat sheep farm, including important differences between extensive – low input flocks and intensive – high input flocks. Where different, describe an appropriate goal for a Canadian meat goat farm.

Why Do Sheep and Goats Fail to Meet Reproductive Targets?

- List and describe important reasons that
  - Rams / bucks fail to mate the ewe / doe
  - Rams / bucks mate the ewe / doe but fail to achieve pregnancy
  - Ewes / does fail to be mated
  - Ewes / does fail to conceive or maintain pregnancy
  - Ewes / does become pregnant but have poor prolificacy

Health Management of Abortion Diseases

- Describe how to investigate an abortion problem in a sheep or goat farm, including history taking, clinical examination, and proper submissions to a diagnostic laboratory, maintaining flock biosecurity including advice to the farm workers as well as themselves.
- List the common causes of infectious and non-infectious abortion in sheep and goats in Canada.
- Describe for each the clinical presentation and epidemiology of that etiology, zoonotic risk if any, control in the face of an abortion event and control in future years.
- List the uncommon or sporadic causes of abortion in sheep and goats in Canada (self-directed learning).

Reproductive Health Management Programs

- Describe the components of reproductive health management programs and the time-line of those components relevant to the production cycle.
- Describe how to induce estrus out of season or synchronize estrus in season using hormones, ram effect or photoperiod manipulation. Be able to write instructions to the client that will likely result in fertile breedings under each of those situations.
- List the components of a pre-breeding examination of a buck / ram.
- List the appropriate ratio of males to females under the most commonly used breeding situations.
- Describe appropriate nutrition of the pre-breeding and breeding period to the male and female.
- Describe management of pregnancy diagnosis by ultra-sound.
• Describe breeding management of dairy goats as it differs from that of meat goats.

**Assessing Youngstock Performance of Sheep and Goats**

• List and describe the parameters used to measure youngstock performance – pre-weaning and weaning, including appropriate numerator and denominator of each, how to calculate and potential sources of data.
• For each parameter, describe an appropriate goal for a Canadian meat sheep farm, including important differences between extensive – low input flocks and intensive – high input flocks. Where different, describe an appropriate goal for a Canadian meat goat farm.

**Why Do Lambs / Kids Not Survive?**

• List the common causes (diseases) responsible for pre-weaning mortality, risk factors predisposing them to those diseases and timing of losses to those diseases.
• Investigating Neonatal Losses in Lambs and Kids
• Describe the criteria used on post mortem to classify death as pre-parturient, parturient or post- parturient.
• Describe how to perform a postmortem on a neonatal mortality and by interpreting anatomic changes, determine general categories of the common causes of mortality.

**Health Management to Reduce Youngstock Morbidity and Mortality and Improve Growth**

• Describe the important nutritional considerations of late gestation of the pregnant ewe / doe including feeding management.
• Outline the use of health management tools to control disease, e.g. vaccination programs to control clostridial diseases, prophylactic medications to control gastrointestinal parasitism, and review procedures to control risk of common abortion diseases.
• List flock/herd level management of periparturient diseases of sheep and goats including pregnancy toxemia, hypocalcaemia and vaginal prolapse.
• Describe the components of lambing / kidding management that will increase the odds of a lamb / kid surviving parturition up to weaning, including dam bonding, colostrum management, nutritional considerations and environmental management.
• Describe how to manage colostrum and rearing of lambs / kids for those farms on disease control programs for retroviral diseases and / or paratuberculosis.
• Review surgical techniques for tail-docking, castration and disbudding (self-directed learning). Compare techniques to what is recommended in the Codes of Practice.
• Describe health management procedures to control important causes of youngstock morbidity / mortality.

**Culling of Adult Females**

• Describe how to calculate culling rates and what appropriate goals are for different production systems in Canada.
• List common voluntary versus involuntary reasons for culling ewes / does from meat / dairy operations.

**Lecture 10: Biosecurity for Sheep and Goat Farms (1 h)**

• Using documents developed by the CFIA for the small ruminant industries, list the key areas of concern for biosecurity and the tools used to mitigate that concern.
• Describe methods using these tools to prevent the introduction and release of disease and spread of disease within the premise, for important diseases of sheep and goats.

**Lecture 11-12: Control of Specific Production Limiting Diseases of Sheep and Goats (2 h)**

• For caseous lymphadenitis, retroviral diseases of sheep and goats, paratuberculosis, ovine foot rot, scrapie, describe programs which control / eradicate or prevent these diseases at the flock
• List provincial / national programs that promote health management to sheep and goats.

**Lecture 13-14: Udder Health of Dairy Sheep and Dairy Goats (2 h)**

- Describe the common pathogens of mastitis of dairy small ruminants, methods of diagnosis and monitoring of udder health.
- Outline the components of a simple health management program for udder health, including goals for level of mastitis and surrogate measures including somatic cell counts.

**Lecture 15-16: Control of Gastrointestinal Parasitism of Sheep and Goats (2 h)**

- Describe appropriate diagnostic methods for monitoring gastrointestinal parasitism.
- List the components of the 5 Star Worm Program and describe how they aid in the sustainable control of gastrointestinal parasites.

**Self-Directed Study of Nutritional Health Management of Sheep and Goats**

Because there are no lectures of small ruminant nutrition in the DVM curriculum, information is provided on feeding management, types of feeds commonly fed to sheep and goats and risks, mineral nutrition including deficiency and toxicity issues, vitamin nutrition including deficiency and toxicity issues. Example rations are provided for meat sheep and dairy goats. This information augments / gives background for some of the nutritional and feeding management issues incorporated into health management programs.

**Self-Directed Study of Housing Requirements for Sheep and Goats**

Guidelines from the Canadian Farm Buildings Handbook are provided.

**EVALUATION**

**Credit and Audit Quizzes:**
There will be one short quiz on the material covered from the first six lectures / 3 sessions, up to the end of Reproductive Management. The quiz will be worth 20% of the final grade and will be multiple choice and short answer.

**Credit Assignment:**
Each credit student will receive an assignment at the beginning of the module which will include a flock / herd health issue for which the student will write a Standard Operating Procedure. The assignment, which must be completed on an individual basis, will be worth 20% of the final grade and is due prior to writing the final examination.

**Credit and Audit Examination:** The final examination composed of multiple-choice format and short-answer questions on the content of the module with a higher emphasis on the material covered after the quiz, and will be worth 60% of the final grade (credit students) and 80% of the final grade (audit students).

Please note that a successful audit / credit is necessary to be eligible for the RHMIi Lambing and Lamb Survival elective and the RHMIi Small Ruminant Stream Priority Rotation.

**RESOURCES**

There is no single recommended text. A list of textbooks and resources will be provided at the time of the first session.
Swine

MODULE COORDINATOR
Dr. Robert Friendship, rfriends@uoguelph.ca Rm 103 Population Medicine (Building 174, formerly the Clinical Research Building) Ext. 54022

MODULE DESCRIPTION
The swine module will contribute to students’ achievement of Phase 3 learning objectives in the context of the swine industry. The primary emphasis is directed towards developing the skills, knowledge and attitudes that will permit the entry-level veterinarian to assess and advise on animal production and performance and evaluate the necessity for, and implement health management programs.

Who should take this module: This module is intended for those students intending to enter a mixed to predominately food animal practice.

NOTE: This module is not a prerequisite for Phase 4 Swine core rotations but is strongly recommended.

TEACHING STRATEGIES:
The prime mode of presentation will be based on a case presentation with seminar discussion. Each stage of production will be examined on the basis of production targets and causes of lower than expected performance and strategies for remedying the situation. The overall health management program on the farm will be evaluated at the conclusion of the module.

LEARNING OBJECTIVES
At the end of the module, the student will be able to

Animal Industries
- Analyze health and production data accurately and systematically at the herd level
- Building on previous Health Management objectives delivered, be able to recognize when norms in animal husbandry, production and performance are not being met, in the Canadian context and within the context of that production system.
- Apply knowledge of the scope, structure and function of the swine industry, including production norms, and inputs and outputs to the analysis of herd problems.

Public Health
- Recognize important zoonotic, environmental and food-borne issues and those Health Management practices that mitigate risk to animals and people (including prudent drug usage) for the swine industry.

Animal Welfare
- Recognize when intervention is required to meet industry, veterinary profession, and legal expectations with respect to the well-being of relevant animals as it relates to the Swine Code of Practice and applicable legislation.
• Recognize what constitutes appropriate intervention.
• Explain how the principles of animal welfare for swine are incorporated into the development and application of swine health management programs

**Animal Behaviour**

• Recognize, describe and advise on the interaction between the behavioural biology of pigs and management practices common to Canada
• Identify and explain the differences between normal, abnormal, and problem behaviour
• Explain methods for prevention and treatment of related management practices that affect behaviour of pigs.

**Evidence-Based Decision Making in the Promotion of Health and Prevention of Disease**

• Describe potential factors that may account for deviations from norms of health and production objectives (e.g., management, environmental, behavioral, infectious, genetic, nutritional, and interactions).
• Develop plausible hypotheses and list means to test hypotheses regarding deviations in health and productivity.
• Develop differential diagnoses, and identify and recommend appropriate strategies for promotion of health, and prevention and control or eradication of disease to correct deviations. Strategies may include the following health promotion measures: vaccination, metaphylactic or prophylactic medication, biosecurity, environmental management, nutritional management, housing and ventilation.
• Identify the variety of issues that affect the cost of optimizing health and production and where appropriate profitability
• Identify key measures that will monitor outcomes or actions taken to correct deviations in health and productivity at the group level.
• Identify industry/government Health Management programs for individuals or groups that are available and effectively communicate recommendations to the client.

**EVALUATION**

Assessment in this module will be based on a project (25%) and a final examination (75%)

A. **The Project:** A local farm will be used as a clinical case and a farm visit incorporated into the course. The class will be divided into teams, with members of each team responsible for assessing a specific area of production. The teams will present their findings during class time and they will incorporate suggestions from class members into a written report for the farmer. Marks will be assigned based on oral presentation, participation in discussion and the final written report.

B. **The Final Examination,** which includes short answer and multiple-choice questions, will be used to assess students’ knowledge and understanding of all of the material covered in this module. Due to the commutative nature of the Phase III courses, pertinent material from the swine lectures in VETM*4460, Food Animal Medicine and Surgery will be included in this examination. The format of the examination will be case-specific problem solving using a case presentation followed by short answer and multiple-choice questions.

Audit students will not sit the summative examination.
RESOURCES

RECOMMENDED TEXT: Swine Health Management Course Notes

OTHER RECOMMENDED RESOURCES: Diseases of Swine, edited by Straw et al, 9th ed

MODULE CONTENT SYNOPSIS

1. Swine industry overview, update, current issues
2. Examination of the swine enterprise: pig flow and economics
3. Housing, ventilation, and animal husbandry
4. Solving pre-weaning productivity problems
5. Nursery management - factors affecting mortality, growth and profitability
6. Grower-finisher stage- factors affecting mortality, growth and profitability
7. Breeding herd productivity- record analysis and problem solving
8. Industry standards- CQA and Animal Care Assessment (public health and animal welfare)
9. Herd health programs- biosecurity, monitoring, health management
# WILDLIFE

## MODULE COORDINATORS

Dr. Claire Jardine, [cjardi01@uoguelph.ca](mailto:cjardi01@uoguelph.ca); office PAHL 4842; tel. ext. 54656  
Dr. Nicole Nemeth, [nnemeth@uoguelph.ca](mailto:nnemeth@uoguelph.ca); office PAHL 4839; tel. ext. 54625

## MODULE DESCRIPTION

The Wildlife Health Module will contribute to students’ achievement of selected Phase 3 Health Management learning objectives. The primary emphasis is directed towards developing the skills, knowledge, and attitudes that will permit the entry-level veterinarian to assess and advise on wildlife disease and population health management, as well as recognition of the various roles veterinarians may play in wildlife health management.

### Who should take this module:

This module is intended for students interested in gaining a better understanding of the veterinarian’s role in wildlife health management. This module will not cover material related to individual-animal wildlife medicine.

### Teaching strategies:

The material will be presented as a combination of interactive lectures, group-based exercises, student presentations, and discussions.

## LEARNING OBJECTIVES

By the end of the module, students will be able to:

- Discuss the role of and opportunities for veterinarians in wildlife population health management
- Describe the key health challenges, including diseases specific to a select groups (i.e., birds, small mammals, amphibians, reptiles, and ungulates), in Canadian wildlife
- Recognize the role of wildlife in relation to human, livestock, and environmental health
- Approach and conduct a general wildlife postmortem examination and understand relevant diagnostic options within the framework of population health and wildlife management perspective
- Describe how wildlife health surveillance is conducted in Canada as well as population management techniques that are used

## EVALUATION

Students will be evaluated on two in class formative quizzes (10% each; 20% total), in-class presentation (20%), and a summative final examination (60%).

-A guide for in-class presentations will be provided to the students on the 1st day of the module.
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<th>SESSION</th>
<th>EVENT, LECTURE TOPIC(S)</th>
<th>FACULTY</th>
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<tbody>
<tr>
<td>1</td>
<td>The role of wildlife in society (hunting, fishing, cultural); wildlife health and management in Canada -The roles of veterinarians in the wildlife realm (surveillance, rehabilitation, diagnostics, research) -Description of formative evaluation - in-class presentations and quizzes</td>
<td>Nemeth/Jardine</td>
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<tr>
<td>2</td>
<td>Diseases of wild small mammals (including fur bearers)</td>
<td>Jardine</td>
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<td>3</td>
<td>Diseases of wild birds [In-class presentations on select wild bird disease topics]</td>
<td>Jardine</td>
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<tr>
<td>4</td>
<td>Quiz #1 (material from sessions 1, 2 and 3) Diseases of amphibians and reptiles</td>
<td>Nemeth</td>
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<td>5</td>
<td>Diseases of wild ungulates [In-class presentations on select wild ungulate disease topics]</td>
<td>Nemeth</td>
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<td>6</td>
<td>Quiz #2 (material from sessions 4, and 5) Wildlife disease diagnostics, surveillance, and research</td>
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<td>7</td>
<td>Wildlife necropsy (wet lab)</td>
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<td>8</td>
<td>Wildlife and One Health (includes public health)</td>
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<td>9</td>
<td>Summative Assessment: -In-class, final examination</td>
<td>Nemeth/Jardine</td>
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