



# **ANSC\*3270 Animal Disorders**

Winter 2020

Section(s): C01

Department of Animal Biosciences

Credit Weight: 0.50

Version 2.00 - January 06, 2020

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## **1 Course Details**

### **1.1 Calendar Description**

This course will highlight common causes of infectious, metabolic and psychological/neurological disorders of domestic and companion animals, and their potential impact on animal welfare and production. Disorders will be addressed in the context of pathophysiology, transmission, and prevention strategies involving environmental enrichment, vaccination, biosecurity, nutrition, and genetic selection.

**Pre-Requisites:** ANSC\*3080

### **1.2 Course Description**

This course will highlight common causes of infectious, metabolic and psychological /neurological disorders of domestic and companion animals, and their potential impact on animal welfare and production. Disorders will be addressed in the context of pathophysiology, transmission, and prevention strategies involving stress mitigation, vaccination, biosecurity, nutrition, and genetic selection.

### **1.3 Timetable**

Monday, Wednesday and Friday 11:30am-12:20pm MACN 105

Timetable is subject to change. Please see WebAdvisor for the latest information.

### **1.4 Final Exam**

Saturday April 18th, 7:00pm - 9:00pm, location is TBD

Exam time and location is subject to change. Please see WebAdvisor for the latest information.

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## 2 Instructional Support

### 2.1 Instructional Support Team

**Instructor:** Georgia Mason  
**Email:** gmason@uoguelph.ca  
**Telephone:** +1-519-824-4120 x56804  
**Office:** ANNU 138  
**Office Hours:** Arrange by email

**Instructor:** Elijah Kiarie  
**Email:** ekiarie@uoguelph.ca  
**Telephone:** +1-519-824-4120 x53746  
**Office:** ANNU 226  
**Office Hours:** Arrange by email

**Instructor:** Eduardo Ribeiro  
**Email:** eribeiro@uoguelph.ca  
**Telephone:** +1-519-824-4120 x56516  
**Office:** ANNU 137  
**Office Hours:** Arrange by email

**Course Co-ordinator:** Niel Karrow  
**Email:** nkarrow@uoguelph.ca  
**Telephone:** +1-519-824-4120 x53646  
**Office:** ANNU 123  
**Office Hours:** Office hours will be at the ANNU coffee cart Tuesdays 1:30 - 3:15 p.m.

### 2.2 Teaching Assistants

**Teaching Assistant:** Reza Akbari Moghaddam Kakhki  
**Email:** rakbarim@uoguelph.ca  
**Office Hours:** email to set up appointment  
 (marking assignment #1)

**Teaching Assistant:** Nicole Moran  
**Email:** morann@uoguelph.ca  
**Office Hours:** email to set up appointment  
 (marking assignment #2)

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## 3 Learning Resources

### 3.1 Additional Resources

**Course Resources (Other)**

- Scientific journal articles will be made available through Courselink.
  - Lecture slides will be made available through Courselink.
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## 4 Learning Outcomes

Students will attend three hours of lecture per week, and the following learning objectives will be assessed through two midterms, two assignments and a final exam. By the end of the course, students should be able to effectively communicate common causes of psychological, infectious, and metabolic disorders to the industry and general public, and propose prevention strategies to help reduce risk of these disorders affecting domestic and companion animals.

### 4.1 Course Learning Outcomes

By the end of this course, you should be able to:

1. Students will be expected to **explain** how animals resist and recover from physical, chemical and biological stress to remain healthy and productive, and how genetics and epigenetics contribute to variation in the stress response and to various disorders of domestic and companion animals. They will also be expected to **distinguish** differences in the neuroendocrine and immune sensory inputs and responses to physical, chemical and biological stress. Students will be expected to **recall** examples of different types of acute and chronic stressors provided in the instructor's course material, and to **rationalize** appropriate use of biomarkers to monitor stress levels in domestic and companion animals. Assessment will be carried out by midterm.
2. Students will be expected to **explain** how psychological and developmental stress affects brain function, **distinguish** the different aetiologies of abnormal repetitive behaviour, **recall** and **explain** the symptoms of depression, and **propose** ways of objectively identifying similar conditions in non-human animals based on external symptoms and/or underlying mechanisms. Assessment will be carried out by midterm.
3. Students will be expected to **explain** how antimicrobials are used to treat disease, and how sub-therapeutic use to promote livestock growth has contributed to the development of antimicrobial resistance (AMR). Students will also be expected to **propose** strategies to prolong therapeutic efficacy of existing antimicrobials, and be **familiar** with areas of research development to deal with AMR. Assessment will be

carried out by midterm.

4. Students will be expected to be **familiar** with recommended biosecurity standards for the Canadian dairy industry, and **rationalize** their importance for maintaining product quality and reducing risk of animal and zoonotic diseases. Students should be able to **apply** concepts of a farm-level biosecurity plan across various livestock sectors to **identify** important biosecurity control areas. Assessment will be carried out by midterm.
5. Students will be expected to **explain** how genetic selection can be used to improve animal health, and to **rationalize** the potential benefits and risks of doing so by **recalling** examples provided in class. Assessment will be carried out by midterm.
6. Students will be expected to **apply** basic knowledge of immunology to **explain** the concept of vaccination to enhance immunity. Students will be expected to **rationalize** the pros and cons of active and passive immunization strategies and their contribution to good biosecurity practices. Assessment will be carried out by assignment #2 and midterm.
7. Students will be **introduced** to the concepts of the interaction between nutrition and gastrointestinal health and function in poultry and swine. Specific emphasis will be placed on the effects of nutrients, feed ingredients and management on the stability of gut microbiota and consequences to animal health and productivity. Students will be expected to **apply** these concepts to **explain** how certain dietary components could be manipulated to manage gastrointestinal health without recourse to antimicrobial growth promoters. Assessment will be carried out by assignment #1, midterm and a final exam.
8. Students will be expected to be **familiar** with the economic and welfare impact of respiratory tract and gastrointestinal disorders of domestic animals, and **rationalize** how physical, chemical, psychological and biological stressors contribute to risk of these disorders. Students will be expected to **recall** examples of disorders provided in class, and to **understand** how microbes and the host response contribute to pathophysiology and transmission. Lastly, students will be expected to **apply** concepts of biosecurity, vaccination, genetics, behavioral enrichment and nutrition to reduce risk respiratory tract and gastrointestinal disorders. Assessment will be carried out by final exam.
9. In the section of “Metabolic Disorders and Infectious Diseases in Ruminants”, students will be expected to **understand** the main physiological and environmental factors affecting immune competence and susceptibility to disorders in ruminants. Students will be expected to have a **holistic understanding** of the main metabolic disorders and infectious diseases occurring in North America herds and their consequences for production. Students will be expected to **explain** the definitions, etiology, epidemiology,

pathophysiology, and prevention strategies for the main subclinical and clinical disorders occurring in ruminants. In addition, students will be expected to **explain** the causes and the short- and long-term consequences of inflammation. Assessment will be carried out by a final exam.

10. The causes of the nutritional related metabolic disorders in modern intensively reared poultry and swine will be **introduced**. Students will be **expected to give examples** of prevalent nutritional metabolic disorders, consequences to animal welfare and productivity and dietary approaches to overcome the disorder. Assessment will be carried out by final exam.
11. Students will be expected to **create** articles that **summarize** cutting-edge research reported in two scientific journal articles assigned by the course instructor. These assignments are designed to get you to **interpret** research data, and **present** novel findings of the research to the public. The article should contain an **imaginative** title that is student **composed**, a research hypothesis **paraphrased** by the student, an **organization** of background material required for the reader to understand the research topic, a brief **summary** of the research methodology, and an **explanation** of the novel research findings. The format of the article must be single-spaced text, Times New Roman 12 font with 1" margins. The article should be no longer than 500 words in length, and it should be divided into two columns; an abstract of two to three sentences should be included, which is not considered part of the word count. At least six references should be provided following the format of an example scientific article posted on Courselink. Students are encouraged to **create** images/figures if it helps to enhance the reader's understanding of the background material; however, they should reflect the student's own artwork and must contain a figure/table title, which is also not included in the word count.

## 4.2 Marking Scheme

### Marking Scheme

5% Title

5% Abstract

40% Background

5% Hypothesis

30% Methodology summary and novel research findings

5% References

10% Spelling and grammar

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## 5 Teaching and Learning Activities

### 5.1 Lecture

**Topics:**

1. Response to Physical, Chemical and Biological Stressors (Karrow)

- Response to stress
- The neuroendocrine stress response
- The immune response to microbial stressors
- Genetics and epigenetics of stress
- Responses to stress: the good, bad and ugly

**Topics:**

2. Psychological Stress and Disorders (Mason)

- Psychological stressors
- Mental health/psychiatric issues
- Prevention/treatment

**Topics:** 3. Antimicrobials for Controlling Infectious Disorders (Karrow)

- Historical usage of antimicrobials for growth promotion and disease prevention
- Consequences of antimicrobial usage

**Topics:** 4. Strategies to Enhance Animal Health and Reduce Antimicrobial Usage (Karrow)

- A. Biosecurity
- B. Genetic selection
- C. Enhancing immunity through vaccination

**Topics:** 5. Strategies to Enhance Animal Health and Reduce Antimicrobial Usage (Kiarie)

- A. Interaction between nutrition and gut health
- B. Feed strategies to promote a healthy microbiome

**Topics:** 6. Metabolic Disorders and Infectious Diseases in Ruminants: Definitions, Etiology, Epidemiology, Pathophysiology and Prevention (Ribeiro)

- Susceptibility to Diseases in Ruminants
- Energy Metabolism and Ketosis
- Metabolism of Ca and Hypocalcemia
- Rumen Acidosis Complex
- Bacterial infections and clinical diseases – uterine diseases and mastitis

- Consequence of inflammation
- Health Management of Dairy Calves

**Topics:** 7. Disorders of the Respiratory Tract: Pathophysiology, Transmission and Prevention (Karrow)

- Viral and bacterial complex disorders

**Topics:** 8. Disorders of the Gastrointestinal (GI) Tract: Pathophysiology, Transmission and Prevention (Karrow)

- Viral and bacterial disorders
- Parasite disorders

**Topics:** 9. Monogastric Metabolic Disorders: Pathophysiology and Prevention (Kiarie)

- Cardiovascular ailments
- Fatty liver and kidney disorders
- Musculoskeletal disorders

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## 6 Assessments

### 6.1 Assessment Details

Course Assignments and Tests (0%)

<b>Schedule</b>	<b>Topic</b>	<b>Instructor</b>	<b>Date</b>	<b>% of Final Mark</b>	<b>Learning Outcomes Assessed</b>
<b>First class</b>	1. Response to Stressors	Karrow	Jan 6		1
	1. Response to Stressors	Karrow	Jan 8		1
	1. Response to Stressors	Karrow	Jan 10		1
	1. Response to Stressors	Karrow	Jan 13		1
	1. Response to Stressors	Karrow	Jan 15		1
	2. Psychological Stress and Disorders	Mason	Jan 17		2
	2. Psychological Stress and Disorders	Mason	Jan 20		2
	2. Psychological Stress and Disorders	Mason	Jan 22		2
	3. Antimicrobials	Karrow	Jan 24		3
	3.	Karrow	Jan		3

<b>Schedule</b>	<b>Topic</b>	<b>Instructor</b>	<b>Date</b>	<b>% of Final Mark</b>	<b>Learning Outcomes Assessed</b>
	Antimicrobials		27		
	4A. Biosecurity	Karrow	Jan 29		4
	4A. Biosecurity	Karrow	Jan 31		4
	4B. Genetic selection	Karrow	Feb 3		5
	4B. Genetic selection	Karrow	Feb 5		5
<b>Midterm 1</b>	11:30-12:20 pm MACN 105	Karrow/ Mason	Feb 7	20	1-3
	4C. Vaccination	Karrow	Feb 10		6, 11
	4C. Vaccination	Karrow	Feb 12		6, 11
	5A. Concepts of AGP in monogastrics	Kiarie	Feb 14		7, 11
<b>Winter break</b>			Feb 17-23		
	5A. Nutrition and gut health	Kiarie	Feb 24		7, 11

<b>Schedule</b>	<b>Topic</b>	<b>Instructor</b>	<b>Date</b>	<b>% of Final Mark</b>	<b>Learning Outcomes Assessed</b>
	in monogastrics				
	5B. Feeding the microbiome I	Kiarie	Feb 26		7, 11
	5B. Feeding the microbiome II	Kiarie	Feb 28		7, 11
<b>Midterm 2</b>	11:30-12:20 pm MACN 105	Kiarie/ Karrow	Mar 2	25	4-7
	6. Susceptibility to diseases in ruminants	Ribeiro	Mar 4		9
	6. Energy metabolism and Ketosis	Ribeiro	Mar 6		9
	6. Metabolism of Ca and Hypocalcemia	Ribeiro	Mar 9		9
<b>Article #1 due</b>	6. Rumen Acidosis Complex	Ribeiro	Mar 11	10	9
	6. Uterine Diseases and Mastitis	Ribeiro	Mar 13		9

<b>Schedule</b>	<b>Topic</b>	<b>Instructor</b>	<b>Date</b>	<b>% of Final Mark</b>	<b>Learning Outcomes Assessed</b>
	6. Consequences of Inflammation	Ribeiro	Mar 16		9
	6. Health Management of Dairy Calves	Ribeiro	Mar 18		9
	7. Respiratory disorders	Karrow	Mar 20		8
	7. Respiratory disorders	Karrow	Mar 23		8
	8. GI disorders	Karrow	Mar 25		8
	8. GI disorders	Karrow	Mar 27		8
	9. Metabolic disorders 1	Kiarie	Mar 30		10
	9. Metabolic disorders 2	Kiarie	Apr 1		10
<b>Article #2 due</b>	10. Last lecture	Karrow	Apr 3	15	8

Final examination date and time: Saturday April 18, 2020 at 7:00pm to 9:00pm, location is TBD. Please confirm details on Web Advisor.

Final exam weighting: 30% (Learning outcomes assessed 7, 8, 9, 10)

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## **7 Course Statements**

### **7.1 Grading Policies**

The article (i.e. hard copy) is due at the beginning of the class scheduled above. Students submitting late assignments will receive a 5% late penalty per day.

### **7.2 Course Policy on Group Work**

While students are encouraged to participate in an individual-and group-learning environment to better understand the course material, all assignments must reflect the work of each individual student.

### **7.3 Course Policy regarding use of electronic devices and recording of Lectures**

Since electronic recording of classes is useful for reviewing course material, it will be allowed with the consent of the course instructor. These recordings are solely for the use of the authorized student and may not be reproduced, or transmitted to others, without the express written consent of the instructor.

## **8 University Statements**

### **8.1 Email Communication**

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

### **8.2 When You Cannot Meet a Course Requirement**

When you find yourself unable to meet an in-course requirement because of illness or

compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

Graduate Calendar - Grounds for Academic Consideration

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

Associate Diploma Calendar - Academic Consideration, Appeals and Petitions

<https://www.uoguelph.ca/registrar/calendars/diploma/current/index.shtml>

### 8.3 Drop Date

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all students (undergraduate, graduate and diploma) except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in their respective Academic Calendars.

Undergraduate Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>

Graduate Calendar - Registration Changes

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml>

Associate Diploma Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/diploma/current/c08/c08-drop.shtml>

### 8.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

### 8.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to book their exams at least 7 days in advance and not later than the 40th Class Day.

For Guelph students, information can be found on the SAS website  
<https://www.uoguelph.ca/sas>

For Ridgetown students, information can be found on the Ridgetown SAS website  
<https://www.ridgetownc.com/services/accessibilityservices.cfm>

## 8.6 Academic Integrity

The University of Guelph is committed to upholding the highest standards of academic integrity, and it is the responsibility of all members of the University community-faculty, staff, and students-to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff, and students have the responsibility of supporting an environment that encourages academic integrity. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

Undergraduate Calendar - Academic Misconduct  
<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

Graduate Calendar - Academic Misconduct  
<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

## 8.7 Recording of Materials

Presentations that are made in relation to course work - including lectures - cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

## 8.8 Resources

The Academic Calendars are the source of information about the University of Guelph's procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.

Academic Calendars  
<https://www.uoguelph.ca/academics/calendars>

