

Course Outline Form: Winter 2018

General Information

Course Code: ANSC*3270

Course Title: Animal Disorders

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.

Credit Weight: 0.5

Course Prerequisite: ANSC*3080

Restriction: None

Academic Department (or campus): Animal Biosciences

Campus: Guelph

Semester Offering: Winter 2018

Scheduled class time and Location: Monday, Wednesday, and Friday 3:30-4:20 pm MACN 113

Instructors Information

Coordinator:

Dr. N.A. Karrow

Email: nkarrow@uoguelph.ca

Office location and office hours: ANNU 123, and office hours will be at the ANNU coffee cart
Mondays 1:30 - 3:15 p.m.

Contributors:

Dr. G. Mason

Email: gmason@uoguelph.ca

Office location and office hours: ANNU 138, arrange by email

Dr. E. Kiarie

Email: ekiarie@uoguelph.ca

Office location and office hours: ANNU 226, arrange by email

Dr. E. Ribeiro

Email: eribeiro@uoguelph.ca

Office location and office hours: ANNU 317, arrange by email

GTAs Information

GTA Name: Midian Nascimento Dos Santos (marking assignment #1)

GTA Email: mncascime@uoguelph.ca

GTA office location and office hours: email to set-up appointment

GTA Name: Alison Lee (marking assignment #2)

GTA Email: alee09@uoguelph.ca

GTA office location and office hours: email to set-up appointment

Course Content

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.

Specific Learning Outcomes:

- 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 assignment #1 and 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 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 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 assignment #2 and final exam.

- 9) In the section of “Metabolic Disorders and Infectious Diseases in Ruminants”, students will be expected to **understand** the main physiological changes occurring during the transition from pregnancy to lactation and their consequences for the metabolism, 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.

Marking Scheme

5% Title

5% Abstract

40% Background

5% Hypothesis

15% Methodology summary

15% Novel research findings

5% References

10% Spelling and grammar

Lecture Content:

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

2. Psychological Stress and Disorders (Mason)

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

3. Antimicrobials for Controlling Infectious Disorders (Karrow)

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

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

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

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

6. Disorders of the Respiratory Tract: Pathophysiology, Transmission and Prevention (Karrow)

- Viral and bacterial complex disorders

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

- Viral and bacterial disorders
- Parasite disorders

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

- The transition period and the susceptibility to disorders
- Metabolism and subclinical diseases – ketosis and hypocalcemia
- Metabolism and subclinical diseases – acidosis and lameness
- Bacterial infections and clinical diseases – metritis and endometritis
- Bacterial infections and clinical diseases – mastitis and additional disorders
- Inflammation and its consequences

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

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

Course Assignments and Tests:

Schedule	Topic	Instructor	Date	% of Final Mark	Learning Outcomes Assessed
First class	1. Response to Stressors	Karrow	Jan 8		1
	1. Response to Stressors	Karrow	Jan 10		1
	1. Response to Stressors	Karrow	Jan 12		1
	1. Response to Stressors	Karrow	Jan 15		1
	1. Response to Stressors	Karrow	Jan 17		1
	2. Psychological Stress and Disorders	Mason	Jan 19		2
	2. Psychological Stress and Disorders	Mason	Jan 22		2
	2. Psychological Stress and Disorders	Mason	Jan 24		2
	3. Antimicrobials	Karrow	Jan 26		3
	3. Antimicrobials	Karrow	Jan 29		3
	4A. Biosecurity	Karrow	Jan 31		4
	4A. Biosecurity	Karrow	Feb 2		4
	4B. Genetic selection	Karrow	Feb 5		5
	4B. Genetic selection	Karrow	Feb 7		5
Midterm 1	Friday 3:30-4:20 pm MACN 113	Karrow/ Mason	Feb 9	20	1-3
	4C. Vaccination	Karrow	Feb 12		6
	4C. Vaccination	Karrow	Feb 14		6
Article #1 due	5A. Concepts of AGP in monogastrics	Kiarie	Feb 16	10	2, 7, 11
Winter break			Feb 19-23		
	5A. Nutrition and gut health in monogastrics	Kiarie	Feb 26		7
	5B. Feeding the microbiome I	Kiarie	Feb 28		7
	5B. Feeding the microbiome II	Kiarie	Mar 2		7

Schedule	Topic	Instructor	Date	% of Final Mark	Learning Outcomes Assessed
Midterm 2	Saturday 3:30-5:00 pm MACN 113	Kiarie/ Karrow	Mar 3	25	4-7
	6. Respiratory disorders	Karrow	Mar 5		8
	6. Respiratory disorders	Karrow	Mar 7		8
	7. GI disorders	Karrow	Mar 9		8
	7. GI disorders	Karrow	Mar 12		8
	8. Susceptibility to disorders in ruminants	Ribeiro	Mar 14		9
	8. Metabolism of calcium and hypocalcemia	Ribeiro	Mar 16		9
	8. Ketosis and hepatic lipidosis	Ribeiro	Mar 19		9
	8. Rumen acidosis complex	Ribeiro	Mar 21		9
	8. Uterine diseases	Ribeiro	Mar 23		9
	8. Mastitis	Ribeiro	Mar 26		9
	8. Inflammation and its consequences	Ribeiro	Mar 28		9
Holiday			Mar 30		
	9. Metabolic disorders 1	Kiarie	Apr 2		10
	9. Metabolic disorders 2	Kiarie	Apr 4		10
Article #2 due	10. Last lecture	Karrow	Apr 6	15	8

Final examination date and time: TBD. Please confirm location on Web Advisor.

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

Course Resources

- Scientific journal articles will be made available through Courselink.
- Lecture slides will be made available through Courselink.

Course Policies

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.

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.

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.

University Policies

Academic Consideration:

The University of Guelph is committed to supporting students in their learning experiences and responding to their individual needs and is aware that a variety of situations or events beyond the student's control may affect academic performance. Support is provided to accommodate academic needs in the face of personal difficulties or unforeseen events in the form of Academic Consideration.

Information on regulations and procedures for Academic Consideration, Appeals and Petitions, including categories, grounds, timelines and appeals can be found in [Section VIII \(Undergraduate Degree Regulations and Procedures\) of the Undergraduate Calendar](#).

Academic Misconduct:

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 discourages misconduct. 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.

Detailed information regarding the Academic Misconduct policy is available in [Section VIII \(Undergraduate Degree Regulations and Procedures\) of the Undergraduate Calendar](#).

Accessibility:

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact the Student Accessibility Services (SAS), formerly Centre for Students with Disabilities (CSD), as soon as possible.

For more information, contact SAS at 519-824-4120 ext. 56208 or email sas@uoguelph.ca or visit the [Student Accessibility Services website \(http://www.uoguelph.ca/csd/\)](http://www.uoguelph.ca/csd/).

Course Evaluation Information:

End of semester course and instructor evaluations provide students the opportunity to have their comments and opinions used as an important component in the Faculty Tenure and Promotion process, and as valuable feedback to help instructors enhance the quality of their teaching effectiveness and course delivery.

While many course evaluations are conducted in class others are now conducted online. Please refer to the [Course and Instructor Evaluation Website](#) for more information.

Drop period:

The drop period for single semester courses starts at the beginning of the add period and extends to the Fortieth (40th) class day of the current semester (the last date to drop a single semester courses without academic penalty) which is listed in [Section III \(Schedule of Dates\) of the Undergraduate Calendar](#).

The drop period for two semester courses starts at the beginning of the add period in the first semester and extends to the last day of the add period in the second semester.

Information about Dropping Courses can be found in [Section VIII \(Undergraduate Degree Regulations and Procedures\) of the Undergraduate Calendar](#).