



ANSC*4490 Applied Endocrinology

Winter 2019

Section(s): C01

Department of Animal Biosciences

Credit Weight: 0.50

Version 2.00 - January 07, 2019

1 Course Details

1.1 Calendar Description

This course examines the endocrine systems of farm animals and their applications to improve and monitor the production, performance, behavior and health of livestock. Considerable emphasis will be placed upon understanding how knowledge of endocrine regulation can be applied within animal production systems.

Pre-Requisite(s): ANSC*3080

1.2 Course Description

In this course, I hope to stimulate your excitement about science and the scientific approach; that is, how new information is discovered and how it can be applied to animal production systems. I will also encourage you to be an independent and critical thinker. This learning process is more important than remembering every detail of the material, but you need to know enough detail to be able to potentially manipulate the endocrine systems we are studying. Assessments emphasize the understanding and integration of information rather than memorization of material.

The lecture notes will be posted on Courselink and students are expected to review the notes and to read the appropriate sections of the textbook to prepare for the lecture.

1.3 Timetable

Tuesday 1:00 - 2:20 p.m.; Thursday 1:00 - 2:20 p.m. ANNU 156

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

1.4 Final Exam

The final assignment is due on Apr 12 at 4:30 pm.

2 Instructional Support

2.1 Instructional Support Team

Instructor:	James Squires
Email:	jsquires@uoguelph.ca
Telephone:	+1-519-824-4120 x53928
Office:	ANNU 146
Office Hours:	By appointment

2.2 Teaching Assistant(s)

Teaching Assistant:	Charlene Hanlon
Email:	chanlon@uoguelph.ca
Office Hours:	By Appointment
Teaching Assistant:	Jocelyn Cameron
Email:	jcamer12@uoguelph.ca
Office Hours:	By Appointment

3 Learning Resources

3.1 Required Resource(s)

Required Texts (Textbook)

N/A

3.2 Recommended Resource(s)

Recommended (Textbook)

Applied Animal Endocrinology 2nd Edition, E.J. Squires, CAB International (also available on reserve at the library and as an ebook on Amazon and Google Play). Note that the 2nd edition contains more detailed information than the 1st edition.

3.3 Additional Resource(s)

Lab Manual (Lab Manual)

N/A

Other Resources (Other)

All course lectures and supplementary materials are available on the Courselink site.

Field Trips (Other)

N/A

Additional Costs (Other)

N/A

4 Learning Outcomes

4.1 Course Learning Outcomes

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

1. By the end of this course, successful students will be able to:
 1. Understand and explain the concepts of endocrinology, including the structure and function of hormones and receptors, and the integration of hormone action.
 2. Evaluate methods to study how endocrine systems work and how they can be manipulated or used to monitor animal production systems.
 3. Integrate information to manipulate selected endocrine systems that can affect
 - animal growth and carcass composition
 - the production of animal products, and
 - animal behaviour, health and response to environment
 4. Critically analyse experiments in endocrinology in written form and in class

presentations

5 Teaching and Learning Activities

5.1 Lecture

Topic(s):

Lecture Date	Topic	Readings & Notes
Endocrine Systems		
Jan 8	<ul style="list-style-type: none"> Introduction and overview of hormones and endocrinology 	<ul style="list-style-type: none"> Textbook Ch. 1, pp. 1-6
Jan 10	<ul style="list-style-type: none"> Synthesis, release and metabolism of hormones 	<ul style="list-style-type: none"> Textbook Ch. 1, pp. 7-17
Jan 15	<ul style="list-style-type: none"> Cell surface receptors 	<ul style="list-style-type: none"> Textbook Ch. 1, pp. 18-29
Jan 17	<ul style="list-style-type: none"> Cell surface receptors (continued) 	
Jan 22	<ul style="list-style-type: none"> Intracellular 	<ul style="list-style-type: none"> Textbook

	receptors	Ch. 1, pp. 29-38
Jan 24	<ul style="list-style-type: none"> • Integration of hormone action 	<ul style="list-style-type: none"> • Textbook Ch. 1, pp. 39-44
Jan 29	In-class quiz on endocrine systems – Tues. Jan. 29	
Endocrine Methodologies		
Jan 31	<ul style="list-style-type: none"> • Methods for determining how endocrine systems function 	<ul style="list-style-type: none"> • Textbook Ch. 2, pp. 47-57
Feb 5	<ul style="list-style-type: none"> • Methods for determining how endocrine systems function (continued) 	
Feb 7	<ul style="list-style-type: none"> • Assay methods for measuring hormones 	<ul style="list-style-type: none"> • Textbook Ch. 2, pp. 57-67
Feb 12	<ul style="list-style-type: none"> • Assay methods for measuring hormones (continued) 	
Feb 14	<ul style="list-style-type: none"> • Receptor binding assays 	<ul style="list-style-type: none"> • Textbook Ch. 2, pp.

		67-70
Feb 26	<ul style="list-style-type: none"> • Methods for producing hormones 	<ul style="list-style-type: none"> • Textbook Ch. 2, pp. 70-77
Feb 28	<ul style="list-style-type: none"> • Manipulating endocrine systems 	<ul style="list-style-type: none"> • Textbook Ch. 2, pp. 77-86
Mar 5	In-class quiz on endocrine methods – Tues. Mar. 5	
Applications of Endocrinology		
Mar 7	<ul style="list-style-type: none"> • <i>Guest Lecture:</i> Endocrine manipulations in aquaculture (R. Moccia) 	
Mar 12	<ul style="list-style-type: none"> • Student Presentations 	<i>Topic:</i> Endocrine manipulation of growth and carcass composition
Mar 14	<ul style="list-style-type: none"> • Student Presentations 	
Mar 19	<ul style="list-style-type: none"> • <i>Guest Lecture</i> 	
Mar 21	<ul style="list-style-type: none"> • Student Presentations 	<i>Topic:</i> Endocrine effect on animal products
Mar 26	<ul style="list-style-type: none"> • Student Presentations 	

Mar 28	• <i>Guest Lecture</i>	
Apr 2	• Student Presentations	<i>Topic:</i> Effects on animal behaviour, health, and response to environment
Apr 4	• Student Presentations	
* Final assignment due Apr 12 at 4:30 pm		

** This schedule is tentative and is subject to change at the instructor`s discretion.

5.2 Seminar

Topic(s):

Groups of 3 students will present on specific applications of endocrinology in Animal Biosciences that are of interest to the group. Background information is available in the textbook to help the groups to get started on their presentations, but the material presented should be current. The presentations will include a discussion of innovative methods used in endocrinology and applications of various endocrine systems. They consist of a 30 minute seminar with 10 additional minutes for discussion. There will be 2 student presentations in one class period. PowerPoint or other computer graphics programs should be used.

Presentations should cover the following points:

- **Introduction:** A summary of the relevant literature in the area that provides a current overview of the subject. Why is this area important?
- **Endocrinological Principles:** A description of the endocrinological principles involved in the problem. This includes an outline of the hormones and receptors involved and their mechanism of action.
- **Innovative Research:** A critical discussion of at least two different key papers in peer-reviewed journals that have made a significant impact or described key methodologies in this area of endocrinology. How have these findings helped to advance the level of knowledge or impact this area of endocrinology? How are they innovative? What model systems are used for this work? What were the key findings?
- **Applications:** A discussion of current applications and other potential applications of the system. How is the system modified or otherwise used to advantage? What is the potential impact of this?

Presenters must email the presentation to the instructor by the day before their set presentation date so that it can be posted on CourseLink.

You are strongly encouraged to preview your presentation with the instructor or TA beforehand so that you can get feedback!

All students are expected to be present at these presentations and should actively contribute to the discussion by asking questions and adding in new information. Students are also expected to make written critical comments on the presentation through 5 presentation bonus questions. For 5 presentations on different days, you can submit the answer to the following bonus question: **Describe how one of the presentations today was innovative and might lead to significant impacts on animal production systems.**

Each answer to this bonus question should be completed on the presentation evaluation sheet on the day that the presentation is given.

Evaluation of the presentation:

Format of the presentation (quality of slides, clarity of presentation)
Content of the presentation and question period (amount of research, quality of information, originality, level of understanding of topic, ability to answer questions)

Total for Presentation (Group Mark)

The additional 5% for answers to presentation bonus questions is an individual grade.

Presentation topics:

Topic 1: Endocrine Manipulation of Growth and Carcass Composition

4 Student presentations from the following topics:

- Porcine stress syndrome and PSE meat
- Effects of somatotropin
- Effects of β -agonists
- Anabolic steroids and analogues
- Dietary chromium and insulin
- Leptin and other adipokines and lipokines
- Thyroid hormones
- Dietary PUFA (linoleic, linolenic, gamma-linolenic acid and conjugated linoleic acid)
- Control of appetite
- Antimicrobials, prebiotics and probiotics
- Effects of the gut microbiome

Topic 2: Endocrine Effects on Animal Products

4 Student presentations from the following topics:

Milk Production

- Hormonal effects on mammary growth and initiation of lactation
- Hormonal effects (eg bST) on maintenance of lactation
- Metabolic diseases of lactation (milk fever, ketosis)

Wool Production

- Factors affecting wool production and endocrine defleecing

Egg Production

- Regulation of follicular development, egg production and moulting
- Regulation of eggshell formation and calcium homeostasis
- Endocrine effects on sexual development in chickens

Topic 3: Effects on Animal Behaviour, Health and Response to Environment

4 Student presentations from the following topics:

- Endocrine measures of health and production efficiency
- Endocrine applications in toxicology
- Control of broodiness in poultry
- Applications of pheromones in vertebrates
- Applications of pheromones in Insects
- 'Sniffer Dogs' as bioassay tools
- The skin as an endocrine tissue
- Endocrine control of cancer

6 Assessments

6.1 Assessment Details

Course Assignments and Tests (0%)

Assignment or Test	Due Date	Contribution to Final Mark (%)	Learning Outcomes Assessed
Quiz on endocrine systems	Jan. 31	15%	1,2
Quiz on endocrine methods	Mar 5	15%	1, 2
Assignment	Mar. 19	10%	4
Class presentation	Mar 12– Apr. 4	20% group mark	3, 4
Presentation bonus questions	Feb 28– Apr. 4	5%	1,2,3,4
Final assignment	Apr. 12 - 4:30 pm (Hardcopy due to the instructor or TA)	35%	3, 4

7 Course Statements

7.1 Grading Policies

Hard copies of the assignments should be submitted at my office room 146 ANNU or to the TAs by 4:30 p.m. on the due date. Late penalties of 2 % per day will be assessed for late submissions.

7.2 Course Policy on Group Work

All group members are expected to contribute equally to the class presentations, but individuals may be responsible for different aspects of the work. All students in the group normally participate in the presentation.

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

Electronic recording of classes is expressly forbidden without consent of the instructor. When recordings are permitted, they 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>

8.3 Drop Date

Courses that are one semester long must be dropped by the end of the fortieth class day; two-semester courses must be dropped by the last day of the add period in the second semester. The regulations and procedures for course registration are available in the Undergraduate and Graduate 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

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.

More information can be found on the SAS website
<https://www.uoguelph.ca/sas>

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>
