



# **ANSC\*6250 Growth and Metabolism**

Winter 2020

Section(s): C01

Department of Animal Biosciences

Credit Weight: 0.50

Version 2.00 - January 08, 2020

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## **1 Course Details**

### **1.1 Calendar Description**

Animal growth and metabolism are considered at the cellular level in a manner that extends beyond the basic disciplines of biometrics and biochemistry with attention focused on the main carcass components - muscle, fat and bone.

### **1.2 Course Description**

The course covers molecular, cellular and systemic regulatory mechanisms, developmental changes, and animal (genetics, sex, etc) differences that influence requirements and efficiency of utilization of nutrients. Advanced concepts for optimizing nutrition to produce safe and healthy foods for human consumption, to safeguard the animal's own health and welfare, to minimize nutrients excretion and reduction of antibiotics usage will be taught and tested.

### **1.3 Timetable**

Thursdays 2:30 – 5:30 pm

Room: ANNU101

### **1.4 Final Exam**

Not applicable

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## 2 Instructional Support

### 2.1 Instructional Support Team

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

**Instructor:** Katharine Wood  
**Email:** kwood@uoguelph.ca  
**Telephone:** 1-519-824-4120 x53695  
**Office:** ANNU 236  
**Office Hours:** arrange by email

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## 3 Learning Resources

### 3.1 Course Resources

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

### 4.1 Course Learning Outcomes

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

1. Develop basic understanding of the processes of dietary energy and nutrients transformations at the gut and systemic levels in terms of anabolism and catabolism, metabolic control, partitioning and efficiency.
2. Develop advanced understanding of optimal and balanced dietary nutrient supply in relation to metabolism at the molecular, cellular, and systemic levels, including special metabolic needs during growth, reproduction, stress, and maintenance.
3. Gain experience and confidence in integrating information on energy and nutrient metabolism in relation to optimal animal productivity, product quality, gut health, metabolic disorders and nutrients excretion.
4. Develop confidence and expertise on advanced topics in growth and metabolism, including principles of identifying gaps in scientific literature, development of research

proposals commensurate to NSERC standards to address contemporary challenges in food animal production.

5. Demonstrate proficiency on personal and professional integrity by respecting diverse points of view and the intellectual contribution of others in a group discussion
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## 5 Teaching and Learning Activities

### 5.1 Lecture

**Thu, Jan 9, 2:30 PM - 5:30 PM**

**Topics:** Course Introduction

**Thu, Jan 16, 2:30 PM - 5:30 PM**

**Topics:** Concepts on growth and metabolism I,

1. Non-ruminants - EK
2. Ruminants - KW

**Thu, Jan 23, 2:30 PM - 5:30 PM**

**Topics:** I. Statistical approaches to experimental design: Power analyses and sample size calculation

II. Approaches in formulating research questions and proposal development

III. Critiquing scientific literature - EK

IV. Approaches to Animal Biosciences proposal development - KW

*Invited guest:* Dr. Michelle Edwards; Statistic and experimental design

*Invited guest:* Dr. Sarah Gibbons, writing specialist, UofG writing services

Assignment of research proposal & review articles on topics in growth & metabolism

**Thu, Jan 30, 2:30 PM - 5:30 PM**

**Topics:** Industry, government, faculty  
Concepts on growth and metabolism II,  
1. Ruminants - KW  
2. Non-ruminants - EK

*Invited guest:* Dr. Jennifer Ellis, Growth modeling

**Thu, Feb 6, 2:30 PM - 5:30 PM**

**Topics:** Review paper presentations - 4  
Presentation: 30 minutes  
Question: 15 minutes

**Thu, Feb 13, 2:30 PM - 5:30 PM**

**Topics:** No class: Assignments

**Thu, Feb 27, 2:30 PM - 5:30 PM**

**Topics:** Review paper presentations - 4  
Presentation: 30 minutes  
Question: 15 minutes

**Thu, Mar 5, 2:30 PM - 2:30 PM**

**Topics:** No class: Assignments

**Thu, Mar 12, 2:30 PM - 5:30 PM**

**Topics:** Industry, government, faculty

*Invited guest:* Dr. Anna-Kate, Shoveller, Amino acids metabolism and calorimetry

*Invited guest:* Dr. John Cant, Applied animal nutrition

*Invited guest:* Dr. Mike Steele, Gut development

**Thu, Mar 19, 2:30 PM - 5:30 PM**

**Topics:** No class: Assignments

**Thu, Mar 26, 2:30 PM - 5:30 PM**

**Topics:** Proposal defense/presentations - 4

Presentation: 15 minutes

Questions: 10 minutes

**Thu, Apr 2, 2:30 PM - 5:30 PM**

**Topics:** No class

## 6 Assessments

### 6.1 Marking Schemes & Distributions

Name	Scheme A (%)
Class participation	10
Presentation-Paper	15
Mini review-Paper	20
Presentation-Proposal	15
Written-Proposal	40
Total	100

## 6.2 Assessment Details

### **Class participation (10%)**

**Due:** Ongoing

**Learning Outcome:** 1, 2, 3, 5

### **Oral presentation (15%)**

**Due:** Varies by schedule

**Learning Outcome:** 1, 2, 3, 4, 5

Students' assignments of critique of published research papers on topics on growth and metabolism

10% (*instructor*)

5% (*peer*)

### **Mini review-Paper (20%)**

**Due:** Varies by schedule, prior to presentation via hard copy and dropbox

Critique of published research papers on topics on growth and metabolism

### **Proposal-Oral defense (15%)**

**Due:** Varies by schedule

**Learning Outcome:** 1, 2, 3, 4, 5

Research proposal on a topic on growth and metabolism

10% (*instructor*)

5% (*peer*)

### **Proposal-Written submission (40%)**

**Due:** Mar 20, 5 PM via Hard copy and dropbox

**Learning Outcome:** 1, 2, 3, 4, 5

Research proposal on growth and metabolism

## 6.3 Guidelines for preparation of research proposal

### **Guidelines for preparation of research proposal:**

Topics for proposal will be provided by the instructors. Each student will be expected to select a topic from a list.

The written proposal should be organized into sections as follows:

- i. Synopsis (summarizing research problem, objectives, research approaches, significance to the industry and benefits to Canada) (mini ½ page; max 1 page)
- ii. Background, research problem/justification (min. 5 page; max. 7 pages)
  - a. A clear description of the product, nutrient, or concept that you are researching (the 'what' and 'why').
  - b. A clear description of how the product, nutrient, or concept influences biology of growth, and/or nutrient metabolism, focusing on the underlying biological mechanisms.
  - c. Critical analyses of available data on the impact of the product, nutrient or concept on 'whole animal growth and metabolism' to assess its practical value (the 'value'; use in commercial animal production).
  - d. Identification of gaps in scientific literature; end with a clear statement outlining the justification for further research.
  - e. Summary, including appropriate conclusions, about our current understanding, and need for more information, on the topic.
- iii. Proposed research question, hypothesis and objectives (Min. ½ page)
- iv. Materials and methods (min. 2 pages)
  - a. Animals; power analyses, sample size determination
  - b. Experimental diets
  - c. Experimental procedures
  - d. Laboratory analyses
  - e. Calculations and statistical analyses approaches
- v. Significance to science and industry (Max ½ page)
- vi. Benefits to Canada (Max ½ page)
- vii. KTT plan (1/2 page)
- viii. References (1 page)

The written and submitted proposal should:

1. Not exceed indicated section maximum length including figures and tables
2. Be written using 12-point, black-colored font, single line spacing (six lines per inch) with no condensed type or spacing
3. Have page margin of 1 inch all around
4. Cite and list references from peer reviewed scientific journals only (A minimum of 10 references). You may use the 'web of science' to conduct a search of the scientific literature: visit <http://www.lib.uoguelph.ca> , go to 'journal articles', and 'agriculture and food science' and 'animal & poultry science' and 'web of science.
5. Have no redundancies in literature citations, for example no more than three citations

to support a concept.

6. Be submitted in MSword format

- Marks will reflect (1) content (as outlined above), (2) organization (flow, appropriate use of headings and sub-headings, (3) quality/appropriateness of references, and (4) quality of synopsis.

- Do NOT copy and paste from other articles. Plagiarism is a major offense and can have serious consequences (Academic misconduct; section VIII in University of Guelph undergraduate calendar).

A hard copy and electronic copy of the research proposal is due for submission at drop box at 5:00 PM March 20.

The presented proposal should be organized into sections as follows:

1. Title slide (1)
2. Outline slide (1)
3. Background slides (min 3; max 5)
4. Hypothesis and objectives (1)
5. Materials and methods (min 4; max 6)
6. Expected results
7. References

Each presentation will be for 20 minutes (15 minutes, presentation, 5 minutes questions)

**Guidelines for critique of published research papers on topics on growth and metabolism:**

Student will choose two papers (one in growth and the other in metabolism) and submit to the instructors for approval. The papers should be chosen from peer-reviewed journals. The instructors will post the chosen papers in course link at least one week prior to presentation to allow enough time for a thorough reading by the class. It is essential that all students read the papers that will be discussed in the upcoming class.

When presenting critique of the published paper, the student will need to provide some carefully selected background information on the topic, i.e., potentially from other sources than the paper itself, followed by a description of key methodology and results, a critical assessment of the methods and conclusions, the contributions of the papers to our understanding of the field, and strengths and weaknesses of the paper. The instructor will clarify concepts and direct discussions when appropriate. Each student paper presentation will be about 25 minutes with 10 minutes question/discussion period. Student presentations will be posted as PDF files after the presentations in class for further references.

The mini-review paper will be approximately 3 pages without including references. The critique should be typed with 1" margin space around and double line spacing by using 12-point font. A cover page is required to include student's name and ID. A hard copy and electronic copy of the mini-review paper is due for submission at drop box at 2:30 PM on the day of presentation.

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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>

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