



ANSC*6250 Growth and Metabolism

Winter 2023

Section(s): C01

Department of Animal Biosciences

Credit Weight: 0.50

Version 1.00 - January 09, 2023

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

COVID-19 Disclaimer: Please be aware that the information on course delivery, accessibility, and examinations presented in this outline was developed based on current University guidelines. However, due to the continuously evolving situation and resulting changes in public health recommendations, the format and delivery of this course may be revised with limited notice.

1.4 Final Exam

Not applicable

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:	Students are asked to email to request a virtual meeting; the instructor will then send out an invitation for a virtual meeting via Microsoft Teams
Instructor:	Katharine Wood
Email:	kwood@uoguelph.ca
Telephone:	1-519-824-4120 x53695
Office:	ANNU 236
Office Hours:	Students are asked to email to request a virtual meeting; the instructor will then send out an invitation for a virtual meeting via Microsoft Teams

2.2 Course delivery

In-person

2.3 Communicating with Instructor

During the course, your instructor will interact with you on various course matters on the course website using the following ways of communication:

- **Announcements:** The instructor and GTA will use Announcements on the Course Home page to provide you with course reminders and updates. Please check this section frequently for course updates from your instructor.
- **Ask Your Instructor Discussion:** Use this discussion forum to ask questions of instructor about content or course-related issues with which you are unfamiliar. If you encounter difficulties, the instructor is here to help you. Please post general course-related questions to the discussion forum so that all students have an opportunity to review the response. To access this discussion forum, select Discussions from the Tools dropdown menu.
- **Email:** If you have a conflict that prevents you from completing course requirements, or have a question concerning a personal matter, you can send the instructor a private

message by email. The instructor will attempt to respond to your email within 24 hours.

- **Video Call:** If you have a complex question you would like to discuss with instructor, you may book a video meeting on Teams. Video meetings depend on the availability and are booked on a first come first served basis.
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3 Learning Resources

3.1 Required Resources

Course Technologies and Technical Support (Software)

- CourseLink (main classroom)
- Zoom integrated in CourseLink (main classroom)
- Teams (via Office 365)

To help ensure you have the best learning experience possible, please review the list of system and software requirements. <https://opened.uoguelph.ca/student-resources/system-and-software-requirements>

CourseLink

This course is being offered using CourseLink (powered by D2L's Brightspace), the University of Guelph's online learning management system (LMS). By using this service, you agree to comply with the University of Guelph's Access and Privacy Guidelines. Please visit the D2L website to review the Brightspace privacy statement and Brightspace Learning Environment web accessibility standards.

<http://www.uoguelph.ca/web/privacy/> <https://www.d2l.com/legal/privacy/>
<https://www.d2l.com/accessibility/standards/>

Technical Support

If you need any assistance with the software tools or the CourseLink website, contact CourseLink Support.

Email: courselink@uoguelph.ca

Tel: 519-824-4120 ext. 56939 Toll-Free (CAN/USA): 1-866-275-1478

Zoom

This course will use Zoom for lectures. Check your system requirements to ensure you will be able to participate. <https://opened.uoguelph.ca/student-resources/system-and-software-requirements>

Teams (via Office 365)

Office 365 Teams is a collaboration service that provides shared conversation spaces to help teams coordinate and communicate information. This course will use Teams for one on one meetings with your Instructor. It is recommended that you use the desktop version of Teams. As a student you are responsible for learning how to use Teams and its features.

For Teams Support visit the CCS website for more information.

<https://www.uoguelph.ca/ccs/services/office365/teams>

3.2 Recommended Resources

Technical Skills (Software)

As part of your learning experience, you are expected to use a variety of technologies for assignments, lectures, teamwork, and meetings. In order to be successful in this course you will need to have the following technical skills:

Manage files and folders on your computer (e.g., save, name, copy, backup, rename, delete, and check properties);

- Install software, security, and virus protection;
- Use office applications (e.g., Word, PowerPoint, Excel, or similar) to create documents;
- Be comfortable uploading and downloading saved files;
- Communicate using email (e.g., create, receive, reply, print, send, download, and open attachments);
- Navigate the CourseLink learning environment and use the essential tools, such as Dropbox, Quizzes, Discussions, and Grades (the instructions for this are given in your course);
- Access, navigate, and search the Internet using a web browser (e.g., Firefox, Internet Explorer); and
- Perform online research using various search engines (e.g., Google) and library databases.

Library access (Library Course Guides)

<https://www.lib.uoguelph.ca/>

As a student, you have access to the University of Guelph's library collection, including both physical and electronic materials. For information on checking out or couriering physical library items, accessing electronic journals and returning items to the library, visit the library's website.

If you are studying off campus and would like to access the library's electronic resources, use the Off Campus Login and login using your Single Sign On credentials or using your last name and library barcode.

<https://www.lib.uoguelph.ca/>

<https://www.lib.uoguelph.ca/campus-login>

3.3 Course Resources

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

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 12, 2:30 PM - 5:30 PM

Topics: Course introduction

Lectures: concepts on growth and metabolism I,

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

Thu, Jan 19, 2:30 PM - 5:30 PM

Topics: Concepts on growth and metabolism II,

1. Approaches in formulating research questions and proposal development (Dr. Sarah Gibbons)
2. Non-ruminants - EK
3. Ruminants - KW

Thu, Jan 26, 2:30 PM - 5:30 PM

Topics: No Class

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

- Topics:**
1. Statistical approaches to experimental design: Power analyses and sample size calculation
 2. Critiquing scientific literature - EK
 3. Approaches to Animal Biosciences proposal development - KW

Invited guest: Dr. Amir Bazrgar OAC Statistics Consultant; Statistic and experimental design

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

Thu, Feb 9, 2:30 PM - 5:30 PM

Topics: Industry, Academia, Government

Invited guests:

Dr. Jennifer Ellis, Growth modeling

Dr. Lee-Anne Huber, Prenatal programming of postnatal development in the pigs

Thu, Feb 16, 2:30 PM - 5:30 PM

Topics: Review paper presentations (growth)

Presentation: 12 minutes

Question: 3 minutes

Thu, Feb 23, 2:30 PM - 5:30 PM

Topics: Winter Break

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

Topics: Review paper presentations (metabolism)

Presentation: 12 minutes

Questions: 3 minutes

Thu, Mar 9, 2:30 PM - 2:30 PM

Topics: Industry, government, academia

Invited Guests:

Dr. John Cant, Applied animal nutrition

Dr. Shai Barbut, Meat processing: integrating animal growth with processing

Thu, Mar 16, 2:30 PM - 5:30 PM

Topics: Industry, government, academia

Invited guests:

Dr. Marcio Duarte, Molecular and cellular aspects of meat production

Dr. Mike Steele, Gut development

Thu, Mar 23

Topics: Proposal defense/presentations

Presentation: 15 minutes

Questions: 5 minutes

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

Topics: Proposal defense/presentations

Presentation: 15 minutes

Questions: 5 minutes

Thu, Apr 6, 2:30 PM - 5:30 PM

Topics: Proposal defense/presentations

Presentation: 15 minutes

Questions: 5 minutes

6 Assessments

6.1 Marking Schemes & Distributions

Name	Scheme A (%)
Invited guest lectures summary	20
Mini review presentation	15
Mini review written	20
Proposal presentation	15
Proposal written	30
Total	100

6.2 Assessment Details

Invited guest lectures summary (20%)

Due: Varies by schedule

Learning Outcome: 1, 2, 3, 5

Each student will submit 4 summaries on key learnings from guest lectures presented in Feb and March. The summary should include details of the concept presented and how it helps in understanding growth and metabolism, the summary should be 1 page long, double spaced. Each summary is worth 5 marks and is due 1 week after guest lecture.

Submission is via Counselink Dropbox

Oral presentation (15%)

Due: Varies by schedule

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

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 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 (30%)

Due: Mar 22, 11:59 PM via 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:

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
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- 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).

Proposal submitted in courselink dropbox by due date

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:

1. 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.
2. 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.
3. **Creating presentation:** Provide 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.
4. Presentation will be about 12 minutes with 3 minutes question/discussion period. Presentations will be posted as PDF files in Counselink drobox after further references.
5. **Creating a 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.
6. An electronic copy of the mini-review written paper is due for submission at Counselink dropbox by 2:30 PM on the day of presentation.

7 Course Statements

7.1 Netiquette expectations

The course website is considered the classroom and the same protections, expectations, guidelines, and regulations used in face-to-face settings apply. Inappropriate behaviour will not be tolerated.

Examples of inappropriate online behaviour include:

- Posting inflammatory messages about your instructor, GTA, guest lecturers or fellow students;
- Using offensive language;
- Copying or presenting someone else's work as your own;
- Adapting information from the Internet without using proper citations or references;
- Buying or selling term papers or assignments;
- Posting or selling course materials to course notes websites;
- Having someone else complete your quiz or completing a quiz for/with another student;
- Stating false claims about lost quiz answers or other assignment submissions;
- Threatening or harassing a student or instructor;
- Discriminating against fellow students, instructors, guest lecturers;
- Using the course website to promote profit-driven products or services;
- Attempting to compromise the security or functionality of the learning management system; and
- Sharing your username and password.

7.2 Dropbox submissions

Assignments should be submitted electronically via the online Dropbox tool. When submitting your assignments using the Dropbox tool, do not leave the page until your assignment has successfully uploaded. To verify that your submission was complete, you can view the submission history immediately after the upload to see which files uploaded successfully. The system will also email you a receipt. Save this email receipt as proof of submission.

Be sure to keep a back-up copy of all of your assignments in the event that they are lost in transition. In order to avoid any last-minute computer problems, your instructor strongly recommend you save your assignments to a cloud-based file storage (e.g., OneDrive), or send to your email account, so that should something happen to your computer, the assignment could still be submitted on time or re-submitted.

It is your responsibility to submit your assignments on time as specified on the Schedule. Be sure to check the technical requirements and make sure you have the proper computer, that you have a supported browser, and that you have reliable Internet access. Remember that technical difficulty is not an excuse not to turn in your assignment on time. Don't wait until the last minute as you may get behind in your work.

If, for some reason, you have a technical difficulty when submitting your assignment electronically, please contact your instructor or CourseLink Support.

<http://spaces.uoguelph.ca/ed/contact-us/>

7.3 Late policy

If you choose to submit assignments to the Dropbox tool late, the full allocated mark will be reduced by 5% per day after the deadline for the submission of the assignment to a limit of six days at which time access to the Dropbox folder will be closed. Late Graded Homework Assignments will NOT be graded if they are submitted after the solutions have been posted to CourseLink.

Extensions will be considered for medical reasons or other extenuating circumstances. If you require an extension, discuss this with the instructor as soon as possible and well before the due date. Barring exceptional circumstances, extensions will not be granted once the due date has passed. These rules are not designed to be arbitrary, nor are they inflexible. They are designed to keep you organized, to ensure that all students have the same amount of time to work on assignments, and to help to return marked materials to you in the shortest possible time.

7.4 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-regchng.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 make a booking at least 14 days in advance, and no later than November 1 (fall), March 1 (winter) or July 1 (summer). Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time.

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-misconduct.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>

8.9 Disclaimer

Please note that the ongoing COVID-19 pandemic may necessitate a revision of the format of course offerings, changes in classroom protocols, and academic schedules. Any such changes will be announced via CourseLink and/or class email.

This includes on-campus scheduling during the semester, mid-terms and final examination schedules. All University-wide decisions will be posted on the COVID-19 website (<https://news.uoguelph.ca/2019-novel-coronavirus-information/>) and circulated by email.

8.10 Illness

Medical notes will not normally be required for singular instances of academic consideration, although students may be required to provide supporting documentation for multiple missed assessments or when involving a large part of a course (e.g.. final exam or major assignment).

8.11 Covid-19 Safety Protocols

For information on current safety protocols, follow these links:

- <https://news.uoguelph.ca/return-to-campuses/how-u-of-g-is-preparing-for-your-safe-return/>
- <https://news.uoguelph.ca/return-to-campuses/spaces/#ClassroomSpaces>

Please note, these guidelines may be updated as required in response to evolving University, Public Health or government directives.
