



ANSC*4470 Animal Metabolism

Winter 2023

Section(s): C01

Department of Animal Biosciences

Credit Weight: 0.50

Version 1.00 - February 06, 2023

1 Course Details

1.1 Calendar Description

Current concepts in whole animal metabolism and the quantitative techniques used to measure whole body metabolic kinetics will be presented. Tissue and organ specific biochemical processes will be integrated with whole body control mechanisms.

Pre-Requisites: NUTR*3210

1.2 Course Description

We will study how regulation of the main pathways of carbohydrate, lipid and amino acid metabolism in gut, liver, muscle, adipose and mammary glands is coordinated so that farm animals may grow and lactate under a wide range of environmental influences. The quantification of metabolic fluxes using tracer kinetic methodology in organ, cell and homogenate preparations will be emphasized for its importance in mathematical model construction. Explanations of metabolic energy transformations will be a component of this course.

The course is divided into 6 2-week sections for which there are prerecorded lecture videos posted on CourseLink to be viewed at any time. A problem set will be given at the beginning of sections #1 to 5 and it is due in CourseLink Dropbox by 11:59 of the 2nd friday of each section. 4 assignments will also be given during the semester for upload to Dropbox. Regularly scheduled classroom time will be used as tutorials to go over questions arising from the course material and assignments. Biweekly quizzes on the 2nd friday of each section will be administered through CourseLink in place of the classroom session.

1.3 Timetable

Lecture Videos on CourseLink

Tutorials Mon, Wed, Fri 09:30-10:20 in MINS 106

Biweekly Quizzes Fri 09:30-10:20 on CourseLink

	lectures	quiz/prob set
1	introductory questions pt 1 introductory questions pt 2 blood pools and tracer kinetics assignment 1	Fri Jan 20
2	glucose transport glycolysis pt 1 glycolysis pt 2	Fri Feb 3
3	TCA cycle gluconeogenesis glycogen turnover lactose and hexose metabolism assignment 2	Fri Feb 17
	lectures	quiz/prob set
4	lipases fatty acid oxidation ketogenesis	Fri Mar 10

	assignment 3 journal article review	
5	lipogenesis protein turnover pt1 protein turnover pt2	Fri Mar 24
6	amino acid catabolism integration of metabolism pt1 integration of metabolism pt2 assignment 4	none

1.4 Final Exam

Final Exam on April 15, 2022

08:30am - 10:30am

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

2 Instructional Support

2.1 Instructional Support Team

Instructor: John Cant
Email: jcant@uoguelph.ca
Office: ANNU 229

2.2 Teaching Assistants

Teaching Assistant (GTA): Amanda Fischer-Tlustos
Email: ansc4470@uoguelph.ca

2.3 Communicating with your 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 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 your 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 your instructor a private message by email. The instructor will attempt to respond to your email within 24 hours. Please use the course email ansc4470@uoguelph.ca when emailing with the TA's.
- **Video Call:** If you have a complex question you would like to discuss with your instructor, you may book a video meeting on Teams (or alternate platform being used by your instructor). Video meetings depend on the availability and are booked on a first come first served basis.

2.4 Netiquette Expectations

Online Behaviour

Inappropriate online behaviour will not be tolerated. Examples of inappropriate online behaviour include:

- Posting inflammatory messages about your instructor or fellow students
- Using obscene or offensive language online
- 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 online
 - Discriminating against fellow students, instructors and/or TAs
 - Using the course website to promote profit-driven products or services
 - Attempting to compromise the security or functionality of the learning management system
 - Sharing your user name and password
 - Recording lectures without the permission of the instructor
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3 Learning Resources

3.1 Course Technology and Technical Support

System and Software Requirements

This course will use a variety of technologies including;

- CourseLink (main classroom)
- Teams (via Office 365)
- Respondus LockDown Browser

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 System Requirements

You are responsible for ensuring that your computer system meets the necessary system requirements. Use the browser check tool to ensure your browser settings are compatible and up to date. (Results will be displayed in a new browser window).

<http://spaces.uoguelph.ca/ed/system-requirements/>
<https://courselink.uoguelph.ca/d2l/systemCheck>

Course Technologies

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

Support Hours (Eastern Time):

Monday thru Friday: 8:30 am–8:30 pm

Saturday: 10:00 am–4:00 pm

Sunday: 12:00 pm–6:00 pm

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 tutorials. 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>

3.1 Technical Skills

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.

3.1 Library Access

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>

4 Learning Outcomes

4.1 Course Learning Outcomes

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

1. Understand the main pathways of carbohydrate, lipid and amino acid metabolism in the gut, liver, muscle, adipose and mammary glands.
 2. Explain how different states of animals (fed/fasting, growth, lactation) work under a wide range of environmental influences.
 3. Calculate metabolic fluxes using tracer kinetic methodology in organ, cell and homogenate preparations.
 4. Be able to integrate tissue and organ specific biochemical process with whole body control mechanisms.
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5 Teaching and Learning Activities

5.1 Lecture

Mon, Jan 9 - Fri, Jan 20

Topics:

Introductory questions Part 1

Introductory questions part 2

Blood pools and tracer kinetics

Assignment 1

Quiz/Problem set - Fri. Jan. 20

Mon, Jan 23 - Fri, Feb 3

Topics: Glucose transport

Glycolysis pt 1

Glycolysis pt 2

Quiz/Problem set - Fri. Feb 3

Mon, Feb 6 - Fri, Feb 17

Topics: TCA cycle

Gluconeogenesis

Glycogen turnover

Lactose and hexose metabolism

Assignment 2

Quiz/Problem set - Fri. Feb.17

Mon, Feb 27 - Fri, Mar 10

Topics: Lipases

Fatty acid oxidation

Ketogenesis

Assignment 3

Journal article review

Quiz/Problem set - Fri. Mar. 10

Mon, Mar 13 - Fri, Mar 24

Topics: Lipogenesis
Protein turnover pt 1
Protein turnover pt 2

Quiz/Problem Set - Fri. Mar. 24

Mon, Mar 27 - Fri, Apr 7

Topics: Amino acid catabolism
Integration of metabolism pt 1
Integration of metabolism pt 2

Assignment 4

Quiz/Problem set - None

Sat, Apr 15, 8:30 AM - 10:30 AM

Topics: FINAL EXAM

6 Assessments

6.1 Marking Schemes & Distributions

Marking Scheme:

Problem Sets: 50% (best 4 out of 5)

Assignments: 15%

Quizzes: 15% (best 4 out of 5)

Final Exam: 20%

6.2 Assessment Details

Problem Sets (50%)

Date: biweekly, due every 2nd friday

Learning Outcome: 1, 2, 3, 4
(Best 4 out of 5)

Assignments (15%)

Learning Outcome: 2, 3
Week 2

Blood pools and tracer kinetics

Quizzes (15%)

Date: biweekly, every 2nd friday on Courselink

Final Exam (20%)

Date: Sat, Apr 15, 8:30 AM - 10:30 AM, TBD

Learning Outcome: 1, 2, 3, 4

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

7 Course Statements

7.1 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.

7.2 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/>

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 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-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>

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

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