



ANSC*6470 - Advanced Animal Nutrition and Metabolism I

Fall 2026 Course Outline

Section: 01

Credits: 0.50

Land Acknowledgement: Guelph

The University of Guelph resides on the ancestral lands of the Attawandaron people and the treaty lands and territory of the Mississaugas of the Credit. We recognize the significance of the Dish with One Spoon Covenant to this land and offer respect to our Anishinaabe, Haudenosaunee and Métis neighbours. Today, this gathering place is home to many First Nations, Inuit, and Métis peoples and acknowledging them reminds us of our important connection to this land where we work and learn.

Calendar Description

A systematic review of key aspects of energy, protein, amino acid and carbohydrate utilization and metabolism in farm animals.

Department(s): Department of Animal Biosciences

Course Description

The purpose of the course is to provide students a core background and recent advances in understanding of key aspects of nutrient utilization and metabolism in animals. As the part I of the two series of courses, this course focuses on three sub-modules of advances in understanding utilization and metabolism of proteins and amino acids, carbohydrates, and energy. Each week will consist of two 80-min class sessions, which will involve class presentations and discussions. Ideally, in the first class session of each of the three sub-modules (protein and amino acids, carbohydrates, energy), the instructor or invited speakers will present a brief overview and relevant background information. For the other class sessions, students will be assigned to lead the discussion on pertinent research papers that are chosen by students and are approved by the instructor. It is essential that all students read the papers that will be discussed in upcoming class meetings. When presenting research papers, the student will need to provide some carefully selected background information on the topic (potentially from other sources than the paper itself), followed by a description of key methodology and results, a critical assessment of the conclusions, the conceptual contribution of the papers to our understanding of the field, and strengths and weaknesses of the paper. The instructor will clarify research methodology and concepts and direct discussions when appropriate. Students will be asked to write a major review paper (approximately 25-30 pages) in their chosen one or combined topic areas from the three sub-modules. The instructor will provide guidelines on student research paper presentations and how students' presentations will be evaluated. The instructor will also provide guidelines on writing the major review paper at the beginning of the course semester.

Lecture Schedule

MonWed 4pm-5:20pm in ALEX*309 (9/10 to 12/22)

Class delivery mode: on site in the assigned class room and/or via virtual meetings

Instructor Information

Ming Fan

Email: mfan@uoguelph.ca

Learning Resources

Additional referred journal publications selected by class students and the instructor for the class use will be circulated to class students via the class circle emails from the the instructor.



Required Resources

While there are no required formal reading materials suggested for this course, the instructor will selectively post some of his previously developed and relevant class background PowerPoint lecture PD files, previously marked assignment PDF files and diet or ration formulation excel files for the class students on the course website: Course link (Website) (<https://courselink.uoguelph.ca/>).

Campus Resources

If you are concerned about any aspect of your academic program: Make an appointment with an Academic Advisor (<https://www.uoguelph.ca/registrar/enrolment-records/academic-advisors>) in your degree program.

Academic Support

McLaughlin Library (<https://www.lib.uoguelph.ca/>) is a central place on campus for providing academic and research support to University of Guelph students. Meet with our staff (<https://www.lib.uoguelph.ca/using-library/appointment-booking/>), attend a workshop (https://cal.lib.uoguelph.ca/calendar/library_events/?t=g), or use our online resources (<https://learningcommons.lib.uoguelph.ca/>):

- Writing (<https://www.lib.uoguelph.ca/writing-studying/writing-resources-workshops/>) and English as an Additional Language (<https://www.lib.uoguelph.ca/writing-studying/english-language-support/>)
- Research Assistance (Finding Sources) (<https://www.lib.uoguelph.ca/writing-studying/research-assistance/>)
- Studying and Time Management (<https://www.lib.uoguelph.ca/writing-studying/studying-resources-workshops/>)
- Supported Learning Groups (SLGs) (<https://www.lib.uoguelph.ca/writing-studying/studying-resources-workshops/slgs/>)
- Presentations (<https://www.lib.uoguelph.ca/writing-studying/studying-resources-workshops/group-work-and-presentations/>)
- Data and Publishing (<https://www.lib.uoguelph.ca/scholarship-publishing/research-lifecycle-support/>)

Cost of Textbooks and Learning Resources

Textbook / Learning Resource	Required / Recommended	Cost
Not Applicable		N/A

Students are advised that prices are often determined by the publisher or bookstore and may be subject to change.

Library Course Reserve (Ares)

For this course, you will be required to access course reserve materials through the University of Guelph McLaughlin Library. To access these items, select **Ares** on the navbar in CourseLink. Note that you will need your Central Login ID and password in order to access items on reserve. For further instructions on accessing reserve resources, visit How to Get Course Reserve Materials (<https://www.lib.uoguelph.ca/find/course-reserves-ares/>).

If at any point during the course you have difficulty accessing reserve materials, please contact the e-Learning Operations and Reserve Services staff at:

Tel: 519-824-4120 ext. 53621 | Email: libres2@uoguelph.ca | Location: McLaughlin Library, First Floor, University of Guelph

Course Level Learning Outcomes

1. Literacy - Students will be required to develop an understanding of key review articles, interpret peer-reviewed original research papers and present ideas and research findings to the class orally. Students are expected to be actively involved in class discussions. Students's scientific writing skills will be improved through writing focused review papers during the semester. Students are asked to follow the guidelines and requirements to prepare and carry out oral presentations and review writing assignments.
2. A sense of historical development - The history of nutrient discovery, nutritional concept development and development of techniques to evaluate nutritional adequacy (i.e., nutrient bioavailability and requirements of essential nutrients) of diets & rations will be weaved into the course material.
3. Understanding of forms of inquiry - Various experimental approaches in the nutritional sciences and their interpretation will form an important part of discussions in class.
4. Depth and breadth of understanding - Aside from covering detailed aspects of the cellular and molecular mechanisms of nutrient transformation (e.g., biosynthesis and catabolism) in the body, students will be encouraged to develop a facility with the philosophy that whole - animal function can be explained by appealing to cellular metabolism at the molecular level.

Schedule of Topics and Assignments

Day	Date:	Topic	Activities	Due
Mon	9/14	First class meeting		
Wed	9/16	Lecture – "Advances in Protein and Amino acid Nutrition and Metabolism" Dr. Ming Z. Fan, Department of Animal Biosciences, University of Guelph		
Mon	9/21	Sub-module 1: "PROTEINS AND AMINO ACIDS" Begins Topic of amino acid and protein bioavailability (1): student presentations		
Wed	9/23	Topic of amino acid and protein bioavailability (2): student presentations		
Mon	9/28	Topic of amino acid and protein requirements (1): student presentations		
Wed	9/30	Topic of amino acid and protein requirements: (2) student presentations		
Mon	10/5	Topic of amino acid and protein utilization and metabolism (1): student presentations		
Wed	10/7	Topic of amino acids in signalling metabolism: student presentations		
Mon	10/12	Thanksgiving Holiday		
Wed	10/14	Sub-Module-2 Carbohydrate Nutrition and Metabolism topics begin: Topic of carbohydrate digestion and absorption (1): student presentations		
Mon	10/19	Topic of carbohydrate digestion and absorption (2): student presentations		
Wed	10/21	Topic of carbohydrate and productivity and health & wellbeing (1): student presentations		
Mon	10/26	Topic of carbohydrate and productivity and health & wellbeing (2): student presentations		
Wed	10/28	Topic of sugar homeostasis and metabolism (1): student presentations		
Mon	11/2	Topic of sugars & metabolites in signalling metabolism and gene expression: student presentations		
Wed	11/4	Su-Module-3 of Energy Utilization and Metabolism Topics Begin: Topic of energy bioavailability (i.e., DE, ME and NE systems) in feedstuffs (1): student presentations		
Mon	11/9	Topic of energy bioavailability (i.e., DE, ME and NE systems) in feedstuffs (2): student presentations		
Wed	11/11	Topic of energy needs for various body functions (1): student presentations		
Mon	11/16	Topic of energy needs for various body functions (2): student presentations		
Wed	11/18	Topic of energy needs for various body functions (3): student presentations		



Mon	11/23	Topic of cellular & molecular events in energy expenditure (1): student presentations
Wed	11/25	Topic of cellular & molecular events in energy expenditure (2): student presentations
Mon	11/30	Topic of cellular & molecular events in energy expenditure (3): student presentations
Wed	12/2	Missing class student presentations

Teaching and Learning Activities

Weekly Activities

Students come to attend scheduled classes between 4 - 5:20 pm on Mondays and Wednesdays. Students read and reflect on circulated references.

Students develop their assigned review assignment writing.

Assessment Breakdown

Description	Weighting (%)	Due Date
Participation in class discussions	20%	First-half semester at the end of the Thanksgiving break and second half semester at the end of the class
Oral presentations (2 x 25%) of original research articles	50%	End of each concerned sub-module
Writing up a major review paper (about 25-30 pages excluding the reference listing section)	30%	Dec-12-2026

Assessment Details

Participation

Participation in class discussions

20%

Course Learning Outcomes Assessed: 1, 2, 3, 4

Presentation

Oral Presentations (2 x 25%)

50%

Course Learning Outcomes Assessed: 1, 2, 3, 4

Paper

Writing up a Major Review Paper

30%

Course Learning Outcomes Assessed: 1, 2, 3, 4

Grading Schemes

All three categories of grades will be posted periodically upon completing their marking by the instructor on the CourseLink site.

Last Day to Drop Course

The final day to drop Fall 2026 courses without academic penalty is the last day of classes: December 04

After this date, a mark will be recorded, whether course work is completed or not (a zero is assigned for missed tests/assignments). This mark will show on the student's transcript and will be calculated into their average.

Course Grading Policies

Submission of Assignments

The course instructor will verbally describe in class and post written course assignment requirements and marking rubrics at the starting of the course on the CourseLink site.

Late Assignment

Class students will need to communicate with the instructor in a written email if they anticipate a late assignment submission.

Standard Statements for Graduate Courses

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 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.

The Academic Misconduct Policy (<https://calendar.uoguelph.ca/graduate-calendar/general-regulations/academic-misconduct/>) is outlined in the Graduate Calendar.

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.

Use of the SAS Exam Centre requires students to make a booking at least 10 business days in advance, and no later than November 1 (fall), March 1 (winter) or July 1 (summer). For students at the Guelph campus, information can be found on the SAS website. (<https://www.uoguelph.ca/sas>)

Accommodation of Religious Obligations

If you are unable to meet an in-course requirement due to religious obligations, please email the course instructor within two weeks of the start of the semester to make alternate arrangements.

See the Academic calendar for information on regulations and procedures for Academic Accommodation of Religious Obligations (<https://calendar.uoguelph.ca/graduate-calendar/general-regulations/academic-accommodation-religious-obligations/>)

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.

Drop Date

Courses that are one semester long must be dropped by the end of the last day of classes; two-semester courses must be dropped by the last day of classes in the second semester. The regulations and procedures for Dropping Courses (<https://calendar.uoguelph.ca/graduate-calendar/general-regulations/registration/>) dropping courses are available in the Graduate Calendar (<https://calendar.uoguelph.ca/graduate-calendar/general-regulations/registration/>).

Email Communication

As per university regulations, all students are required to check their <uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its students.

Health and Wellbeing

The University of Guelph provides a wide range of health and wellbeing services at the Vaccarino Centre for Student Wellness (<https://wellness.uoguelph.ca/>). If you are concerned about your mental health and not sure where to start, connect with a Student Wellness Navigator (<https://wellness.uoguelph.ca/navigation/>) who can help develop a plan to manage and support your mental health or check out our mental wellbeing



resources. (<https://wellness.uoguelph.ca/shine-this-year>) The Student Wellness team are here to help and welcome the opportunity to connect with you.

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).

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.

Resources

The Academic Calendars (<http://www.uoguelph.ca/registrar/calendars/?index>) are the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs.

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. See the Graduate Calendar for information on regulations and procedures for Academic Consideration (<https://calendar.uoguelph.ca/graduate-calendar/general-regulations/grounds-academic-consideration/>).