ANSC*6480 - Advanced Animal Nutrition and Metabolism II

Winter 2025 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 lipid, vitamin and mineral utilization and metabolism in farm animals.
Department(s): Department of Animal Biosciences

In addition to livestock animals (cows, sheep, pigs and poultry), this course also focuses on fish, pets, horses and other companion animals. However, the nutrients (lipids, vitamins & minerals) are the main focus rather than the nutrition of individual animal species.

Course Description

This course will help students develop the skills to be able to continuously improve their understanding of the function, utilization, and effects of nutrients and other dietary compounds, and the complex cellular mechanisms involved in nutrient metabolism.

The course is not meant to be comprehensive and systematic. Rather, it will be topic-based and explore recent advances in our understanding of the roles and metabolism of nutrients, the cellular mechanisms involved in nutrient utilization and the regulatory roles that different nutrients can play.

The course will stimulate students to take their learning experience to a higher level. It will present challenging material. It will also foster in the students the notion that whole-body functions of animal can be explained by appealing to cellular metabolism.

Lecture Schedule

Tu 2:30pm-5:20pm in ANNU*156 (1/6 to 4/21)

Lectures will be in-person and synchronous on Zoom (recorded). See Courselink for the link to the Zoom meeting (under Content).

Instructor Information

David Huyben, PhD
Professor
Email: huybend@uoguelph.ca
Office: ANNU 135 or Teams
Office Hours:
Email Dr. Huyben to suggest and arrange times that work for both of us to meet in person or on Teams. Can meet after class as well if Dr. Huyben is not busy.

Learning Resources

Required Resources

Lecture slides, lecture recordings, assignment outlines, journal club papers and additional reading materials will be posted on the course website: Courselink (Website) (https://courselink.uoguelph.ca/)

Campus Resources

If you are concerned about any aspect of your academic program: Make an appointment with a Program Counsellor (https://www.uoguelph.ca/uaic/programcounsellors/) in your degree program. If you are struggling to succeed academically: There are numerous academic resources offered by the Learning Commons (https://www.lib.uoguelph.ca/using-library/spaces/learning-commons/) including, Supported Learning Groups for a variety of courses, workshops related to time management, taking multiple choice exams, and general study skills.

Cost of Textbooks and Learning Resources

Textbook / Learning Resource	Required / Recommended	Cost
None	None	None

Course Learning Outcomes

1. Critical and Creative Thinking: Critically evaluate current research and understand both the complexity of knowledge and the potential contributions of other disciplines (e.g. cell biology, neuroscience, epidemiology) in order to address complex issues in animal nutrition using established principles and techniques.
2. Literacy: Extract material from a variety of resources, assess the quality and validity of the material, and use it to discover new knowledge.
3. Global Understanding: Explain which lab, field and statistical techniques can be used to collect, analyse, interpret and present data in order to create knowledge in their respective area of interest while understanding the limitations of those techniques.
4. Communicating: Communicate knowledge and data in a clear and effective way using written and oral formats to a range of audiences. Students will also be able to create accurate, informative, and attractive graphics to support communication in oral formats.
5. Professional and Ethical Behaviour: Follow appropriate guidelines and procedures typical of their area of interest and carry out their work with scientific integrity. Accomplish the tasks at hand with proficient skills in teamwork and leadership, while remembering ethical reasoning behind all decisions.

Lecture Schedule

Day	Date:	Topic	Activities	Due
Tue	1/7	Introduction to the course. Presentation of the Evaluation Scheme (0.5h), Description of Individual Review Paper (general guidelines and expectations) (0.5h), Instructor Review #1: Lipids, Vitamins and Minerals: Chemical Structures Classification and Properties (1.5h)	Lecture by David Huyben	
Tue	1/14	Instructor Review #2: Dietary Requirements for Lipids, Vitamins and Minerals: Concepts for Animal Nutritionists (1.5h), Description of Team Project (General guidelines and expectations) (0.5h), Selection of Individual Review Paper Topics and Discussion (0.5h)	Lecture by David Huyben	
Tue	1/21	Instructor Review # 3: Lipids, Vitamins and Minerals as Structural Components (1.5h), Journal Club 0: What to look for in a scientific paper? Review of a few original scientific articles led by instructor (1 h)	Lecture by David Huyben, Individual Outline Task 1a	
Tue	1/28	Instructor Review #4: Lipids and Fat-Soluble Vitamins as Regulatory Molecules (1.5h), Journal Club 1: Review Paper #1 on choline fed pigs (practice) (1h)	Lecture by David Huyben, Review JC Paper #1	
Tue	2/4	Instructor Review #5: Data Compilation, Mathematical Modeling and Artificial Intelligence in Precision Animal Nutrition (1.5h), Journal Club 2: Review Paper #2 on lipids/omega-3 fed fish (1h)	Lecture by Dominique Bureau, Review JC Paper #2, Team Outline Task 2a	

Tue	2/11	Team Project Outline Presentations (2h), Journal Club 3: Review Paper #3 on vitamin B fed dairy cows	Student Presentations Task 2b, Review JC Paper #3
Tue	2/18	Winter Break	
Tue	2/25	Instructor Review #6: Nutrition, the Gut Microbiome and it's Role in Intestinal Health and Metabolism (1.5h), Journal Club 4: Animal microbiome paper (1h)	Lecture by Brendan Daisley, Review JC Paper #4
Tue	3/4	Instructor Review #7: Ruminant nutrition and the role of lipids, vitamins and minerals (1.5h), Tour of the feed production and nutritional analytical equipment at the ABSc department (1h)	Lecture by John Cant
Tue	3/11	Open session Q & A with instructor to prepare for individual and team projects (1h)	Optional
Tue	3/18	First half of class: Student Presentations on Individual Review Paper (2h), Time with instructor to discuss individual review paper or team project (0.5h)	Individual Presentation Task 1b
Tue	3/25	Second half of class: Student Presentations on Individual Review Paper (2h), Time with instructor to discuss individual review paper or team project (0.5h)	Individual Presentation Task 1b
Tue	4/1	Final Showcase of Team Projects - In person and Online (recorded and uploaded to YouTube Channel) (2.5h), Last class!	Team Presentation Task 2c
Tue	4/8	No Class	
Tue	4/15	No Class	

Teaching and Learning Activities

Lectures

The course will be comprised of lectures (reviews) by the course instructor, presentations on cutting-edge research topics made by well-established scientists (guest lecturers), and discussions on the structural, metabolic and regulatory roles of lipids, vitamins, and minerals, as well as, issues related to the dietary supplies of these different nutrients. The instructors will provide a small number of scientific papers to read prior to each class.

Individual Review Paper

Each student will be expected to write a review paper on a cutting-edge topic on a specific nutrient, which can either be a lipid, vitamin, mineral or related compound (e.g. nucleotides, choline, etc.). The topic has to be on a recently elucidated chemical, digestive, metabolic, cellular, or physiological mechanism or process related to this nutrient or molecule.
The preparation of the review will follow a series of steps.

Early in the semester, each student will submit a short outline of the topic, comprised of a tentative title and reference for **three key scientific papers** (preferably original research articles) and **an abstract (300 words max.)** by the specified deadline. The students are required to consult with the instructor on the suitability of their topic in advance of the deadline. A list of suggested topics for individual research projects are provided in the Additional Course Information section of this course outline.

The student will be required to prepare a **lit review presentation (10 min max.)** on the specific topic of their review. The seminar should provide a good overview of the topic but doesn't have to be exhaustive or fully representative of the entire review paper. The instructor and fellow students will provide feedback on the content and format of the seminar as well as on the presentation style of the student.

The student will prepare a **review paper (10 pages max.)** and submit it to Dropbox. Guidelines on the format of the review will provided by the instructor during the semester. The review should be as scientific and systematic as possible. The review should be written for a readership composed of your peers (i.e. graduate level animal nutritionists/ scientists).

Team Project

Teams of students (2-3 students/team) will work on a common project. The projects will be selected by the students in close consultation with the instructor. Each student will be responsible for a sub-project or specific tasks within each project. Students will be required to work in cooperation with the other students in the team. The instructor will provide general guidelines for the team project in class throughout the semester.

Each student will submit a **brief project outline (300 words max.)** of their overall project and sub-project idea to the instructor for approval by the specified deadline.

The team will then present their project to the instructor in a **short seminar (5 min max.)** at around the mid-point of the semester and seek feedback.

At the end of the semester, the students will prepare a **final showcase (10 min max.)** of their project for the department and industry stakeholders. The students will play an active role in organizing and promoting the showcase. A significant part of the mark for the Team Project will be for the organization of the showcase.

Participation

Participation is an important part of the course. Five journal club/discussions will be organized throughout the semester. The instructor will lead the discussion and the students will be expected to have read documents/papers prior to class and actively participate in the discussion.

Assessment Breakdown

Description	Weighting (%)	Due Date
Task 1a Individual Review Paper Outline	10%	Jan 21 2024 11:59pm
Task 2a Team Project Outline	10%	Feb 4 2024 11:59pm
Task 2b Team Project Outline Presentation	10%	Feb 11 2024 11:59pm
Journal Club Participation	10%	Feb 25 2024 11:59pm
Task 1b Individual Review Paper Presentation	10%	Mar 25 2024 11:59pm
Task 2c Team Project Final Showcase	25%	Apr 1 2024 11:59pm
Task 1c Individual Review Paper	25%	Apr 8 2024 11:59pm

Assessment Details

Research Proposal

Individual Review Paper Outline **10**
Course Learning Outcomes Assessed: 1, 2, 4

Team Project Outline **10**
Course Learning Outcomes Assessed: 1, 2, 4

Group Presentation

Team Project Outline Presentation **10**
Course Learning Outcomes Assessed: 1, 2, 3, 4, 5

Participation

Journal Club Participation **10**
Course Learning Outcomes Assessed: 1, 4, 5

Presentation

Individual Review Paper Presentation **10**
Course Learning Outcomes Assessed: 1, 2, 3, 4

Group Project

Team Project Final Showcase **25**
Course Learning Outcomes Assessed: 1, 2, 3, 4, 5

Literature Review

Individual Review Paper **25**
Course Learning Outcomes Assessed: 1, 2, 3, 4

Last Day to Drop Course

The final day to drop Winter 2025 courses without academic penalty is the last day of classes: April 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

Submit all assignments to Dropbox on Courselink unless accessed in class (journal club participation).

Late Assignment

Late assignments will be given a grade of 0%, unless the student contacts the instructor and arranges an alternative deadline.

Course Standard Statements

Course Policies

Class attendance is only required for journal club participation and for assignment presentations.

Course Technology Requirements

This course will use a variety of technologies including:

- CourseLink (main classroom)
- Zoom
- 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 (https://opened.uoguelph.ca/student-resources/system-and-software-requirements/)

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 the first business day in November, March or July as appropriate for the semester. Similarly, new or changed accommodations for online quizzes, tests and exams must be approved at least a week ahead of time. 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/navigators/) 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/).