

ANSC*4650 - Comparative Immunology

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

This course gives an overview of the immune defense mechanisms of domestic species, and to compare common and unique defense strategies developed for resisting microbial and viral infections. Topics include innate and acquired immunity, evolution of the immune system, immunoregulation, and the host response to pathogen invasion.

Prerequisite(s): ANSC*3080

Department(s): Department of Animal Biosciences

Course Description

This course is designed to give an overview of the immune defense mechanisms of domestic species, and to compare common and unique defense strategies developed for resisting microbial and viral infections. Topics include innate and acquired immunity, evolution of the immune system, immunoregulation, and the host response to pathogen invasion.

Lecture Schedule

MonWedFri 2:30pm-3:20pm in MCKN*227 (1/6 to 4/21)

Instructor Information

Niel Karrow, Professor

Course Instructor

Email: nkarrow@uoguelph.ca

Office: ANNU123

Office Hours:

Office hours will take place on Zoom. Time TBD

Spencer Leuschner, MSc thesis candidate

Teaching Assistant

Email: sleuschn@uoguelph.ca

Office Hours:

Office hours will be arranged via email

Office Hours

Office Hours: Will take place on Zoom. Friday evenings 7:00 pm- 8:00 pm

<https://zoom.us/j/95995906820?pwd=uV5K9pjYYFLNuvd2C2A8a9uEalt0l.1>

Meeting ID: 959 9590 6820

Passcode: 816456

NOTE: If you find that you are emailing me with a question that takes more than one sentence to respond to, then you should be coming to office hours.

Learning Resources

Additional Resources

- An "Example IBL.doc" will be made available through Courselink.
- Lecture slides and notes will be made available through Courselink.
- List of abbreviations

Cost of Textbooks and Learning Resources

Textbook / Learning Resource	Required / Recommended	Cost
Not Applicable		

No text book is required.

Course Level Learning Outcomes

1. Students will be expected to explain the concepts of innate and acquired immunity and recall examples of humoral and cellular components provided in the instructor's course material.
2. Students will be expected to distinguish innate and acquired immune system differences across vertebrate species that were provided in the instructor's course material.
3. Students will be expected to recall examples of crosstalk between the innate and acquired immune systems provided in the instructor's course material.
4. Students will be expected to explain how the immune response is regulated by recalling examples provided in the instructor's course material and predict how immune dysregulation can lead to disease.
5. Students will be expected to illustrate how genetic diversity contributes to variation in the host immune response by recalling examples provided in the instructor's course material.
6. Students will be expected to apply the course material to predict how the immune system specifically targets parasitic, viral, fungal, and bacterial infections.
7. Inquiry-based learning (IBL) topics will be covered in class, and students will be expected to **recall** and **clarify** the assigned questions. In a class setting, students will be expected to **discuss prior knowledge** of the topics, and to **identify knowledge uncertainties**. Students will then be expected to **individually create hypotheses** to address the questions, then **research only peer-reviewed literature** to **identify pertinent information** to address knowledge uncertainties. Students will then be expected to **individually summarize** and **critically evaluate** these research findings, **attempt** to answer the question, and **reflect** on remaining uncertainties and the learning process.

NOTE: The use of AI in this assignment is not permitted. Search tools will be used to test this, and if it indicates AI has been used, the student will receive a "0" grade for the assignment.

Teaching and Learning Activities

Lecture Content:

Unit 1. Introduction to body defense

Unit 2. Physical barriers at the host-microbe interface

Unit 3. Danger signals and pattern recognition receptors/molecules

Unit 4. Sentinel cells

Unit 5. Sentinel cell products

Unit 6. The complement system

Unit 7. Effector cells of the innate immune system:
neutrophils

Unit 8. Effector cells of the innate immune system:
macrophages

Unit 9. The acute phase response

Unit 10. Antigens and sites of antigen presentation

Unit 11. Antigen presenting cells and antigen presentation

Unit 12: Antigen receptor diversity: MHC

Unit 13. Effector and regulatory T cells

Unit 14. B cells and immunoglobulins

Unit 15: Antigen receptor diversity: BCR and TCR

Course schedule:

<u>Date</u>	<u>Topic</u>	<u>Notes</u>
Jan 6	Unit 1	
Jan 8	Unit 1	
Jan 10	Unit 2	
Jan 13	Unit 2	
Jan 15	Unit 3	
Jan 17	Unit 3	
Jan 20	Unit 3	
Jan 22	Unit 4	Go over IBL1 in class
Jan 24	Unit 4	
Jan 27	Unit 5	Hard copy of IBL1 due in class
Jan 29	Unit 5	
Jan 31	Unit 5	
Feb 3	Unit 5	
Feb 5	Unit 6	
Feb 7	Unit 6	
Feb 8	Midterm 1	Covers Units 1-5, location TBD
Feb 10	Unit 7	
Feb 12	Unit 7	
Feb 14	Unit 7	
Feb 15-23 Winter break		
Feb 24	Unit 8	

Feb 26	Unit 8	
Feb 28	Unit 9	
Mar 3	Unit 9	
Mar 5	Unit 10	
Mar 7	Unit 10	
Mar 10	Unit 10	
Mar 12	Unit 11	
Mar 14	Unit 11	
Mar 15	Midterm 2	Covers Units 6-10, location TBD
Mar 17	Unit 12	
Mar 19	Unit 13	
Mar 21	Unit 13	
Mar 24	Unit 13	
Mar 26	Unit 14	
Mar 28	Unit 14	Go over IBL2 in class
Mar 31	Unit 14	
Apr 2	Unit 15	
Apr 4	Unit 15	Hard copy of IBL2 due in class
April 21	Final Exam	Covers Units 11-15, Time: Mon 8:30 am-10:30 am, Location TBD

Assessment Breakdown

Description	Weighting (%)	Due Date
Inquiry-based Learning Assignment #1	10%	Jan. 27
Midterm Exam #1	20%	Feb. 8
Inquiry-based Learning Assignment #2	10%	Apr. 4
Midterm Exam #2	25%	Mar. 15
Final Exam	35%	April 21

Assessment Details

Assignment

Inquiry-based Learning Assignment #1
Course Learning Outcomes Assessed: 7

10%

Midterm

Midterm Exam #1
Course Learning Outcomes Assessed: 1, 2, 3, 4, 5, 6

20%

Assignment

Inquiry-based Learning Assignment #2
Course Learning Outcomes Assessed: 7

10%

Midterm

Midterm Exam #2

25%

Course Learning Outcomes Assessed: 1, 2, 3, 4, 5, 6

Exam

Final Exam

35%

Course Learning Outcomes Assessed: 1, 2, 3, 4, 5, 6

Final Exam

Date: Apr 21

Time: Mon 8:30am-10:30am

Location: TBA *Please see Web Advisor closer to the date of scheduled final for location.*

To understand rules and regulations regarding Examinations students are encouraged to read Student's Responsibilities (<https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/examinations/>)

If the student is unable to meet the final exam requirements due to medical, psychological or compassionate circumstances they are encouraged to review Student's Responsibilities in the Academic Consideration, Appeals and Petitions (<https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/academic-consideration-appeals-petitions/>) section of the Academic Calendar.

Marking Scheme for IBLs

5% Question being addressed- provided!

10% Summarize class knowledge prior to research- provided!

20% Identify knowledge uncertainties to be researched (listed in point form)- provided!

5% Create a testable hypothesis to address the question

20% Summarize research findings to address knowledge uncertainties

15% Critical evaluation

10% Reflect on remaining uncertainties and learning process

10% Spelling and Grammar

5% References (Include at least 3)

Note: A penalty of 5% per day will be assigned for late assignments.

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 Standard Statements

Netiquette Expectations

For distance education courses, the course website is considered the classroom and the same protections, expectations, guidelines, and regulations used in face-to-face settings apply, plus other policies and considerations that come into play specifically because these courses are online.

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 username and password; and
- Recording lectures without the permission of the instructor.

Courselink System Requirements

You are responsible for ensuring that your computer system meets the necessary system requirements. (<https://opened.uoguelph.ca/student-resources/system-and-software-requirements/>) Use the browser check (<https://courselink.uoguelph.ca/d2l/systemCheck/>) tool to ensure your browser settings are compatible and up to date. (Results will be displayed in a new browser window)

Zoom Requirements

This course uses **Zoom** as a video communication tool.

System Requirements:

1. An internet connection – broadband wired or wireless (3G or 4G/LTE)
2. Speakers and a microphone – built-in or USB plug-in or wireless Bluetooth
3. A webcam or HD webcam - built-in or USB plug-in

Microsoft Teams System Requirements

This course may use **Microsoft Teams** as a video communication tool. A Webcam, a microphone to record video, and headphones/speakers to play back the recording are also needed. In order to use Microsoft Teams, you must meet the following technical requirements:

1. An internet connection – broadband wired or wireless (3G or 4G/LTE);
2. Speakers and a microphone – built-in or USB plug-in or wireless Bluetooth;
3. A webcam or HD webcam - built-in or USB plug-in;

Supported mobile platforms: Android 4.4 or later and iOS 10.0 or later.

Technical Skills

As part of your online experience, you are expected to use a variety of technology as part of your learning:

- Manage files and folders on your computer (e.g., save, name, 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 instructors for this are given in your course);
- Access, navigate, and search the internet using a web browser (e.g., Chrome, Firefox, Microsoft Edge, Safari, etc.);
- Perform online research using various search engines (e.g., Google) and library databases.

Technical Support

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

Courselink Support

University of Guelph

Day Hall, Room 211

Email: courselink@uoguelph.ca (<https://calendar.uoguelph.ca/syllabi/commoncontext/detechnology/email%20to:courselink@uoguelph.ca>)

Tel: 519-824-4120 ext. 56939

Toll-Free (CAN/USA): 1-866-275-1478

Walk-In Hours (Eastern Time):

Monday thru Friday: 8:30 am-8:30pm

Phone/Email Hours (Eastern Time):

Monday thru Friday: 8:30am-8:30pm

Saturday: 10:00am - 4:00pm

Sunday: 12:00pm - 6:00pm

Additional Course Statements

Intellectual Property:

Presentations that are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether they be instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted. There are resources online attempting to sell my lecture material from previous years! This material is out of date, and I provide updated slides and notes.....so save your money for your rent and food!

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). If for some reason I become ill during the semester, or we have a snow day, we will jump on Zoom for the class lecture using my office hour link.

Standard Statements for Undergraduate 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/undergraduate-calendar/undergraduate-degree-regulations-procedures/academic-misconduct/>) is outlined in the Undergraduate 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.

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 10 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 Accommodations of Religious Obligations (<https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/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

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 undergraduate students 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 the Undergraduate Calendar - Dropping Courses (<https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/dropping-courses/>).

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 Undergraduate Calendar for information

on regulations and procedures for Academic Consideration. (<https://calendar.uoguelph.ca/undergraduate-calendar/undergraduate-degree-regulations-procedures/academic-consideration-appeals-petitions/>)