Immunology
UNIVERSITY OF TORONTO

IMM250H1 Winter 2025
Immunity and Infection

Course & Instructor Information

Course Co-Coordinators
Dr. Jasty Singh & Dr. Ray Amith
Course Email: imm250@course.utoronto.ca
Office Hours: Monday, 1:00-3:00pm on Microsoft Teams

Course Lecturers
Dr. Ray Amith

Guest Lecturers
Dr. Tania Watts
Dr. Wendy Tamminen

Required:

 Stable internet connection  Laptop or computer

Given the rigorous nature of this course, please review whether online learning is right for you here.

Delivery Mode:
Lectures in this course will be held **online, asynchronously**. Lecture videos will be released Mondays at 9am for a given lecture week, and students will be able to self-pace their learning (first release Monday, January 6). ***Optional*** tutorials will be scheduled around major assessments (around the midterm test, assignment, final assessment) well be held using an **online, synchronous** approach on the indicated dates. Note that all scheduled meetings and deadlines are in Eastern Time (ET).

Arts & Science Calendar Course Overview

Students will be introduced to the basic concepts of immunity to infectious disease and how breakdown of the immune response can lead to autoimmunity. We will trace the history of current ideas in immunology and the immune response by examining how bacteria and viruses cause disease and the initial discoveries that led to such developments as vaccination. Current topical and newsworthy infectious diseases (HIV, tuberculosis, SARS-CoV-2, avian flu) will be used as examples of how the immune system copes with microbial infections.

IMM250 is a required course for all immunology programs, however it is designed to fulfill breadth requirements and is an appropriate choice for students in other science or humanities programs. Development of writing skills through the composition of a science article for the general public is one objective of this course.

Recommended Preparation: BIO120H1, BIO130H1.

Evaluation Scheme & Course Assessments

Assessment	% of Grade	Due Date
Midterm Test	30%	February 10, 2025 (online)
Final Exam	35%	TBA; in person
Top Hat Participation	10%	Ongoing
Assignment: Science & Society Paper	25%	March 17, 2025 (11:59pm)

1. Midterm Test (30%)

The midterm test will be available online via Quercus Quizzes on **February 10, 2025,** from **9am ET to 9pm ET**. It will cover the first five (5) lectures and the format will be multiple-choice. Students will have two (2) hours to write once they start.

Refer to the "Missed Assessment Policy" section below for information on how to request accommodation for a missed midterm test and what accommodations may be possible.

2. Final Exam (35%)

The date of the **in-person** Final Exam will be scheduled by the Faculty of Arts & Science. The format of the Final Exam is multiple choice, and it will cover lectures 6-11. Students will have **2 hours** to write.

Students who miss the Final Exam for a valid reason may petition to the Faculty of Arts & Science to write the deferred exam. Please note that the format of the deferred exam may be different (e.g., written short answer questions).

3. Textbook and Top Hat Participation (10%)

We will be using a custom-built interactive Immunology textbook published with Top Hat for this class. To purchase the IMM250S 2025 textbook go to: https://app.tophat.com/e/965199**.**

When creating your Top Hat account, please ensure that your email address, name, and student number match your University of Toronto email address, name, and student number EXACTLY. Please DO NOT use your UTORid as your student number to register for Top Hat.

There are several questions embedded within the textbook and each will be assigned 0.5 point for participation and 0.5 point for correctness.

Textbook chapters will be made accessible in *Homework Mode* at 9am on the Monday of each corresponding lecture. Each chapter will remain in Homework Mode for 1 week until 9am on the Tuesday of the following week. While the chapter is in Homework Mode, you can submit answers for the homework questions embedded in the text. When the Homework Mode period ends for a given chapter, it will be put into *Review Mode* for the remainder of the course. Responses can no longer be submitted in this mode and correct answers will become accessible.

Note: Due to fluxes in class registration at the beginning of the term, Chapters 1 and 2 will each remain in Homework Mode for two weeks, rather than one.

The Top Hat grades are NOT transferrable to other assessments. There is no accommodation for missed Top Hat participation for any reason (e.g., legitimately missed chapters, technical problems, forgetting to submit questions, etc.).

4. Assignment: Science & Society Paper (25%)

Quercus submission deadline: **March 17, 2025, at 11:59pm.**

Late submissions of assignments are subject to a penalty of 5% deduction per day. **No papers will be accepted after March 31, 2025 at 11:59pm.**

Accommodation requests for assignment extensions are highly discouraged. Refer to the "Missed Assessment Policy" section below for information on how to request accommodation for a missed assignment and what accommodations may be possible.

5. Tutorials (non-mandatory)

We will be holding two **online, synchronous** tutorials in this course:

Pre-midterm: February 3, 9-11 AM
Term paper tutorial: TBD

NB: While tutorials are not mandatory, attendance is *strongly* recommended. The tutorial slides and recording will be posted on Quercus the day after each tutorial takes place.

Missed Assessment Policy

- This course follows the University of Toronto's Policies on missed tests and assignments and requires students to complete an Absence Declaration on ACORN for illness-related circumstances.
- Other reasons for missing course assessments will require prior approval by the course coordinator. If approval is not granted in advance for non-medical reasons, then 0% will be recorded for the missed assessment.
- Note: If you submit an assessment, it will be assumed that you deemed yourself fit enough to do so and your grade will stand as calculated. No accommodations will be made based on claims of medical, physical or emotional distress ***after*** the fact.
- ***Top Hat participation*** – There are no make-ups for missed Top Hat participation, given the nature of the assessment (i.e., there is a 1-week period to complete it).
- ***Missed Midterm*** – Missed midterms will be accommodated at the course coordinator's discretion. *The make-up midterm will be composed of a mix of short-answer and multiple-choice questions.*
- ***Science & Society Paper*** – Requests for accommodation surrounding the term paper are highly discouraged and will only be accommodated when warranted at the course coordinator's discretion. Following the deadline, a penalty of 5% per day will be applied to late submissions.

Statement on Academic Integrity

All students, faculty and staff are expected to follow the University's guidelines and policies on academic integrity. For students, this means following the standards of academic honesty when writing assignments, collaborating with fellow students, and writing tests and exams. Ensure that the work you submit for grading represents your own honest efforts. Plagiarism—representing someone else's work as your own or submitting work that you have previously submitted for marks in another class or program—is a serious offence that can result in sanctions. Speak to your course instructor for advice on anything that you find unclear. To learn more about how to cite and use source material appropriately and for other writing support, see the U of T writing support website at http://www.writing.utoronto.ca. Consult the Code of Behaviour on Academic Matters for a complete outline of the University's policy and expectations. For more information, please see http://www.artsci.utoronto.ca/osai and http://academicintegrity.utoronto.ca.

Note: Normally, students will be required to submit their course essays to the University's plagiarism detection tool (Turnitin) for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their essays to be included as source documents in the tool's reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University's use of this tool are described on the Centre for Teaching Support & Innovation web site ***(https://uoft.me/pdt-faq).***

Multiple submissions will be allowed and students will be given the chance to check their originality scores prior to final submission. ***Please note: we strongly recommend that you check your similarity score at least one day before the deadline, as similarity reports might not be generated on time during periods of intense traffic.***

If your paper is tagged by the plagiarism detection tool (Turnitin) with a high similarity score (anything >25%), we will contact you. You will be given the chance to look at the similarity report generated by Turnitin and talk to us. After this step, the report will be sent to the University's Academic Integrity Office, at which point they will start an investigation on the incident.

Can I use Generative Artificial Intelligence (AI) Tools in IMM250?

The work you submit for this course must be your own and may not include any content from generative artificial intelligence (AI) tools, either verbatim or with edits. You may, however, use generative AI to *create an outline for the Science & Society Paper assignment* but the final submitted assignment must be original work that is correctly referenced and produced by the individual student alone.

Any use of generative AI must be documented in an appendix for your assignment. The documentation should include what tool(s) was/were used, how they were used, and how the ideas generated by the AI were incorporated into the submitted work.

Please note that any uses of generative AI beyond the ones listed above are not permitted, and will be considered use of an unauthorized aid, which is an academic offense. Submissions will be assessed at the discretion of the course coordinator, and students will be asked to show evidence of their work if a case of Academic Integrity and the inappropriate use of Generative AI tools is suspected.

Accessibility Needs

Students with diverse learning styles and needs are welcome in this course. If you have an acute or ongoing disability issue or accommodation need, please feel free to contact Drs. Singh and Amith (imm250@course.utoronto.ca), as well as register with Accessibility Services (AS) at the beginning of the academic year by visiting http://accessibility.utoronto.ca.

Intellectual Property Statement

This course will be recorded on video and will be available to students in the course for viewing remotely. Note that all course materials are the intellectual property of the course instructors, and they are made available to you for your personal use in this course. Sharing, posting, selling, or using this material outside of your personal use in this course is **not** permitted under any circumstances and is considered an infringement of intellectual property rights. According to intellectual property laws, not asking permission constitutes stealing.

Mental Health & Well-Being

Your mental health is important. Throughout university life, there are many experiences that can impact your mental health and well-being. As a University of Toronto student, you can access free mental health and wellbeing services at Health & Wellness (https://studentlife.utoronto.ca/department/health-wellness/) such as same day counselling, brief counselling, medical care, skill-building workshops, and drop-in peer support. You can also meet with a Wellness Navigation Advisor who can connect you with other campus and community services and support. Call the mental health clinic at 416-978-8030 ext. 5 to book an appointment or visit **https://uoft.me/mentalhealthcare** to learn about the services available to you.
You can also visit your College Registrar to learn about the resources and supports available: https://www.artsci.utoronto.ca/current/academic-advising-and-support/college-registrars-offices
If you're in distress, you can access immediate support: https://uoft.me/feelingdistressed

Questions & Additional Course Help

All course content or course administration questions must be posted to the online Discussion Board on Quercus or brought to office hours. If you email your instructors with a course content or general administration question, you will be directed to Quercus Discussions. Any messages of a more personal nature (e.g., medical documentation for a missed class/assignment) should be emailed to the course coordinators, Drs. Singh and Amith (imm250@course.utoronto.ca) or brought to scheduled office hours (above). You can expect a response within 48 hours (Monday-Friday) to a discussion board posting or to an email.

Course Schedule

The tentative schedule for course topics is shown on the following pages. Some adjustments may be made to weekly topics as the course progresses.

Date	Tentative Topic	Top Hat Chapter
Jan. 6	**Course Business & Overview of the Immune Response** • Cells and receptors of innate and adaptive immunity are introduced with a historical perspective.	**Chapter 1**
Jan. 13	**Innate Immunity: the first line of defense to infection** • Types of pathogens; mechanisms of pathogenicity • *Case study* - Helicobacter pylori, Barry Marshall and his self-induced infection • Steps of innate immunity • Recognition/sensing of pathogens through pattern recognition receptors and activation of innate cells	**Chapter 2**
Jan. 20	**Innate immunity: Soluble and cellular mediators** • Soluble and cellular mediators of innate immunity: cytokines, complement, phagocytes & other cells • *Case study* – Disorders of complement regulation: hereditary angioedema • Inflammation and how the innate immune response develops	**Chapter 3**
Jan. 27	**Features of the Adaptive Immune Response** • Basic lymphocyte biology: how B cells and T cells recognize antigens and respond. • Hallmarks of the adaptive immune system: specificity, diversity, tolerance, clonal selection and memory.	**Chapter 4**
Feb. 3	**Generation of the adaptive immune response** • Activation of naïve lymphocytes: multiple signals initiate an adaptive immune response. • Secondary lymphoid tissues: architecture and function; lymphocyte recirculation. • The adaptive response in space and time: How a typical adaptive immune response unfolds. • *Case study* – When the adaptive response is broken: SCID	**Chapter 5**
Feb. 10	**MIDTERM TEST (ONLINE – 2hrs; 9am-9pm)**	
Feb. 17	***NO CLASS – Reading Week***	
Feb. 24	**T Cell Responses in Host Defense** • T cell activation, differentiation, heterogeneity • *Case Study* – Leishmania Infection • HLA – your immunological fingerprint: what is HLA and what is its physiological role in T cell activation? Role of HLA diversity in health & disease.	**Chapter 6**

Mar. 3	**The Antibody Response** • Fine-tuning the antibody response over time • Antibody effector functions • Antibodies in medicine *Case Study* – Rituximab: Achieving "Essential Medicine" status	**Chapter 7**
Mar. 10	**Immunology of the Gastrointestinal Tract** • Anatomical and chemical barriers to intruders • Breaking through the barriers: Salmonella infection • Gut microbiota-immune system crosstalk *Case Study* – Losing tolerance to gut microbiota: Crohn's disease	**Chapter 8**
Mar. 17	**Immunopathology** • Septic shock: an innate immune response gone out of control • Allergic reactions: general mechanisms of allergic reactions; focus on food allergy The autoimmunity epidemic: mechanisms of tolerance to autoantigens: central and peripheral tolerance; impact of genes and environmental factors on susceptibility to autoimmune diseases; the hygiene hypothesis	**Chapter 9**
Mar. 24	**Guest Lecture: Vaccines – Harnessing the Adaptive Immune Response**	**Chapter 10**
Mar. 31	**Guest lecture – Influenza infection:** Description of viral types, pathogenesis Pandemics in history (includes a short update on Covid-19) H5N1 flu, flu vaccines	**Readings**: None
Apr. 9-30	***FINAL EXAM PERIOD – Final Exam Date TBA***	