Immunology
UNIVERSITY OF TORONTO

# IMM250H1 Winter 2020
## Immunity and Infection

## Course & Instructor Information

### Course Lecturers
Dr. Liliana Clemenza liliana.clemenza@utoronto.ca
Dr. Jennifer Gommerman jen.gommerman@utoronto.ca
Dr. Tania Watts tania.watts@utoronto.ca

### Course Administrator & Contact Person
Dr. Jasty Singh jastaran.singh@utoronto.ca
Office Hours: Tuesday, 1-3pm, Room 7208 by appointment.
*Alternate meeting arrangements can be made upon request.

### Lectures
Wednesday, 9-11am; Convocation Hall

## Arts & Science Calendar Course Overview (24L)

Students will be introduced to the basic concepts of immunity to infectious disease and how breakdown of the immune response can lead to auto-immunity. 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, 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 5, 2020 (in class) |
| **Assignment: Science & Society Paper** | 20% | March 1, 2020 (11:59 pm) |
| **Final Exam** | 45% | TBA |
| **Top Hat Participation** | 5% | Ongoing |

## *1. Midterm Test (30%)*

The midterm exam will take place during class time on Wednesday, **February 5th**, 2020 from **9:10-11am**. It will cover the first 4 lectures and be multiple-choice format. *Midterm locations TBA.*

**Missed Midterm Test Policy**
If the midterm test is missed due to illness, then:
1. The student must obtain the University of Toronto 'Verification of Student Illness or Injury' form, have it filled out by their Physician, Surgeon, Nurse Practitioner, Registered Psychologist, or Dentist, and submit it to the Immunology Office (Room 7205, Medical Sciences Building), within one week of the missed exam. Forms submitted by email will not be accepted.
2. **If** the note confirms that the student was incapacitated on the day of the test, **then** the weighting of the students other graded work (including the final exam) will be increased by the amount of the missed test. **If** the note does not confirm that the student was incapacitated on the date of the test, **then** a grade of "0" will be assigned for the test.

***PLEASE NOTE THAT THERE ARE NO MAKE-UP MID-TERM TESTS.***

## *2. Assignment: Science & Society Paper (20%)*

**Quercus submission deadline**: **Sunday, March 1 at 11:59 pm**.

**Late submissions** of assignments are subject to a penalty of 5% deduction per day. **No papers will be accepted after Sunday, March 15 at 11:59 pm.**

Students with valid reasons for deadline extensions must contact their registrar with the appropriate documentation. **Deadline extensions will be granted only following a request submitted to the student's registrar.**

## *3. Final Exam (45%)*

The date and location of the Final Exam will be scheduled by the Faculty of Arts & Science. The **format** of the final exam is multiple choice and cumulative, but emphasis will be placed towards the second part of the course.

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 is written short-answer questions and it will be cumulative.

## *4. Top Hat Participation (5%)*

We will be using the Top Hat (www.tophat.com) classroom response system in class and in tutorials. You will be able to submit answers to in-class questions using Apple or Android smartphones and tablets, laptops, or through text message. Additionally, we will be using a custom-built interactive Immunology textbook within Top Hat for this class. We will also be using Top Hat Test which allows us to go paperless and run tests through any personal or mobile device (i.e. your phone or laptop) in an online, secure testing environment.

### Top Hat Grading

A Top Hat subscription will also give you access to an interactive course textbook. ***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

Wednesday one week prior to the corresponding lecture. Each chapter will remain in Homework Mode for **2 weeks** until 9AM on the Wednesday following the lecture. 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 three weeks, rather than two.

**The questions presented in class will only be graded for participation marks (no grading for correctness)**, and the questions presented in non-mandatory tutorials will NOT be graded, and will only be used as a teaching tool.

### Top Hat Registration & Support

You can visit the Top Hat Overview (https://success.tophat.com/s/article/Student-Top-Hat-Overviewand-Getting-Started-Guide) within the Top Hat Success Center which outlines how you will register for a Top Hat account, as well as providing a brief overview to get you up and running on the system. Should you require assistance with Top Hat at any time, due to the fact that they require specific user information to troubleshoot these issues, please contact their Support Team directly by way of email (support@tophat.com), the app support button, or by calling 1-888-663-5491.

**To subscribe and purchase the IMM250S 2019 course (Join Code: 503945), go to:** https://app.tophat.com/e/503945

**Note: A subscription to Top Hat, with a total fee of $58 plus taxes, is required for this course and includes the in-class response system, online testing, and access to the interactive textbook. A small percentage (5%) of the course grades will be allocated for participation as described above. The Top Hat grades are NOT transferrable to other assessments.**

### *5. Tutorials (non-mandatory)*

Please note that we will be holding two tutorials in this course:

Pre-midterm: TBA, Week of Jan 27-31
Term paper tutorial: TBA

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

## Marking Concerns With Assignments

Any requests to have an assignment re-graded must be made in writing directly to Dr. Singh **within one week** of the date the marks were posted on Quercus. To be considered, your message must clearly identify your concern, contain a detailed justification for your concern and make specific references to the relevant course material and the graded rubric. Keep in mind that it is possible for your assignment grade to go down if the re-graded mark is lower than your original assignment grade.

## 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: Upon submission on Quercus, student term papers will be automatically submitted to Turnitin.com for review of textual similarity and detection of possible plagiarism. In doing so, students will allow their assignments to be included as source documents in the Turnitin.com reference database, where they will be used solely for the purpose of detecting plagiarism. The terms that apply to the University's use of the Turnitin.com service are described on the Turnitin.com website.*

*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 on Turnitin.com****.*

*If your paper is tagged by 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.*

## 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 approach Dr. Singh, as well as register with Accessibility Services (AS) at the beginning of the academic year by visiting http://accessibility.utoronto.ca.

## Intellectual Property Statement

Audio recording of lectures is permitted, but **no videotaping of lectures will be permitted under any circumstances**. Note that all IMM250H1 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.

## 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. Any messages of a more personal nature (e.g., medical documentation for a missed class/assignment) should be emailed to the course administrator 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 | Lecturer |
|---|---|---|
| **Jan. 8** | **Course Business & Overview of the Immune Response** | Dr. Singh<br><br>**Readings**: Chapter 1 |
| **Jan. 15** | **Innate Immunity: the first line of defense to infection**<br>• Types of pathogens; mechanisms of pathogenicity<br>• *Case study* - Helicobacter pylori, Barry Marshall and his self-induced infection<br>• Steps of innate immunity<br>• Recognition/sensing of pathogens through pattern recognition receptors and activation of innate cells | Dr. Singh<br><br>**Readings**: Chapter 2 |
| **Jan. 22** | **Innate immunity: Soluble and cellular mediators**<br>• Soluble and cellular mediators of innate immunity: cytokines, complement, phagocytes & other cells<br>• *Case study* - Phagocyte disorders: Chronic granulomatous disease<br>• Inflammation and how the innate immune response develops<br>• *Case study* - Septic shock: when the immune response goes out of control | Dr. Singh<br><br>**Readings**: Chapter 3 & Section 9.1 (Sepsis and Septic Shock) |
| **Jan. 29** | **Immunology of the Gastrointestinal Tract: Anatomical and chemical barriers to intruders**<br>• Immune function of epithelial cells<br>• Keeping microbial growth in check through stratification in the gut lumen: mucus and mucins, defensins, IgA<br>• Breaking through the barriers: Shigella infection<br>• Gut microbiota-immune system crosstalk<br>• Case study - Losing tolerance to gut microbiota: Crohn's disease | Dr. Clemenza<br><br>**Readings**: Chapter 8 |
| **Feb. 5** | **MIDTERM EXAM** | |
| **Feb. 12** | **Forming the Army: The Adaptive Immune Response**<br>• Characteristics of adaptive immunity<br>• Development of B and T cells<br>• Recognition of antigens<br>• *Case study* – A human example of immunodeficiency | Dr. Gommerman<br><br>**Readings**: Chapter 4 |
| **Feb. 19** | **NO CLASS – READING WEEK** | |
| **Feb. 26** | **Equipping the Army: The role of antibodies in host defense and medicine**<br>• Generation & fine-tuning of antibodies<br>• Antibody effector functions<br>• What is a monoclonal antibody?<br>• *Case studies* – Treatment of lymphoma with Rituximab & Grace's story – hu3F8 | Dr. Gommerman<br><br>**Readings**: Chapter 7 |

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|---|---|---|
| **Mar. 4** | **"Fine-tuning the troops: How to generate a smart adaptive immune response**<br>• Triggering T-cells with antigen<br>• T-cell activation, differentiation, heterogeneity<br>• *Case study* - Leishmania | Dr. Gommerman<br><br>**Readings**: Chapter 6 |
| **Mar. 11** | **Coordinating the Battlefield: Lymph nodes are designed to support the adaptive immune responses**<br>• Structure of lymphoid organs<br>• Mechanisms of lymphocyte trafficking are explained.<br>• *Case study* - Lymphoma | Dr. Gommerman<br><br>**Readings**: Chapter 5 |
| **Mar. 18** | **Influenza Infection Explained**<br>• Description of viral types<br>• Pathogenesis & historical pandemics<br>• H5N1 flu & vaccinations | Dr. Watts<br><br>**Readings**: None |
| **Mar. 25** | **Retreat: Regulating the adaptive immune response**<br>• Mechanisms to keep the immune system in check<br>• *Case study* – Multiple Sclerosis | Dr. Gommerman<br><br>**Readings**: Chapter 9 |
| **Apr. 1** | **Review Class** | Dr. Singh |