

## Course & Instructor Information

### Course Coordinator & Instructor

Dr. Alberto Martin [alberto.martin@utoronto.ca](mailto:alberto.martin@utoronto.ca)

Office Hours: please email Dr. Martin for appointment

### Course Instructors

Dr. Jean-Philippe Julien [jean-philipe.julien@sickkids.ca](mailto:jean-philipe.julien@sickkids.ca)

Dr. Chao Wang [chao.wang@sri.utoronto.ca](mailto:chao.wang@sri.utoronto.ca)

Dr. Landon Edgar [landon.edgar@utoronto.ca](mailto:landon.edgar@utoronto.ca)

Dr. Dana Philpott [dana.philpott@utoronto.ca](mailto:dana.philpott@utoronto.ca)

Dr. Arthur Mortha [arthur.mortha@utoronto.ca](mailto:arthur.mortha@utoronto.ca)

### Teaching Assistants

Part I (Martin lectures): Boyan Tsankov [boyan.tsankov@mail.utoronto.ca](mailto:boyan.tsankov@mail.utoronto.ca)

Part II (Julien, Wang & Philpott lectures): Enoch Tin [enoch.tin@mail.utoronto.ca](mailto:enoch.tin@mail.utoronto.ca)

Part III (Mortha & Edgar lectures): Ling Ling Tai [siuling.tai@mail.utoronto.ca](mailto:siuling.tai@mail.utoronto.ca)

### Lectures

Lectures in this course will be held **in-person** on **Tuesday/Thursday, 10:10 – 11:00 AM**. Copies of lectures slides will be posted online.

### Reference Material

Although there is no required text for this course, any recent edition of Janeway, Travers *et al.* Immunobiology text (e.g. 9<sup>th</sup> Edition), which most of you already have, will serve as a "first resource" for you. Instructors will be providing you with reference lists of key papers or reviews that they will be discussing. In fourth-year courses we expect you to start reading some of the primary literature. Immunology is an experimental science, and you will find that in this course it is not just facts and concepts that are being relayed, but also that the experimental foundations for these facts and concepts are stressed. Thus, you may have to consult the primary literature to clarify in your mind an experimental approach which was discussed in class but which you did not fully grasp because you were unfamiliar with it. **We recommend that you read the recommended papers and do the practice exam questions to become familiar with the kind of problems we ask during the assessment.**

### Review Sessions

Although you are always free to seek out individual instructors for clarification of the lecture material. For the past several years the classes have found it useful that we held some group review sessions at which TA and/or instructors were present to answer questions posed by the students. These are strictly optional and no new material is deliberately presented. A group review session will be held in person, a few days before each

assessment. For the power point assignment, TA will provide a guidance/ FAQ session on the assignment at a pre-arranged time.

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

This course will focus on the molecular and cellular biology of immune recognition. The course will emphasize historical and recent experimental evidence leading to our current understanding of immune recognition. Subtopics are subject to change and have recently included mechanisms of diversification of immunoglobulin receptors, T cell –MHC interactions, T cell activation and signaling mechanisms; receptors of the innate immune system; biology of innate lymphoid cells.

**Pre-Requisites:** BCH210H1/BCH242Y1, BCH311H/CSB349H1/MGY311Y1/PSL350H1, IMM350H1/IMM351H1.

## Course Learning Objectives

At the end of this course, you should:

- Understand key experimental evidence for mechanisms of V(D)J rearrangement, somatic hypermutation, and class switch recombination.
- Understand some key structural principles of receptor interactions in the immune system
- Understand key experiments defining T cell recognition of antigen, mechanisms of antigen presentation and costimulation.
- Understand glycosylation as it pertains to proteins expressed on immune cells.
- Understand experimental evidence for key recognition events in innate recognition of pathogens (TLRs, NLRs, etc).
- Be familiar with the evidence for different subsets of innate lymphoid cells and their biology.

## Evaluation Scheme & Course Assessments

Assessment	% of Grade	Due Date
Assessment 1 – Term Test	40%	October 10, 2024, during class time, room TBA
Final Assessment	60%	Dec exam period TBD

*\*\* Graduate Students in IMM1428H1 will have an additional essay component, worth 20% of the course, with the other assessments weighted at 80% as per above.*

### 1. Assessment 1 – Term Test (40%)

Assessment 1 will take place on **October 10, 2024** during class time. It will be a 50 minute short/long answer examination held during class time. The questions will cover on the material covered by Dr. Julien and Dr. Martin’s lectures. The test will be in person, room TBA, likely in the exam centre.

*Note that the Assessment 1 grade will be made available before the drop date (Nov. 4, 2024 for Undergraduate students; October 28, 2024 for Graduate students).*

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

## **2. Final Assessment (60%)**

The date and location of the Final Assessment will be scheduled by the Faculty of Arts & Science. It will consist of short or long answer essay questions and is scheduled for 2 hours. The questions will be on the material covered by Drs. Wang, Edgar, Philpott, and Mortha.

Students who miss the Final Assessment for a valid reason may petition to the Faculty of Arts & Science to write the deferred assessment.

## **3. Term Paper (IMM1428H students ONLY)**

IMM1428 is available as a graduate course. Note: Students in the Immunology Ph.D. program cannot use IMM1428 as part of their graduate credit requirement.

**TERM PAPER FOR GRADUATE STUDENTS:** For students enrolled in IMM1428H there will be an additional component in evaluating your performance in this course. You will be required to write a term paper of 10 double spaced page in length, not including references or brief figures, on any major topic in the course. You may not, however, choose a topic that is closely related to your own research area. You are free to discuss possible topics with any of the instructors and you must obtain approval from the course coordinator (Dr. Martin) for your essay topic in advance. We are looking for an essay that demonstrates your critical thinking/evaluation of a focused area related to any topic touched on in the course not in your immediate research area. This approval must be obtained by **November 7, 2024.** For grading purposes, the essay will contribute 20% of the final aggregate mark, the balance being made up of the two assessments (30% term test, 50% final exam). Essays must be handed in as a PDF uploaded to the Quercus site. **Due Date: November 28, 2024.** Essays will be graded by the course coordinator with potential input from another faculty member with expertise in the area.

## **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.
- **Missed Tests:** Missed tests (term test and final assessment) will be accommodated at the course coordinator’s discretion. *Only 1 make-up exam will be scheduled for each of the missed tests, normally within 1-2 weeks after the missed test.*

## **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>, and consult this [Academic Integrity checklist](#).

## **Accessibility Needs**

The University of Toronto is committed to accessibility. If you require accommodations for a disability, or have any accessibility concerns about the course, the classroom or course materials, please contact Accessibility Services as soon as possible: [disability.services@utoronto.ca](mailto:disability.services@utoronto.ca) or <http://studentlife.utoronto.ca/accessibility>.

## 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	Lecture Subject	Prof.
Sept. 5	Introduction to the course content and operational procedures  V(D)J recombination	Dr. Martin
Sept. 10	V(D)J recombination	Dr. Martin
Sept. 12	V(D)J recombination	Dr. Martin
Sept. 17	Affinity Maturation and class switch	Dr. Martin
Sept. 19	Affinity maturation and class switch	Dr. Martin
Sept. 24	Affinity maturation and class switch	Dr. Martin
Sept. 26	Antibody structure	Dr. Julien
Oct. 1	Antibody Functions and Applications	Dr. Julien
Oct. 3	Therapeutic Antibodies	Dr. Julien
Oct. 8	Q and A session – Martin, Julien & TA available.	
Oct. 10	<b>Assessment 1: Held during class time 40% of course-to be held in TBD</b>	Drs. Julien & Martin
Oct. 15	T cell development	Dr. Wang
Oct. 17	Antigen Processing	Dr. Wang
Oct. 22	Innate pattern recognition - TLRs	Dr. Philpott
Oct. 24	Innate pattern recognition – cytosolic sensors	Dr. Philpott
<b>Oct. 28 to Nov. 1</b>	<b>READING WEEK – NO CLASSES</b>	

Nov. 5	Innate pattern recognition – cytosolic sensors, inflammasomes	Dr. Philpott
Nov. 7	Biology and function of innate lymphoid cells <b>Grad students- require approval of their essay topic by Dr. Martin by today</b>	Dr. Mortha
Nov. 12	Biology and function of innate lymphoid cells	Dr. Mortha
Nov. 14	Biology and function of innate lymphoid cells	Dr. Mortha
Nov. 19	Biology and function of innate lymphoid cells	Dr. Mortha
Nov. 21	Glycoimmunology I: fundamental glycobiology and leukocyte glycosylation	Dr. Edgar
Nov. 26	Glycoimmunology II: regulatory roles of glycans in immunity	Dr. Edgar
Nov. 28	Q and A session - Wang, Edgar, Mortha, Philpott available. <b>Grad student essays due today by midnight.</b>	
Exam period December 6- 21	<b>Assessment 2, Wang/Edgar/Philpott/Mortha</b> <b>Date TBA - please do not make travel plans before Dec 21 until we know exam schedule</b>	