

## MICB302 – Immunology (2018W)

**Calendar Description:** Cells, molecules, and mechanisms of innate and adaptive immunity. Antigen presenting cells and the major histocompatibility complex, T and B lymphocytes and their antigen receptors, T and B cell development, innate and adaptive immune responses against pathogens, diseases associated with aberrant immune responses.

**Lectures:** Monday, Wednesday and Friday, 12 pm – 12:50 pm, WOOD 2.

### Instructor:

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Office hours – TBA (MWF afternoons, will vary each week)

### Teaching assistants:

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### Course objectives:

- To reinforce and build upon important concepts in immunology and cell biology developed in MICB202 and BIOL200.
- To gain an in-depth understanding of the cells and molecules of the immune system, the immune response to infection by pathogens, and how the immune response can sometimes cause disease. Selected case studies will be used to provide examples of the concepts of the immune response in the infection and disease.
- Prerequisite for MICB402.

### Prerequisites and assumed background for this course:

- **MICB202 (Introductory Medical Microbiology and Immunology)** We will assume that you are familiar with the major concepts in immunology that were discussed in MICB202. We will go over some of the key points, but please review your notes from this course.
- **BIOL200 or equivalent (Cell Biology)** We will assume that you are familiar with cellular organization and the functions of various organelles, the basic structures of DNA, proteins and membranes, and important cellular functions including transcription, mRNA splicing, translation, and protein secretion. Please look at relevant sections in the “Essential Cell Biology” or “Molecular Biology of the Cell” textbooks to refresh your memory.

**Optional textbook: A. Abbas *et. al.*, Cellular and Molecular Immunology, 9<sup>th</sup> edition.**

Students can elect to use *The Immune System*, 3<sup>rd</sup> or 4<sup>th</sup> edition by Peter Parham if they have purchased a used copy or borrowed a copy from their friends.

All students should purchase the interactive MICB203 notes package. The package can be purchased from the students of the Microbiology and Immunology Student Association (MISA) in room 133 of the WESBROOK building (1st floor, by room 100 and the vending machines). The reading package will be sold from Sept. 5<sup>th</sup> to Sept. 12<sup>th</sup>, 2018, 12 – 2 pm. The cost for the first book is \$5 and is payable by CASH ONLY. Please have exact change. No \$50 or \$100 notes can be accepted.

The cost for the second book will be determined when it is ready for printing. Students will be permitted to bring in their notes packages for the final exam.

**iClickers**

We will use iClickers in class to answer multiple-choice questions in many of the lectures, but they will not be used for any part of the course grade. Therefore, students are not required to purchase an iClicker from the Bookstore.

**Important Course Dates:**

- Tuesday Sept. 4<sup>th</sup>, 2018 – First day of term, classes cancelled so student can attend Imagine and the Microbiology and Immunology Department's Orientation Meeting.
- Wednesday Sept. 5<sup>th</sup>, 2018 – First day of classes. First meeting of MICB302.
- Tuesday Sept. 18<sup>th</sup>, 2018 – Last day for change in registration and for withdrawal from most Term 1 courses without withdrawal standing of "W" recorded on a student's academic record.
  
- Wednesday Oct. 10<sup>th</sup>, 2018 – Midterm exam #1 (expected to start between 6:30 – 7:00 PM).
- Monday Oct. 8<sup>th</sup>, 2018 – Thanksgiving Day holiday – University closed.
- Friday Oct. 12<sup>th</sup>, 2018 – Last day for withdrawal from most Winter Session Term 1 courses with withdrawal standing of "W" recorded on a student's academic record. Course cannot be dropped without Faculty approval after this date on the SSC.
  
- Wednesday Nov. 7<sup>th</sup>, 2018 – Midterm exam #2 (expected to start between 6:30 – 7:00 PM).
- Monday Nov. 12<sup>th</sup>, 2018 – Statutory holiday in lieu of Remembrance Day holiday – University closed.
  
- Friday Nov. 30<sup>th</sup>, 2018 – Last meeting of MICB302, last day of classes for term 1.
- Tuesday Dec. 4<sup>th</sup> – Wednesday Dec. 19<sup>th</sup>, 2018 (inclusive) – Winter exam session. The final is scheduled by Enrolment Services. Check SSC in mid-October for the preliminary exam schedule. See the following section.
  
- Wednesday Jan. 2<sup>nd</sup>, 2018 – Term 2 courses begin.

**MICB302 Canvas site:** Login at <https://canvas.ubc.ca>

**The purpose of the website is to:**

- post figure sets, review questions, and other study aids.
- provide a forum for students to exchange views about the course and the course material (Piazza).
- post news items and research items relating to current developments in immunology research.

**The purpose of the lecture period is to:**

- convey the important concepts that you will need to know for the exams using figures from the textbook as well as other figures to enhance your understanding of the material.
- point out areas of active research in immunology.

**Learning objectives:** By the end of the course, you should be able to:

1. Identify the major mechanisms (inflammatory responses, cytotoxic T cells, antibodies) by which immune cells protect us from different types of pathogens (viruses, extracellular bacteria, intravesicular bacteria, parasites) or from cancer cells.
2. Understand how immune cells detect the presence of pathogens and cancer cells (pattern recognition receptors, antigen receptors, antigen presentation pathways, NK cell receptors).
3. Describe processes that lead to the elimination of pathogens (*e.g.*, opsonization, phagocytosis, neutralization, complement activation, cell-mediated cytotoxicity).
4. Describe the structure and function of key molecules that mediate immune responses including antibodies, antigen receptors, Toll-like receptors, MHC proteins, cytokines, chemokines.
5. Describe the main cell types of the immune system including their development, function, and for lymphocytes, how they generate antigen receptors.
6. Understand the processes that occur during T and B cell development that allow these cells to become tolerant to self-antigens and responsive to other antigens.
7. Describe the function of T and B lymphocytes in an immune response
8. Describe all the innate and adaptive processes involved in an immune response to a pathogen (*i.e.*, how immune cells perceive a pathogen, how they respond to it and how this usually results in clearance of the pathogen and a return to homeostasis).

### Learning objectives (continued):

9. To be able to predict what type of immune response you would need to combat a particular type of pathogen.
10. Describe how defects in immune cell regulation can lead to immunodeficiency diseases, autoimmune diseases and allergies.
11. Describe the basis for and application of current experimental approaches in immunology including flow cytometry, monoclonal antibodies, immunofluorescence, knockout and transgenic mice, adoptive transfer of immune cells, and gene expression profiling.
12. Relate processes that occur in immune cells to similar processes that occur in all cell types and which have been described in previous cell biology courses (*e.g.*, mRNA splicing, protein secretion, receptor signaling).

**Tutorials:** There are six tutorial sections. The tutorials are semi-structured. The TAs will be provided with copies of questions for you to work on. Students would be encouraged to work in groups and construct good answers for 2 or 3 short answer questions (SAQs) for about 15 minutes. Students will then work individually to answer 5 – 10 multiple-choice questions (MCQs) related to the subject area of the SAQs.

Students will be provided with a scantron sheet to write their answers to the SAQs questions on the back and the MCQs on the bubble section. Students must attempt the SAQs questions to be eligible to have the MCQs count. For the tutorials – the best 6 of 8 sessions will be used in the calculation of the tutorial grade (see below).

You can also meet with the TAs to discuss lecture materials and to get help with the practice questions posted on Canvas. **Tutorials will start week 2 (Sept. 10<sup>th</sup>).**

### Tutorial sections:

|             |                           |                             |
|-------------|---------------------------|-----------------------------|
| Section T01 | Tuesday 12:30 – 1:30 PM   | Scarfe 206                  |
| Section T02 | Thursday 11:00 – 12:00 PM | Scarfe 204                  |
| Section T03 | Thursday 11:00 – 12:00 PM | MacMillan 154               |
| Section T04 | Tuesday 11:00 – 12:00 PM  | Forest Sciences Centre 1001 |
| Section T05 | Thursday 12:00 – 1:00 PM  | McLeod 242                  |
| Section T06 | Tuesday 12:30 – 1:30 PM   | EOS - Main 135              |

**Case study assignments:** Students will have access to a short story about a patient with a problem with their immune system. Students' understanding of the problem will be assessed by 15 – 20 MCQs (or a few SAQs). Students will be provided with the question stems of the MCQs when the story is released. Students will have 5 – 6 days to investigate the case study before being assessed. The questions will open on Canvas and students will have 48 hours to complete them. Announcements will be sent out when the story is open and when the assessment period is open. For the case study assignments – the best 6 of 8 sessions will be used in the calculation of the case study grade.

**Case study assignments will start the week of September 10<sup>th</sup>.**

**Grade Distribution:**

Students will have the option of how they would like their course grades calculated. This year, we'll have two midterms, a graded component of tutorials (this is to encourage you to attend and discuss immunology with your classmates), and case study assignments (1 approximately every 2 weeks).

Students will be required to **select an option by October 8<sup>th</sup>** (so students have time to try out the tutorials and case study assignments). If no response is submitted, **Option 1** will be applied.

If a student selects option 4, they can elect to switch to option 1, 2 or 3. If a student selects option 2 or 3, they can elect to switch to option 1. Students would need to request the change by November 5<sup>th</sup>.

**Option 1** – based on exam performance only.

Midterm 1 and Midterm 2 – 50% (best exam will count for 30%, the other exam for 20%)  
Final exam – 50%

**Option 2** – based on exam and tutorial performance only.

Midterm 1 and Midterm 2 – 45% (best exam will count for 25%, the other exam for 20%)  
Final exam – 50%  
Tutorial – 5%

**Option 3** – based on exam and case study assignments (online) performance only.

Midterm 1 and Midterm 2 – 45% (best exam will count for 25%, the other exam for 20%)  
Final exam – 50%  
Case study assignments – 5%

**Option 4** – based on exam, tutorial and case study assignments (online) performance.

Midterm 1 and Midterm 2 – 45% (best exam will count for 25%, the other exam for 20%)  
Final exam – 45%  
Tutorial – 5%  
Case study assignments – 5%

## Exams:

**Note: The Department of Microbiology and Immunology now has a policy of scheduling exams for large courses in the evening. This is to ensure that you can get the full time allotted for writing the exam. It also allows us to select rooms with better writing surfaces.**

1. There will be two midterms. The first midterm is scheduled for the evening of Wednesday October 10<sup>th</sup>, 2018. The second midterm is scheduled for the evening of Wednesday November 7<sup>st</sup>, 2018.

If you miss the midterm due to illness, you will be allowed to write a makeup midterm. This must be done within two weeks of the original midterm date.

**Students must report any absences from the exam within 48 hours.** Students can then provide documentation of their illness at a later time. For exams missed due to illness, a doctor's note must explain why you were unable to write the exam – a note that reads “was seen in my office” is not sufficient. If students don't report their absence within 48 hours, a grade of “0” will be entered into the course records.

If you have an evening course or university function (*i.e.*, varsity team) that conflicts with the time of the exam, this must be reported one week prior to the exam. You would need to provide documentation to support your request for writing the midterm at an alternate time (*i.e.*, a paper copy of your time-table, letter from the UBC sports team). You will be required to write the exam at the earliest possible time (maybe before the rest of the class, or first thing the following morning).

Details about the midterm exam will be released a week before the exam (*i.e.*, the content that would be eligible for examination). The information will be sent by email using the University's registration system and will be posted on Canvas. Therefore, it is important that your email address is recorded with the University.

For students that miss midterm #1 or midterm #2 and are unable to write the make up exam, the weight of the missed exam will be shifted to the other midterm and the final exam. For the purposes of the grade calculation, the midterm that was completed will be considered the 'best exam.' Half of the grade of the missed midterm will be shifted to the completed midterm; the other half will be shifted towards the final exam.

For the midterm exams only, any student that feels that they should have been awarded additional marks can appeal this in writing. The student must discuss (in writing, on a separate paper) why their answer should be awarded additional marks – the question will be re-evaluated by the instructors. **The student's mark could be increased, decreased or remain the same.** The request for re-evaluation must be received within one week of the midterm exams being returned to the students.

## Exams (continued):

Students are reminded that the exams are photocopied prior to their return to students and that students **MUST NOT** edit their copy of the exam prior to resubmitting their exam. Students that alter their midterm exams and request the exam be re-evaluated will be subject to academic discipline.

Students are required independently to work on the take-home component of the exams (if this is part of the exam). Students that submit exams where the answers have been copied will be awarded a mark of zero for this portion of the exam.

2. The final exam will be held during the final exam period. The final exam will be comprehensive, but more emphasis will be placed on the content from the after the midterms cut-off date. The material in the latter part of the course builds on earlier material; thus, you will need to be familiar with the major concepts from the first half of the course.

Students will be permitted to bring in the interactive course notes package to the final exam, but no other materials.

The exam period is set for Tuesday December 4<sup>th</sup> – Wednesday December 19<sup>th</sup> inclusive. This means that you should **not** make airline reservations until you know your exam schedule. The Dean's Office **will not** permit students to write final examinations at alternate times because of travel conflicts.

3. The midterm and final exams will consist of short answer or short essay questions. Most questions can be answered with several sentences, or at maximum with 1 – 2 paragraphs. It is okay to present your answer in point form and labeled diagrams or drawings often help.

Clear and concise writing is better than a large volume. Responses that have the right answer, but with lots of incorrect or irrelevant information may receive lower scores than responses that are correct and concise.

Tip: Outline your response first as opposed to writing a 'stream of consciousness' answer.

Missed Final Exams: Students that are absent during the final exam must report to the Dean's Office as soon as possible and request a form for a Deferred Exams. The Dean's office will require valid documentation to explain your absence from an exam. Deferred Exams are scheduled by the Registrar's Office and are usually held in late July.

Note that instructors are not permitted to rearrange the times of final exams for students other than in a case of exam hardship. An exam hardship is defined as 3 exams within a 24-hour period. For example, Student "A" has an exam at 8:30 am, 12:00 noon and 7 pm; this is an exam hardship and the 2<sup>nd</sup> exam would be rescheduled (probably to the following day). An example of what is **NOT** an exam hardship: Student "B" has exams scheduled at 8 am, 12:00 noon, then 8 am the following day. The third exam is in the next 24-hour period.

## Teaching approach, how to study, what you need to know:

1. In the lecture periods, we will discuss the major concepts from the textbook and other readings to enhance your understanding of the material. In many cases, we will draw diagrams that explain the concepts. The figures and diagrams will illustrate the most important concepts. When you study for the exams, make sure that you can explain the figures and diagrams to yourself.
2. A set of **Powerpoint figures** will be posted on the web site **after each class**. **You should bring your interactive notes package to each class so that you can write out your own notes.**

However, you should copy any hand drawn diagrams, as these will not be posted on the web site.

For the exams, you will be responsible for all of the material covered during the lectures (including the concepts/information contained in all figures and diagrams shown or drawn during the lecture). You would also be responsible for reading any journal articles posted on Canvas by the instructors and identified as eligible for examination.

3. Use the **textbook** to gain a better understanding of the material. During the lectures, we will indicate for each chapter which sections and figures are the most relevant. Focus on the text that relates to the concepts and figures we have covered in the lecture notes. The textbook is excellent and we encourage you to use it.
4. Try to answer the **review questions** found in the textbook on your own or discuss them with classmates.
5. Ask questions in class. Note that the instructor may ask you to see them after class or at office hours if a long answer is necessary.
6. E-mail your TA or the instructor – keep your questions brief and to the point. See the instructor during their office hours. **Have your questions prepared on a separate piece of paper. Students will not be permitted to search through their computer looking for questions – this is not a good use of your time or my time.**
7. Keep up with the material; don't leave everything for the week before the exam. There is a great deal of material and the later material builds on earlier material. It will be hard to understand subsequent chapters if you are not familiar with the concepts from the earlier chapters.

## Tutoring:

Many private companies will offer tutoring services to students enrolled in courses at UBC, often for an hourly fee. The instructors of MICB302 do not support or endorse any of these services. The employees of these companies have had no contact or discussions with the instructors and **are not** provided with any of the course materials. Students are directed to use caution if hiring any of these companies. Appeals that the course grade was lower than expected because of incorrect information provided by these companies will not be accepted.

### **Reach Out for Success:**

University students often encounter setbacks from time to time that can impact academic performance. Discuss your situation with your instructor or an academic advisor. Learn about how you can plan for success at: [www.students.ubc.ca](http://www.students.ubc.ca).

For help addressing mental or physical health concerns, including seeing a UBC counsellor or doctor, visit: [www.students.ubc.ca/livewelllearnwell](http://www.students.ubc.ca/livewelllearnwell).

### **Classroom Civility:**

To create and preserve a classroom atmosphere that optimizes teaching and learning, all participants share a responsibility in creating a civil and non-disruptive forum. **Students are expected to conduct themselves at all times in this classroom in a manner that does not disrupt teaching or learning.**

- You are expected to be on time. Class starts promptly at 12:00 noon. You should be in your seat and ready to begin class at this time. Class ends at 12:50 minutes pm. Packing up your things early is disruptive to others around you and to myself.
- Classroom discussion should be civilized and respectful to everyone and relevant to the topic we are discussing. Any discussion from class that continues on Canvas should adhere to these same rules and expectations.
- Electronic devices such as computers, cell phones and pagers must be turned off during class, unless you have informed the instructor ahead of time that you are expecting an emergency message.

### **Academic Misconduct:**

From the UBC Academic Calendar: Academic honesty is essential to the continued functioning of the University of British Columbia as an institution of higher learning and research. All UBC students are expected to behave as honest and responsible members of an academic community. Breach of those expectations or failure to follow the appropriate policies, principles, rules, and guidelines of the University with respect to academic honesty may result in disciplinary action.

<http://www.students.ubc.ca/calendar/index.cfm?tree=3,54,0,0>

What is academic misconduct?

Academic misconduct is behaviour that erodes the basis of mutual trust on which scholarly exchanges commonly rest, undermines the University's exercise of its responsibility to evaluate students' academic achievements, or restricts the University's ability to accomplish its learning objectives. See the following URL below for specific examples of academic misconduct.

<http://www.students.ubc.ca/calendar/index.cfm?tree=3,54,111,959>

### **Academic Misconduct (continued):**

What happens if a student commits academic misconduct?

Academic misconduct often results in a one-year suspension from the University and a notation of academic discipline on the student's record. Other disciplinary measures include a letter of reprimand, a grade of zero for the assignment and/or for the course, suspension from the University, and expulsion from the University.

<http://www.students.ubc.ca/calendar/index.cfm?tree=3,54,111,960>

Examples of academic misconduct that would apply to MICB302 (this list is not comprehensive):

- Writing an exam for another student, or hiring someone to write your exam.
- Copying answers from another student during an examination.
- Bringing materials such as review sheets into the exam.
- Showing your answers to another student during an examination.
- Having someone answer iClicker questions with your iClicker when you are absent, or answering another student's iClicker questions when they are absent.
- Changing an answer on your midterm exam before submitting it for remarking.

### **Laptops in class:**

Over the past few years we have monitored students in MICB302 (and in other classes) as part of studies to develop more effective methods for teaching. There is no doubt that having your laptop on will decrease your attention in class if you have email and internet browsers running in the background. In some cases, your laptop will be a detriment to people sitting near you. There will be no cases where you need to access your laptop during MICB302 classes (but you will need it outside of class!). We strongly urge you to leave it off. You will need to 'take notes; for the class primarily to record topics that were emphasized and to record questions you have. If you intend to use a laptop, you will be asked to sit at the back of the room so that the screen of your laptop does not distract your neighbours.