



UNIVERSITY OF
TORONTO
SCARBOROUGH

BIOC35 – Principles in Parasitology

Instructor: Adam Mott

Office: SY264

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Office hours: Monday 1 PM – 2 PM

Class: Thursday 9 AM – 11 AM

Please be prepared and consult the syllabus, lecture, and reading materials prior to any office hour meeting so we can maximize our time. If you need to book an appointment to meet outside of these hours please contact me by e-mail. I will respond only to emails sent from UTSC or UTORONTO e-mail accounts that include the course code in the subject.

Teaching assistant: Aswini Kuruparan (aswini.kuruparan@mail.utoronto.ca)

Content warning: Part of the study of parasitology includes discussions of the disease symptoms caused in humans among other hosts. This may involve the use of images that depict human disease and suffering that some of you may find disturbing.

Course objectives: BIOC35 will introduce principles in parasitic lifestyles. There are three main goals I have in teaching this course, so at the conclusion of the term I hope that you will have:

1. **Become convinced that parasites are the most fascinating group of organisms on the planet and have gained an appreciation of their impact on human, animal, and plant health.**
2. **Learned to identify a variety of parasites, the diverse strategies that they use to effectively infect hosts, and the ways we combat these pathogens.**
3. **Improved both your ability to evaluate the scientific literature, popular science communications, and to produce effective and compelling communications of your own to engage the general public.**

We will learn about common parasite life strategies, host-parasite interactions and co-evolution, parasite immune evasion strategies, impacts on public health, treatment and prevention strategies, and a little bit of history. We will concentrate primarily on

parasites of medical and veterinary importance, but we will also discuss how the strategies and mechanisms of parasitism are shared broadly irrespective of host. I also hope to show you the amazing diversity of parasites and convince you that they are wonderful tools to better understand biology broadly.

Learning outcomes: Through the lectures, readings, and assignments you will:

- Understand the ubiquity of parasitism as a life-style, and contrast it with commensalism and mutualism.
- Correctly use scientific terminology to describe parasites and their life-cycles, host-parasite interactions, and the host response to infection.
- Identify the general strategies of immune evasion used by parasites and compare and contrast these strategies.
- Understand the public health and economic importance of these organisms, how they are controlled, and compare control methods to those used against other classes of microbes.
- Identify the unique aspects of parasite biology that present challenges for their control by hosts and human interventions, while making them excellent systems for the study of many facets of biology.
- Identify and classify a variety of parasites.
- Critically evaluate popular and primary scientific literature.
- Effectively communicate scientific principles to the general public.

Texts and readings:

As many of you will not have access to the library reserve copies of any textbook I might assign, I will not be using a textbook. Instead, I will focus on using materials that I develop myself and a variety of available digital resources that will be posted on Quercus. There are also some older digital textbooks available through the University of Toronto library online, which we may refer to at times.

How the course will work and the topics we will cover:

As you may be aware, this is the second time that this course is being offered, so as we go through the semester we may adjust certain aspects of the course based on your feedback and how we are meeting our learning objectives. This also means that I won't present you with a week by week topic list, since I will be making significant changes and don't know precisely how fast we will be able to cover this material.

At the start of the course we will spend some time discussing parasites in general, learning the unique aspects of their study, and mastering the vocabulary to discuss them. With that foundation, my intention is to then move through different parasites at a rate of one per week or two. In general, I will post some background information on each parasite for the start of the week that I will expect you to master before we meet together. There will be a quiz to incentivize your efforts in learning this background information that will be completed prior to our meetings on Thursday. That way we can

spend our time in 'lecture' on Thursdays briefly covering those elements and then move onto the more interesting discussion of unique features of the parasite, its biology, or ecology. Each lecture session will be broken down into multiple sections with breaks built in so we aren't online for 2 straight hours. These sessions will be available live, but also recorded versions will be made available in case you are unable to attend.

As my background is mainly in protozoan (single-celled) parasites, and as they represent the best-studied and most medically important group, we will spend much of our time on these organisms. But the course will also feature sections on arthropods (both as ectoparasites and vectors of other parasites) and parasitic worms. I hope this breadth of study will help you recognize similarities between these diverse organisms, while spending a greater time with each will allow us to learn about the cutting edge science involved in their study. No course would ever be able to cover all the fascinating parasites out there, but I will also try to include brief notes about some of the strangest and most interesting parasites (in my opinion).

Topic list

- Background and the history of parasites, neglected tropical diseases, and their study
- Arthropods as parasites and vectors of disease
- Parasitic worms including those of veterinary and agricultural importance
- Protozoan parasites and parasite control

Important notes about the course:

- Each week I will post resources and materials to Quercus that should be mastered prior to our formal class meeting on Thursday.
- These resources may include a short recorded presentation.
- After you work your way through the materials you will complete that week's quiz on Quercus, which **will only be available until the start of the lecture at 9 AM Eastern Time on Thursday.**
- The 'lecture' portion will be conducted via Zoom. I will have a powerpoint presentation to work through as in a traditional lecture, but I hope these sessions will be interactive. It is imperative that you complete the pre-work so you are prepared to contribute. Recordings will be made available.

Grading:

Weekly quizzes – 20%

Ten quizzes each worth 2% occurring in Weeks 2 through 11. Quizzes will be conducted on Quercus and are due before class begins each week, so I would strongly encourage you not to leave the quiz until the last minute!

Midterm exam – 25%

Composed of a combination of multiple choice, fill in the blanks, diagrams, problem solving, and short answer questions. It will be based on material covered up to the midterm date.

Date: TBA; outside of class time

If you miss the midterm you must contact me within 48 hours to schedule the makeup exam. The makeup will be offered the following week only.

Final exam – 35%

Composed of multiple choice, fill in the blanks, diagrams, problem solving, short answer, and short essay questions. The final exam will be cumulative as it relates to overlapping concepts through the course, but will focus on material after the midterm date.

Date: TBA; during final exam period

Science communication fact sheet – 5%

This assignment will involve the design of a CDC-style fact sheet for a parasite that we haven't yet covered in class and will be completed in pairs. This will involve learning independently about a parasite that affects human, animal, or plant health and then designing an informational resource for the general public to educate them about important aspects of the parasite. I will give you more detail and examples when we discuss the assignment in class. This assignment is designed to help you improve your science writing skills for a general audience and learn to distill technical sources into understandable language.

Date: Due by the end of Week 4.

Evaluation of primary literature – 10%

I hope that one skill that all of you learn during this course is how to critically analyze scientific literature. Even those of you who do not ultimately pursue a career in science will benefit from being able to judge scientific issues that impact society at large. In this assignment you will choose an article that discusses parasites from the primary scientific literature. This assignment will be completed in groups and involves holding a journal club with your group, followed by a written critique of the article.

Date: Weeks 7 and 8.

Reflection on the impact of parasites – 5%

In this assignment you will listen to an audio presentation on the impacts of parasite burden on human populations. I will recommend some sources, though you will also be free to find your own. After listening you will find at least one article, report, or additional media source discussing the most interesting aspect of the podcast to you. The submitted assignment will be a 5 slide powerpoint presentation that will briefly summarize the podcast and the additional source that you identify. This assignment will also help you polish your science

communication skills, while giving you some practice in the design of scientific talks.

Date: Due by the end of Week 10.

Optional assignment(s) – TBD

If time allows there may be very short optional assignment(s) for bonus credit. For these bonus assignments no late submissions will be accepted.

Any late assignments will be penalized 10% per day. Late assignments will only be accepted up to 7 days past the original deadline, otherwise a mark of zero will be assigned.

Course email policy:

Dr. Mott: adam.mott@utoronto.ca

- Your email message must originate from your UTSC or UTORONTO address and include the course code in the Subject line. Please include in the body of the message your full name. Otherwise the email will likely be deleted, along with spam messages.
- I will do my best to respond to email inquiries by email within 48 hours (in most instances) during the workweek (does not apply to weekends).
- If a question cannot be answered easily by email, I will send a reply to indicate that you should attend my office hours instead.

Teaching assistant:

Please contact the TA via email to schedule appointments to ask specific questions about course assignments if required. The TA will follow the same policy as above with regards to email composition and timing.

Accessibility needs:

The University provides academic accommodations for students with disabilities in accordance with the terms of the Ontario Human Rights Code. This occurs through a collaborative process that acknowledges a collective obligation to develop an accessible learning environment that both meets the needs of students and preserves the essential academic requirements of the University's courses and programs.

Students with diverse learning styles and needs are welcome in this course. If you have a disability that may require accommodations, please feel free to approach me and/or

the Accessibility Services office (more information can be found here: <https://www.utoronto.ca/ability/>).

Academic integrity:

All suspected cases of academic dishonesty will be investigated following procedures outlined in the Code of Behaviour on Academic Matters. If students have questions or concerns about what constitutes appropriate academic behaviour or appropriate research and citation methods, they are expected to seek out additional information on academic integrity from their instructors or from other institutional resources.

Use of Plagiarism Detection Software:

Normally, students will be required to submit their course essays to the University's plagiarism detection tool 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>).

Religious accommodations:

The University has a commitment concerning accommodation for religious observances. I will make every reasonable effort to avoid scheduling tests, examinations, or other compulsory activities on religious holy days not captured by statutory holidays. According to University Policy, if you anticipate being absent from class or missing a major course activity (like a test, or in-class assignment) due to a religious observance, please let me know as early in the course as possible, and with sufficient notice (at least two to three weeks), so that we can work together to make alternate arrangements.

Equity, diversity, and inclusion:

The University of Toronto is committed to equity, human rights and respect for diversity. All members of the learning environment in this course should strive to create an atmosphere of mutual respect where all members of our community can express themselves, engage with each other, and respect one another's differences. U of T does not condone discrimination or harassment against any persons or communities.

Recording:

This course, including your participation, will be recorded on video and will be available to students in the course for viewing remotely and after each session.

Course videos and materials belong to your instructor, the University, and/or other sources depending on the specific facts of each situation and are protected by copyright.

Do not download, copy, or share any course or student materials or videos without the explicit permission of the instructor.

For questions about the recording and use of videos in which you appear, please contact your instructor.

Quercus:

This course uses the University's learning management system, Quercus, to post information about the course. This includes posting readings and other materials required to complete class activities and course assignments, as well as sharing important announcements and updates. The site is dynamic and new information and resources will be posted regularly as we move through the term, so please make it a habit to log in to the site on a regular, even daily, basis. To access the course website, go to the U of T Quercus log-in page at <https://q.utoronto.ca>. Once you have logged in to Quercus using your UTORid and password, you should see the link or "card" for BIOC35. You may need to scroll through other cards to find this. Click on the BIOC35 link to open our course area, view the latest announcements and access your course resources. There are Quercus help guides for students that you can access by clicking on the "?" icon in the left side column.

SPECIAL NOTE ABOUT GRADES POSTED ONLINE: Please also note that any grades posted are for your information only, so you can view and track your progress through the course. No grades are considered official, including any posted in Quercus at any point in the term, until they have been formally approved and posted on ACORN at the end of the course. Please contact me as soon as possible if you think there is an error in any grade posted on Quercus.

Missed term work:

If you miss term work (including term tests) due to illness you must self-declare within 48 hours via Acorn. Please note it is mandatory for you to fill in the notes field within the self-declaration tool on Acorn to specify what term work you are missing and applicable due dates to be considered. For some additional instructions on how to declare illness please review the following resource:

<https://help.acorn.utoronto.ca/blog/uFAQs/how-do-i-declare-an-absence/>

If you are missing term work for another reason including: short-term illness under the care of a Physician or someone affiliated with Health and Wellness, disability reasons, a family death, vehicle accident, essential travel that is not vacation related, or varsity activities must e-mail the course instructor and Jennifer Campbell (jac.campbell@utoronto.ca) in advance or within 48 hours of the term work due date. Please note all documentation will be verified for authenticity by Jennifer Campbell and any accommodations (if applicable) will be determined by the course instructor.

Please note that we understand that life happens and you may miss term work for valid reasons and we will help you navigate through those situations. Please remain in communication with our departmental admin office as well as your course's teaching team.