

## Department of Biology Course Outline

### SC/BIOL 4360 3.00 Parasitology Fall 2019

#### Course Description

Biology of animal parasites; developmental, structural and functional adaptations to the parasitic environments; immune and other responses of hosts; parasitic diseases. Three lecture hours. One term. Three credits.

#### Prerequisites

SC/BIOL 2030 4.00

#### Course Instructor and Contact Information

Course Director - Dr. Spencer Mukai  
Office – 002 Farquharson (Keele Campus), 344 York Hall (Glendon Campus)  
Email – [smukai@yorku.ca](mailto:smukai@yorku.ca)  
Office hours – Tuesdays 5:00 -6:30 PM OR by appointment

#### Schedule

Tuesdays 7:00-10:00 PM  
Chemistry Building, Room 115

#### Evaluation

##### Assignments and Grading:

Mini quizzes (iClicker, every class- you are allowed to miss only 2 quizzes).....	5%
Mid-Term Exam (Oct. 8, 2019- in class).....	25%
Parasite ID Test 1 (Oct. 22, in-class)- Protozoa (life cycles, structure/function, classification) .....	5%
Parasite ID Test 2 (Nov. 19, in class)- Helminths (life cycles, structure/function, classification).....	10%
Enquiry-based learning group assignment (due Dec. 3, 2019).....	20%
Final Exam (cumulative- December exam period, Dec. 5-20, 2019).....	35%
	<b>100%</b>

\*Final course grades may be adjusted to conform to Program or Faculty grades distribution profiles.

#### Important Dates

Mid-term exam (in class – October 8, 2019)  
Parasite Identification Test 1 (second half of class time- Oct. 22, 2019)  
Parasite Identification Test 2 (second half of class time- November 19, 2019)  
Enquiry-based assignment (due December 3, 2019)  
Final exam (during December examination period, December 5-20, 2019)  
**\* Do not book vacations or time off until the official examination period has ended\***  
  
First day of class: Tuesday September 10, 2019  
Last day of class: Tuesday December 3, 2019

**Drop date:** Friday November 8, 2019

\*Course Withdrawal Period (students can withdraw from a course & receive a "W" on the transcript): November 9–December 3, 2019

\*You may withdraw from a course using the registration and enrolment system after the drop deadline until the last day of class for the term associated with the course. When you withdraw from a course, the course remains on your transcript without a grade and is notated as "**W**". The withdrawal will not affect your grade point average or count towards the credits required for your degree.

NOTE: for additional important dates such as holidays, refer to the "Important Dates" section of the Registrar's Website (<https://registrar.yorku.ca/enrol/dates/fw19>)

## Resources

**Required Text: Parasitology: A Conceptual Approach (2015). Eric S. Loker and Bruce V. Hofkin. Garland Science.**

Other excellent reference texts:

- Parasitology: An Integrated Approach. Gunn, A. and Pitt, S.J. John Wiley & Sons Inc., NJ (2012)
- Human Parasitology 4<sup>th</sup> Edition. Bogitsh, B.J., Carter, C.E., and Oeltmann, T.N. Academic Press, MA (2013)
- Foundations of Parasitology 8<sup>th</sup> Edition. Roberts, L.S. and Janovy, J. Jr. McGraw- Hill, NY (2009)

Supplementary text books and manuals will be made available at the Reserve Desk in the Steacie Science & Engineering Library.

## Learning Outcomes

**Upon successful completion of this course, students should be able to:**

1. Describe general principles and concepts of parasitology
2. Understand the terminology used in parasitology and to use parasite terminology with proper context
3. Be able to classify major parasites of animals and humans
4. Identify and describe the structure and function of cells, tissues and organs of various animal parasites
5. Describe and be able to compare and contrast the many strategies that parasitic animals have undertaken to successfully complete their life cycles in the face of discontinuity of hosts
6. Describe the diseases caused by animal parasites and understand the measures for treatment, prevention and control of each parasite
7. Generalize on the intestine as a place for animal parasites to inhabit and to predict the changes that animal parasites may make to the intestinal milieu that are supportive of the parasite
8. Describe how anthropogenic changes to the environment can alter parasite transmission
9. Describe, with the aid of figures, some of the ways by which the host may respond to the presence of animal parasites, in particular in mounting an adaptive and protective immune response, and to consider the many ways by which animal parasites may circumvent the defense mechanisms of the host
10. Work effectively and cooperatively in small groups to elucidate an answer to an inquiry-based research topic

## Course Content

### BIOL 4360 3.0- Parasitology

#### FALL 2019

#### Class dates & proposed lecture topics

**Sept. 10**, Introduction; principles and general concepts; terminology

**Sept. 17**, Parasitic Protozoa – Introduction to parasitic protozoa (*Entamoeba histolytica*, *Naegleria floweri*, *Acanthamoeba* spp.)

**Sept. 24**, Parasitic protozoa- Metamonada (*Giardia lamblia*, *Trichomonas vaginalis*)

**Oct. 1**, Parasitic protozoa - Apicomplexa (*Plasmodium* spp., *Toxoplasma gondii*, *Cryptosporidium* spp.)

**Oct. 8**, **Mid-term Exam (in class)**

**Oct. 15 (NO CLASS- FALL READING WEEK)**

**Oct. 22**, **Parasite ID Test 1** (second half of lecture); Parasitic protozoa - Apicomplexa (*Plasmodium* spp., *Toxoplasma gondii*, *Cryptosporidium* spp.)

**Oct. 29**, Parasitic Protozoa – Kinetoplastida (*Leishmania* spp., *Trypanosoma* spp., other flagellates)

**Nov. 5**, Parasitic Protozoa – Kinetoplastida (*Leishmania* spp., *Trypanosoma* spp., other flagellates), Platyhelminthes – General features; Class Trematoda– the digeneans

**Nov. 12**, Platyhelminthes – Class Trematoda– the digeneans (*Schistosoma mansoni*, *S. hematobium*) Platyhelminthes - Class Cestoda (Cestoidea) – the tapeworms

**Nov. 19**, Phylum Nematoda – General features; Class Enoplea – *Trichuris trichiura*, *Trichinella spiralis*, mermithids

**Nov. 26**, **Parasite ID Test 2** (second half of class), Nematoda- *Strongyloides stercoralis*, *Ancylostoma duodenale*, *Necator americanus*, *Ascaris lumbricoides*, *Wuchereria bancrofti*, *Brugia malayi*, *Onchocerca volvulus*, *Dracunculus medinensis*

**Dec. 3**, **Submit Group Assignment (hard copy and e-copy)**, Nematoda - *Strongyloides stercoralis*, *Ancylostoma duodenale*, *Necator americanus*, *Ascaris lumbricoides*, *Wuchereria bancrofti*, *Brugia malayi*, *Onchocerca volvulus*, *Dracunculus medinensis*; course wrap up, review of material if time permits

## Experiential Education and E-Learning

A crucial component of a parasitologist's training is the ability to correctly identify the parasite species that is contributing to animal or plant diseases. Digitized images from prepared slides of parasitic protozoa and helminths will be studied (similar to using a virtual microscope). In addition, selected material from traditional lab manuals which illustrate parasite diversity, structure and function will be posted on the course website. Parasite cell, tissue and organ structure will be identified, described and related to functional adaptations of a parasitic lifestyle. You are expected to know all aspects of the life cycles (hosts, mode of transmission, pathology and diseases resulting from infection, treatments for diseases and interventions to halt transmission). The Parasite ID tests will be in the form of a "bell-ringer"- images of parasites will be projected onto the classroom screen and you will have to identify selected parasites which we have studied. In addition, you must be able to identify specific anatomic structures associated with each parasite and know their functions.

In addition, you will have a major inquiry-based group project (maximum 4 students/group). Details will be provided on a separate hand-out. You must form working groups by **September 17, 2019**.

### Other Information

**Grading:** The grading scheme for the course conforms to the 9-point grading system used in undergraduate programs at York (e.g., A+ = 9, A = 8, B+ = 7, C+ = 5, etc.). Assignments and tests will bear either a letter grade designation or a corresponding number grade (e.g. A+ = 90

to 100, A = 80 to 90, B+ = 75 to 79, etc.)

(For a full description of the York grading system see the York University Undergraduate Calendar) (<https://calendars.students.yorku.ca/2019-2020/academic-and-financial-information/academic-information/grades-and-grading-schemes>)

### Course Policies

- **MINI-QUIZZES:** You will have a mini-quiz (5 questions) during each class based on the material from the previous week. You are allowed to miss 2 classes without a penalty. If you miss more than 2 classes, your grade will be proportional to the number of classes missed. You must first download the free iclicker App from Google Play or the App Store, then register yourself in the course “**Parasitology F19**” at the iclicker reef website (<https://app.reef-education.com/#/login>) using your Wi-Fi device (phone, tablet or lap top).
- **DOCUMENTATION FOR MISSED PARASITE ID TESTS & MID-TERM:** If you miss a test or quiz with a legitimate documented reason, please fill out the Online Document Submission Form at (<http://science.apps01.yorku.ca/machform/view.php?id=84113>) If you miss a test with a legitimate documented reason, only a "York Attending Physician's Statement Form" (downloaded from <https://secure.students.yorku.ca/pdf/attending-physicians-statement.pdf>) OR a similarly detailed doctor's note (i.e. not a form just stating that the student visited the clinic) will be accepted for medical excuses. The documentation should cover the date of the missed test. All documentation supporting your excuse for missing a test must be received by the beginning of next class. Students should contact me as early as possible after a missed test/exam (preferably within 24 hours). **THERE WILL BE NO MAKE-UP TESTS.** If you miss a Parasite ID Test or the Mid-term Exam, you will receive a grade of **ZERO** for that test unless legitimate documentation (see above) is provided. After legitimate documentation has been provided, the weight of the missed test will be transferred to the Final Exam.
- **LATE ASSIGNMENTS:** Late group assignments will be deducted 10% per calendar day, up to a maximum of 96 hours (including weekends), then you will receive a grade of **ZERO**, that is, assignments will no longer be accepted after 96 hours.
- **GRADED TESTS/EXAMS:** If you believe that a written answer on a test was marked incorrectly, you must submit your (written) rationale and paper for remarking within 1 week of the test being made available to you. Only those answers written in **ink** will be eligible for remarking. Note: Remarking can result in the mark being raised, confirmed or lowered. In order to be fair and consistent with regard to the entire class, individual grades are not negotiable. I cannot provide “extra credit” assignments. Marks for assignments and tests will not be “rounded”. Contact the course director about marks **ONLY** if there is a clear error in your mark (calculation, clerical, etc.) as soon as possible at **smukai@yorku.ca**. It is highly unlikely that you will receive a response regarding any other mark-related queries.
- **DEFERRED STANDING FOR FINAL EXAM:** Students who do not write the Final Exam during the December 2019 examination period but have completed all other components and assignments by the scheduled dates, must submit a **Deferred Standing Agreement** form downloaded at ([https://secure.students.yorku.ca/pdf/deferred\\_standing\\_agreement.pdf](https://secure.students.yorku.ca/pdf/deferred_standing_agreement.pdf)) together with relevant documentation (Attending Physician's Statement Form) to the course director requesting permission to write a deferred exam (i.e., sign the Deferred Standing Agreement form). It is Senate Policy that "Normal requests for deferred standing must be communicated within one week following a missed examination, or on the last day to submit

course work". Please check out the Registrar's Office Deferred Standing FAQs (<https://myacademicrecord.students.yorku.ca/deferred-standing>)

- **ACADEMIC HONESTY:** Numerous students in Faculty of Science courses have been charged with academic misconduct when materials they uploaded to third party repository sites (e.g. Course Hero, One Class, etc.) were taken and used by unknown students in later offerings of the course. The Faculty's Committee on Examinations and Academic Standards (CEAS) found in these cases that the burden of proof in a charge of aiding and abetting had been met, since the uploading students had been found in all cases to be wilfully blind to the reasonable likelihood of supporting plagiarism in this manner. Accordingly, to avoid this risk, students are urged not to upload their work to these sites. Whenever a student submits work obtained through Course Hero or One Class, the submitting student will be charged with plagiarism and the uploading student will be charged with aiding and abetting. Note also that exams, tests, and other assignments are the copyrighted works of the professor assigning them, whether copyright is overtly claimed or not (i.e. whether the © is used or not). Scanning these documents constitutes copying, which is a breach of Canadian copyright law, and the breach is aggravated when scans are shared or uploaded to third party repository sites.
- **RECORDING LECTURES:** Students are allowed to record lectures using their own voice recording devices. However, taking pictures or video recording of lecture slides or exam questions discussed in class will **NOT** be allowed. Lecture recordings and lecture slides cannot be uploaded or distributed to any third party sites (see above section regarding ACADEMIC HONESTY).
- **E-MAIL ETIQUETTE:** Use your Yorku email address as other email addresses (e.g., Hotmail, Gmail) are filtered out by the university's email system and do not always reach their intended recipient. **Please do not use the Moodle email function or respond to course announcement emails.** I will try to respond within 2 business days, but this is not always possible. I typically do not check email between 6 pm and 9 am, nor on the weekends.  
**Subject line:** your name, student number and a brief indication of topic (e.g., 'Question regarding host-parasite interaction'). **Emails without the required information will not receive a response. Please include your NAME at the end of each email.** I may not be able to offer individual tutoring by email. **If your question requires me to type up several paragraphs to essentially repeat what was discussed in class, I may not be able to respond.** Please attend classes regularly and take notes during lectures. If you require additional help, please consider attending my designated office time before class.

## University Policies

### Academic Honesty and Integrity

York students are required to maintain the highest standards of academic honesty and they are subject to the Senate Policy on Academic Honesty (<https://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/>). The Policy affirms the responsibility of faculty members to foster acceptable standards of academic conduct and of the student to abide by such standards.

There is also an academic integrity website with comprehensive information about academic honesty and how to find resources at York to help improve students' research and writing skills, and cope with University life. Students are expected to review the materials on the Academic Integrity website at (<https://spark.library.yorku.ca/academic-integrity-what-is-academic-integrity/>)

### Access/Disability

York University is committed to principles of respect, inclusion and equality of all persons with disabilities across campus. The University provides services for students with disabilities (including physical, medical, learning and psychiatric disabilities) needing accommodation related to teaching and evaluation methods/materials. These services are made available to students in all Faculties and programs at York University.

Student's in need of these services are asked to register with disability services as early as possible to ensure that appropriate academic accommodation can be provided with advance notice. You are

encouraged to schedule a time early in the term to meet with each professor to discuss your accommodation needs. Please note that registering with disabilities services and discussing your needs with your professors is necessary to avoid any impediment to receiving the necessary academic accommodations to meet your needs.

**Additional information is available at the following websites:**

Counselling & Disability Services (<https://accessibility.students.yorku.ca/>)

Counselling & Disability Services at Glendon ( <https://www.glendon.yorku.ca/counselling/>)

York Accessibility Hub (<https://accessibilityhub.info.yorku.ca/>)

**Ethics Review Process**

York students are subject to the York University *Policy for the Ethics Review Process for Research Involving Human Participants*. In particular, students proposing to undertake research involving human participants (e.g., interviewing the director of a company or government agency, having students complete a questionnaire, etc.) are required to submit an *Application for Ethical Approval of Research Involving Human Participants* at least one month before you plan to begin the research. If you are in doubt as to whether this requirement applies to you, contact your Course Director immediately.

**Religious Observance Accommodation**

York University is committed to respecting the religious beliefs and practices of all members of the community, and making accommodations for observances of special significance to adherents (<https://registrar.yorku.ca/enrol/dates/religious-accommodation-guidelines-2019-2020>)

Should any of the dates specified in this syllabus for an in-class test or examination pose such a conflict for you, contact the Course Director within the first three weeks of class. Similarly, should an assignment to be completed in a lab, practicum placement, workshop, etc., scheduled later in the term pose such a conflict, contact the Course director immediately. Please note that to arrange an alternative date or time for an examination scheduled in the formal examination periods (December and April/May), students must complete an Examination Accommodation Form, which can be obtained from Student Client Services, Student Services Centre or online at (<https://secure.students.yorku.ca/pdf/religious-accommodation-agreement-final-examinations.pdf>)

**Student Conduct in Academic Situations**

Students and instructors are expected to maintain a professional relationship characterized by courtesy and mutual respect. Moreover, it is the responsibility of the instructor to maintain an appropriate academic atmosphere in the classroom and other academic settings, and the responsibility of the student to cooperate in that endeavour. Further, the instructor is the best person to decide, in the first instance, whether such an atmosphere is present in the class. The policy and procedures governing disruptive and/or harassing behaviour by students in academic situations is available at - <http://secretariat-policies.info.yorku.ca/policies/disruptive-andor-harassing-behaviour-in-academic-situations-senate-policy/>