



## **BIO120H1F – Adaptation & Biodiversity**

Department of Ecology & Evolutionary Biology, U of T

### **Course Syllabus – Summer 2016**

#### **The BIO120 team**

Laurel Duquette, Lecturer  
Penelope Gorton, Course and Lab Coordinator  
Laura Heslin Piper, Course Administrator  
Dom Fenech, Laboratory Technician  
+ Teaching Assistants (TAs)

#### **BIO120 office – [bio120@utoronto.ca](mailto:bio120@utoronto.ca)**

- Please direct all course enquiries to the BIO120 office and not to individual team members; the office will re-direct enquiries as appropriate.
- ES 3045A (Earth Sciences Centre, enter off 33 Willcocks, take stairs to third floor), 416-978-7588
- Please include your full name and student number in e-mails sent to the BIO120 Office.
- **Office hours:** Tuesdays and Thursdays 12:00 to 2:00 p.m., or by appointment

#### **Course description**

Principles and concepts of evolution and ecology related to origins of adaptation and biodiversity. Mechanisms and processes driving biological diversification illustrated from various perspectives using empirical and theoretical approaches. Topics include: genetic diversity; natural selection; speciation; physiological, population and community ecology; global change biology; conditions for coexistence; conservation, species extinction, and invasion biology. Prerequisite: Grade 12 Biology or equivalent. Students without high school Biology must contact the BIO120 Office. Exclusion: BIO150Y1Y.

#### **Course objectives**

1. A goal of this course is to provide you with a solid foundation in evolutionary and ecological principles and concepts—as related to the origins of adaptation and biodiversity—so that you can make informed decisions on pressing societal issues, such as population growth, global environmental change, and the conservation of biodiversity, and be prepared for advanced study in the biological sciences.
2. Darwinian evolution is the unifying concept in biology and explains biodiversity on earth and why species differ. You will learn that the traits of organisms are the product of a complex interplay between natural selection, genetic variation, and constraints imposed by evolutionary history.
3. You will learn that adaptive evolution is a process that results from selection pressures imposed by the physical and biotic environment on individuals within populations. The ecological challenges of capturing resources for growth, successful reproduction, and avoiding enemies largely determine the way organisms function.
4. You will learn how natural systems work and how humans function as part of the natural world. From reading *Why Evolution is True*, you will learn how various independent lines of evidence demonstrate the fact of evolution and give insight into its mechanisms, particularly adaptation by natural selection.
5. In the laboratories you will learn to make observations, devise hypotheses, and conduct experiments in ecology and evolutionary biology, including critically evaluating and communicating (both orally and in writing) hypotheses and experimental designs.

**Required course materials** (#1 is available at Scholar House Productions, at 100 Harbord Street, or in limited quantities from the U of T bookstore. #2 is available from the U of T Bookstore.)

1. **BIO120 Laboratory Manual Fall 2015**  
You cannot use previous lab manuals (e.g., if you took BIO120 in Fall 2014, you cannot re-use your lab manual).
2. **Why Evolution is True** by Jerry Coyne (2009 or later, paperback edition, Penguin).
3. Additional readings will be posted on the Portal.

### Course site on the Portal

The BIO120 site on the U of T Portal ([portal.utoronto.ca](http://portal.utoronto.ca)) contains: a copy of this course syllabus, announcements, lecture slides, lab-related content, discussion board, test and lab marks, and sample test questions. Only students who are enrolled in BIO120 on ROSI have access to this site (within 24-48 hours of enrolling). **It is mandatory that you check the announcements at least once a week.** For information about setting up your UTORid, logging into the Portal, and using Blackboard, please visit: <http://www.portalinfo.utoronto.ca/students.htm>.

### Lectures

- Tuesday and Thursday 10:10 a.m. to 12:00 p.m. in SS 2117 (Sidney Smith Hall, 100 St. George Street)
- See table on page 5 of this syllabus for schedule of lectures.
- Lecture slides will be available on the Portal. If you choose to print slides, we request that, in an effort to conserve paper and ink, you consider printing: six slides per page, on both sides of a page or use previously used paper, and using only black ink.
- Taping lectures with a personal recorder is permitted. Lecture recordings will not be available.

### Lecture tutorials

- These are the times when you can ask the lecturer questions about the content of the lectures: **Tuesdays and Thursdays 12:00 p.m. to 1:00 p.m.** after lecture (also in SS2117). You can attend either the Tuesday or Thursday session or both; attendance is optional. Format is “question and answer.”

### Laboratories *(also read the BIO120 Laboratory Manual for detailed information)*

- Labs begin the first week of classes (the week of May 9).
- Students enrolled in P0101 practicals have labs on Tuesdays from 1:10 p.m. to 4:00 p.m.
- Students enrolled in P0201 practicals have labs on Thursdays from 1:10 p.m. to 4:00 p.m.
- All labs will be held in room 013 of the Ramsay Wright Laboratories (25 Harbord St., enter off St. George Street and take the stairs to the basement).
- Check the Portal after 5:00pm on Monday May 9th to confirm what lab section you are in.
- **Preparation for Lab 1:** Read Chapter 1 in the BIO120 Laboratory Manual Fall 2015, and Chapter 6, which is posted on the Portal.
- If you are not enrolled in a practical section on ROSI, please contact Laura Heslin Piper at [bio120@utoronto.ca](mailto:bio120@utoronto.ca)
- Procedures for requesting a temporary lab change (for example, due to illness) are discussed in the “Important Policies and Procedures” section on pages 3 and 4 of this syllabus.
- Note: Labs are held every week; see schedule on page 4 of the syllabus.

### Academic support

- Any questions on **lecture** content can be (1) asked during the weekly Lecture Tutorials (see above), or (2) posted on the BIO120 discussion forum on the Portal.
- Any questions on **laboratory** content can be (1) directed to the BIO120 Course Coordinator during her office hours (see “Contacts” on the Portal), or (2) posted on the BIO120 discussion forum on the Portal.
- The **discussion forums** on the Portal have been created for students to post their questions regarding course material. It is expected that students will respond to their classmates’ questions. Course staff will only respond to posts where appropriate (and within 48 hours, weekdays only).

## Evaluation

<b>Lecture material</b> , including required readings	70%
<b>Lab material</b> , including required readings	30%
You must obtain a minimum average of 50% on the laboratory material (lab quizzes, assignments, etc., and lab material on Final Exam) in order to pass the course.	

### Evaluation details:

<b>Mid-Term Test</b> on Tues. May 31, from 10:10 a.m. to 11:50 a.m. (1 hour, 40 minutes) - Content: 48 multiple-choice questions covering Lectures 1 to 12, including required readings. (Lab material will not be evaluated.) Location(s) will be posted on the Portal.	36%
<b>Final Exam</b> during June 20-24 exam period, exact date TBA (2 hours) - Content: 56 multiple-choice questions (40 questions from Lectures 13 to 22, and 16 questions from Lab Chapters 1 to 5, and Appendices A to C).	38%
<b>Laboratory quizzes and assignments</b> - Quizzes (4%), In-lab Assignments (3%) and Writing a Scientific Proposal assignment (15%) - See page 6 of the syllabus for detailed information.	22%
<b>Reading Quizzes</b> - Detailed information is available on the Portal under “Reading Quizzes”.	4%

### Important course policies and procedures *(please read these carefully!)*

- (1) Your quiz, assignment, test, and exam **grades for BIO120 will be visible to you on the Portal**. It is your responsibility to check your grades and report any inconsistencies to the BIO120 Office as soon as possible.
- (2) Please send all course-related email to [bio120@utoronto.ca](mailto:bio120@utoronto.ca); Laura Heslin Piper will forward your email to the appropriate team member. Include your full name and student number in the body of the message. You should use your UTOEmail address or else your emails are likely to be diverted to Junk Mail.
- (3) The Mid-Term Test and the Final Exam consist of multiple-choice questions; marks are not deducted for incorrect responses. Bring an HB pencil, eraser, and your T-card to all tests/exams; no aids are permitted (no cell phones, calculators, dictionaries, etc.).
- (4) If you **miss the Mid-Term test** due to illness you must contact the BIO120 Office no later than Wed. June 1st; valid documentation is required in order to be considered to write the make-up test. The make-up test consists of short-answer or essay questions (i.e., not multiple-choice). **Valid documentation consists of one of the following: U of T Medical Certificate (available online), U of T Health Service Form, or letter from your College Registrar.**
- (5) If you **miss the Final Exam** you must contact your college registrar and initiate a petition to write a deferred exam. If your petition is granted, the exam is typically written during the next Faculty Examination Period.
- (6) If you **miss your scheduled lab period** for an authorized reason (e.g., illness), you must contact the BIO120 office **within 24 hours**. Valid documentation (see #4 above) may be presented in person to the BIO120 Office during office hours (or by appointment) **within one week** of the missed lab. If the lab is still being offered, you can attend a make-up lab if there is space available. If it is not possible to attend a make-up lab, you will be assigned a make-up assignment for any in-lab assignment you may have missed. It is important to note that you are permitted to make up **only one missed lab** with the appropriate documentation. Note that you are still responsible for submitting any assignments on time that are due for the lab you missed; no extensions will be granted on or after the due date. E-mail your assignment to: [p.gorton@utoronto.ca](mailto:p.gorton@utoronto.ca), or submit it online (when appropriate).

- (7) Labs begin at 1:10 p.m. on Tuesdays and Thursdays. **If you arrive late to lab**, the teaching assistant will send you to see the Course Coordinator. She will decide if you have missed too much of the lab and therefore cannot remain to complete it.
- (8) The lab quizzes are completed on the Portal. They are available for seven days preceding the start of lab. No extensions or exemptions are allowed if you do not write the quiz by the start date and time of the associated lab. Detailed information on the quizzes is available on the Portal.
- (9) 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, contact Accessibility Services as soon as possible: <disability.services@utoronto.ca > or <studentlife.utoronto.ca/accessibility>.
- (10) Read pages 6-9 and 6-10 in Chapter 6 of the BIO120 Laboratory Manual (available on the Portal) for **important policies for the “Writing a Scientific Proposal” assignment**.
- (11) BIO120 has a zero tolerance policy for **plagiarism**. If you are caught plagiarizing the work of others in any of your assignments, you will receive a grade of zero for the assignment and the Office of Student Academic Integrity will be notified.
- (13) **Turnitin.com**: Students will submit their “Writing a Scientific Proposal” report (Chapter 6 in the BIO120 Laboratory Manual) to Turnitin.com. Normally, students will be required to submit their report to Turnitin.com for a review of textual similarity and detection of possible plagiarism. In doing so, students will allow their reports 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 web site. You can choose to not submit your report to Turnitin.com, but you must contact the Course Coordinator before Monday, May 23rd to make alternate arrangements.

## Lecture Schedule

Date	#	Title	Required Material
May 10	1	Introduction to evolution	<i>Why Evolution is True</i> by Jerry Coyne (2009); read BIO120 Guide to Coyne* for more details
	2	Darwin’s dangerous idea	
May 12	3	Variation – the raw material of evolution	
	4	Gene Flow, Genetic Drift and Molecular Evolution	
May 17	5	Natural Selection	
	6	Nature and study of adaptation	
May 19	7	Evolution of Sex	
	8	Sexual Selection	
May 24	9	Speciation	
	10	Cambrian explosion and mass extinctions	
May 26	11	Evolution and Development	
	12	Human Evolution	
May 31	Mid-Term Test from 10:10 a.m. to 11:50 a.m. on Lectures 1 to 12		
June 2	13	Introduction to ecology and physical diversity	Read: Mee L. 2006. Reviving Dead Zones. Scientific American, 295: 78-85.*
	14	Biological diversity (biomes: adapting to physical diversity)	
June 7	15	Building biological diversity I: primary productivity	Complete: Understanding Population Growth Models SimBio online exercise
	16	Building biological diversity II: ecological communities	
June 9	17	Populations and age-structure	Complete: Isle Royale SimBio online exercise
	18	Population growth I: models of single populations	
June 14	19	Population growth II: models of disease growth	
	20	Species interaction	Read: Frias-Torres, S. et al. 2015. Reef fishes recruited at midwater coral nurseries. African Journal of Marine Science. 37(3):421-426. Listen to: Replanting a coral reef. CBC Radio Quirks and Quarks November 14, 2015.*
June 16	21	Case study – managing the world’s fisheries	Listen to: The cod came back. CBC Radio Quirks and Quarks November 31, 2015
	22	Metapopulations and Landscape ecology	
Final Exam written during exam period (June 20 to 24); covers Lectures 13 to 22, Lab Chapters 1 to 5, and Appendices A to C.			

\* available through the BIO120 site on the Portal.

Lab	Dates	Exercise	Chapter	Quiz
1	May 10 or 12	Insect Diversity and Adaptation Proposal introduced	1 6	
2	May 17 or 19	Phenotypic Plasticity Plant-Animal Interactions ( <i>set-up</i> ) The Scientific Method ( <i>self-study</i> ) Sources Assignment due	2 3 A 6	1
3	May 24 or 26	Plant-Animal Interactions Introduction to Statistics ( <i>self-study</i> ) Proposal Draft due	3 B 6	2
4	May 31 or June 2	Measuring Genetic Variation Population Genetics ( <i>self-study</i> ) Proposal due	4 C 6	3
5	June 7 or 9	Reconstructing Evolutionary Relationships Proposal returned	5 6	4
	June 14 or 16	Revised Proposal (optional) and Response due	6	
	June 21 or 23	Revised Proposals returned		

BIO120H Laboratory Evaluation	
Assessment	Points
<b>(1) Quizzes</b>	<b>400</b>
Quiz #1	100
Quiz #2	100
Quiz #3	100
Quiz #4	100
<b>(2) In-lab assignments</b>	<b>300</b>
Lab 2	100
Lab 4	100
Lab 5	100
<b>(3) Scientific Proposal</b> (see Chapter 6 for more details)	<b>1500</b>
<b>(a) Sources Assignment</b> (due for Lab 2)	100
<b>(b) Proposal Draft</b> (due for Lab 3)	100
<b>(c) Proposal</b> (due for Lab 4)	600 (if Revised Proposal is submitted) 1200 (if Revised Proposal is not submitted)
<b>(d) Revised Proposal</b> (optional; due one week after Lab 5)	600
<b>(e) Response</b> (due one week after Lab 5)	100
<b>(4) Final Exam</b> (Ch. 1 to 5, and App. A to C will be evaluated on the Final Exam)	<b>800</b>
<b>Total</b> (=30% of final grade)	<b>3000</b>

