



BIOL*2400 Evolution

Winter 2020

Section(s): C01

Department of Integrative Biology

Credit Weight: 0.50

Version 1.00 - November 01, 2019

1 Course Details

1.1 Calendar Description

This course provides a broad overview of evolutionary biology. It examines the concepts and mechanisms that explain evolutionary change and the evolution of biological diversity at different levels of biological organization (gene to ecosystem) and across space and time. It also introduces historical forms of scientific inquiry, unique to biology. The course is designed to be of interest to students with general interests in science and in research in all areas of biology.

Pre-Requisites: BIOL*1070, BIOL*1090

1.2 Course Description

This course provides a broad overview of evolutionary biology. It examines the concepts and mechanisms that explain evolutionary change and the evolution of biological diversity at different levels of biological organization (gene to ecosystem) and across space and time. It also introduces historical forms of scientific inquiry. The course is designed to be of interest to students with general interests in science and in research in all areas of biology.

1.3 Timetable

Lectures: Monday/Wednesday/Friday, 12:30-1:20pm ALEX 100 (First class is Monday Jan 6th)

Tutorial sessions: You will be scheduled into a Friday tutorial section. These will be held in SCIE 2304 at 11:30-12:20pm, 1:30-2:20pm and 2:30-3:20 pm. Please check CourseLink to find your assigned section and group before the first tutorial on Friday January 24th.

1.4 Final Exam

Final exam time and location are subject to change. Please see WebAdvisor for the latest information from the registrar's office.

2 Instructional Support

2.1 Instructional Support Team

Instructor:	Professor Jinzhong Fu
Email:	jfu@uoguelph.ca
Telephone:	+1-519-824-4120 x52715
Office:	SC1 1458
Office Hours:	by appointment
Course Co-ordinator:	Shaylah Tuttle-Raycraft
Email:	stuttle@uoguelph.ca
Telephone:	519-824-4120 x58096
Office:	SSC 2502
Office Hours:	By appointment.

3 Learning Resources

3.1 Required Resources

Lecture (Readings)

The purposes of lectures are to motivate interest and curiosity in the topic of evolution while supporting students in their learning of fundamental topics, concepts and methods in evolutionary biology. Students are strongly encouraged to supplement their learning of particular concepts taught in class through readings from the course textbook and the primary literature as indicated by the instructor. Students will be advised in advance if they are expected to complete any readings prior to lecture.

Readings (Textbook)

<https://carlzimmer.com/books/evolution-making-sense-of-life/>

Textbook and primary literature readings are assigned. The textbook for the course is Evolution: Making Sense of Life (3rd edition) by C. Zimmer and D. Emlen (ISBN: 9781319079864) and is on reserve in the main library or available for purchase at the University and Coop bookstores. Major concepts from the required readings from the textbook will be tested on the midterm and final exams. You may choose to use an earlier edition of this textbook.

Courselink (Website)

<https://courselink.uoguelph.ca>

Most Powerpoint slides from lecture and other course materials will be posted here. (Note that these are only the Powerpoint slides that illustrate the lectures. To be successful on the exams, you will need to take your own notes as you will be tested on what the lecturer says in class). The Courselink site will be used: for instructions and hints on the Term Assignment, to ask the Professor about course material, to ask the Course Coordinator about logistics, to communicate with the class on class Discussion forums about new discoveries in Evolutionary Biology and to communicate with the other students in your tutorial group in your private group Discussion topic.

Tutorial Assignments, Worksheets, and Discussions (Other)

The purpose of the tutorials is to engage your participation in solving evolutionary problems with your colleagues. Teaching assistants will support your completion of group assignments and your individual critique assignment. They will assist you in developing study skills and help improve your scientific writing. You may find that discussion of course concepts outside of tutorial with your group members enhances your learning and overall experience in BIOL2400. Tutorial Material will be covered on the Midterm and Final examinations.

3.2 Campus Resources

The Academic Calendar is the source of information about the University of Guelph's procedures, policies and regulations which apply to undergraduate, graduate and diploma programs:

<https://www.uoguelph.ca/registrar/calendars/undergraduate>

If you are concerned about any aspect of your academic program:

- make an appointment with a program counsellor in your degree program.

<http://www.bsc.uoguelph.ca/index.shtml> or

<https://www.uoguelph.ca/uaic/programcounsellors>

If you are struggling to succeed academically:

- There are numerous academic resources offered by the Learning Commons including, the Writing Centre, Supported Learning Groups for a variety of courses, workshops related to time management, taking multiple choice exams, and general study skills. You can also set up individualized appointments with a learning specialist. <http://www.learningcommons.uoguelph.ca/>

If you are struggling with personal or health issues:

- Counselling services offers individualized appointments to help students work through personal struggles that may be impacting their academic performance. <https://www.uoguelph.ca/counselling/>
- Student Health Services is located on campus and is available to provide medical attention. <https://www.uoguelph.ca/studenthealthservices/clinic>
- For support related to stress and anxiety, besides Health Services and Counselling Services, Kathy Somers runs training workshops and one-on-one sessions related to stress management and high performance situations. <http://www.uoguelph.ca/~ksomers/>

If you have a documented disability or think you may have a disability:

- The Student Accessibility Services (SAS) can provide services and support for students with a documented learning or physical disability. They can also provide information about how to be tested for a learning disability. For more information, including how to register with the centre please see: <https://www.uoguelph.ca/sas/>

4 Learning Outcomes

4.1 Learning Outcomes

By the end of this course, you should be able to:

1. Conceptual Skill - Differentiate Darwin's original theory from evolutionary theory after the "Modern Synthesis".
2. Conceptual Skill - Accurately define and describe terms and concepts such as evolution, adaptation and fitness.
3. Conceptual Skill - Explain simple methods of phylogenetic tree estimation and interpretation.
4. Conceptual Skill - Explain basic mechanisms of evolutionary change at the genetic, molecular and phenotypic levels such as natural selection, genetic drift, mutation and gene flow.
5. Conceptual Skill - Identify, differentiate, analyze and give examples of processes

- such as sexual selection, multi-level selection, and life-history evolution.
6. Conceptual Skill - Identify species concepts and explain common mechanisms of speciation.
 7. Inquiry Skill - Construct a phylogenetic tree using the cladistic approach and apply the comparative method to explain character evolution.
 8. Inquiry Skill - Elementary practice with model building and hypothesis testing.
 9. Basic Skill - Comprehend scientific and summarize scientific material on Evolution.
 10. Basic Skill - Acquisition, filtering, and synthesis of scientific concepts, facts and methods.
 11. Basic Skill - Applied numeracy.
 12. Basic Skill - Communicate scientific ideas about evolution.
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5 Teaching and Learning Activities

5.1 Lecture

Topics:

General topics and their approximate coverage in the course are listed below. The order of presentation during the semester is subject to change. Readings refer to relevant chapters the course textbook, *Evolution: Making Sense of Life* (3rd edition) by D. Emlen and C. Zimmer.

Topic	Suggested Readings from Textbook
1 History of Evolutionary Thought	Ch. 1 & 2
2 Inferring Evolutionary History - Phylogenetic Reconstruction	Ch. 4
3 Population Genetics: Drift, Migration and Natural Selection	Ch. 5 & 6
4 Quantitative Genetics	Ch. 7
5 Evolutionary Developmental Biology	Ch. 9
6 Natural Selection in the Wild	Ch. 10

	Topic	Suggested Readings from Textbook
7	The Evolution of Sex and Sexual Selection	Ch. 11
8	Life History Evolution	Ch. 12
9	The Evolution of Social Behaviour	Ch. 16
10	Speciation	Ch. 13
11	Diversification and Extinction: Macroevolution	Ch. 14
12	Human Evolution	Ch. 17

5.2 Tutorial Review Sessions

Teaching assistants will run tutorial help sessions to assist students with course material and the assignments at times scheduled by the registrar on specific Fridays (January 24th, 31st, February 7th, March 7th, March 21st) in SSC 2304 (11:30; 13:30; 14:30). The Professor may also conduct post-midterm review sessions in tutorial slots.

5.3 Note

You can be tested on applying concepts discussed in class to descriptive examples given in the text even if the example is not covered in lecture. You will NOT be tested on concepts in the text that were not discussed in class.

5.4 Important Dates

Date	Activity
January 6th	First Class
January 13th	Students assigned to groups for Group Assignment
January 24th	Tutorial

January 30st	Group Assignment due
January 31st	Tutorial
February 5th	Midterm #1
February 7th	Tutorial
February 14th	No class
February 17th – 21st	Mid-semester Break, no classes
February 29th	Draft Writing Project due
March 6th	Tutorial
March 11th	Midterm #2
March 20nd	Tutorial
March 25th	Final Writing Project due
April 3rd	Last Class
TBD	Final Exam

6 Assessments

6.1 Marking Schemes & Distributions

Each student's higher midterm grade will be worth 25% and lower midterm grade will be worth

15% of their final grade.

Name	Scheme A (%)	Scheme B (%)
Midterm 1	15	25
Midterm 2	25	15
Group Assignment	10	10
Writing Project	15	15
Final	35	35
Total	100	100

6.2 Assessment Details

Group assignment (10%)

Due: Thu, Jan 30, 11:55 PM
On line, Submit to Dropbox

Course Content/Activity: Lecture, textbook

Learning Outcome(s) Addressed: 3,4,7,8,11,12

Midterm 1 (15%)

Date: Wed, Feb 5, In-class

Note: Each student's higher grade in the two in-class midterms will be worth 25%, while their lower midterm grade will be worth 15% of their final grade.

Course Content/Activity: Lecture, readings, group assignment

Learning Outcome(s): 1,2,3,4,7,8,10,11,12

Individual Writing Project-Draft (5%)

Due: Fri, Feb 28, 11:55 PM
Due online to PEAR website

Learning Outcome(s): 9,10,12

Midterm 2 (25%)

Date: Wed, Mar 11

Note: Each student's higher grade in the midterms will be worth 25%, while their lower midterm grade will be worth 15% of their final grade.

Course Content/Activity: All lectures from the beginning of the semester, reading, and Group Assignment

Learning Outcome(s): 1,2,3,4,5,6,7,8,11

Individual Writing Project - Final (10%)

Date: Wed, Mar 25, 11:55 PM

Submit to PEAR

Learning Outcome(s) : 9,10,12

Final Exam (30%)

Exam time and location TBD. Please see WebAdvisor for the latest information.

Course Content/Activity: All lectures from the beginning of the course, reading & Group Assignment

Learning Outcome(s) : 1,2,3,4,5,6,7,8,9,11

6.3 Note

Group Assignment

- Students will be expected to work in groups of 4 assigned through Courselink. All group members will have been scheduled into the same tutorial section to facilitate group interaction. A tutorial has been scheduled for January 25th for help with the assignment.
- The Assignment will involve reflection, discussion and calculation on the topics of Phylogenetic Reconstruction and Population Genetics. The Assignment will be based on lecture material.
- The Assignment will be posted on Courselink at least one week prior to the due date.

- The Assignment (one document submitted per group) must be uploaded to Dropbox on Courselink by 11:55 pm on the due date. Assignments must be submitted in .txt or .pdf format. The penalty for late submission will be 25% of the total assignment value per day. Please note that Turnitin will be used (see below).
- We recommend that all communication among group members be done in your group's private Discussion topic on Courselink.

Midterm Exams

- The midterm exams will take place in class during the regular lecture period for that day.
- The midterm exams will include material covered in lecture to that point and in the group project.
- Tutorials have been scheduled on the Friday before both midterm exams.
- The midterm exams will consist of multiple choice and short answer questions.
- Since the material presented in the class will be integrated, all exams will be comprehensive.
- Each student's higher grade in the midterms will be worth 25%, while their lower midterm grade will be worth 15% of their final grade.

Individual Writing Project - Draft and Final Versions

Assignments must be submitted in .docx format. The penalty for late submission will be 25% of the total assignment value per day. Each student will write and submit a Summary of one of the peer reviewed primary scientific articles provided on Courselink. Your target audience is a second year biology student in our Evolution class and not the general public. The Summary will be a maximum of 400 words. Details of requirements including formatting of references and websites will be given in class and posted on the class Courselink site. The first draft of the writing project must be uploaded to PEAR and Courselink for grading by 11:55 pm on the due date and will be worth 5% of the final grade. Students will then revise their draft project based on feedback and upload an edited and final version for grading (10% of the final grade) to Courselink and PEAR by 11:55 pm on the due date. There will be a 25% penalty per day of the total value of the assignment for each late submission. The use of summaries of the chosen scientific article published in the popular press (e.g., www.livescience.com; sciencedaily.com; bbc.com/news/science_and_environment) or

elsewhere is strictly prohibited and is grounds for an allegation of academic misconduct. Tutorials have been scheduled for help with the draft and final versions.

We will be using Turnitin, integrated with the CourseLink Dropbox tool, to detect possible plagiarism, unauthorized collaboration or copying as part of the ongoing efforts to maintain academic integrity at the University of Guelph. All submitted assignments and summaries will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of the Turnitin.com service is subject to the Usage Policy posted on the Turnitin.com site. A major benefit of using Turnitin is that students will be able to educate and empower themselves in preventing academic misconduct. In this course, you may screen your own assignments through Turnitin as many times as you wish before the due date. You will be able to see and print reports that show you exactly where you have properly and improperly referenced the outside sources and materials in your assignment.

Final Exam

- The final exam will take place during the regular examination period.
- The final exam will cover all lectures in the course and the group assignment.
- It will consist of multiple choice and short answer questions.
- It will be cumulative and require a deep synthetic understanding of all the concepts covered in the course.

7 Course Statements

7.1 When You Cannot Meet a Course Requirement

There will be two midterm examinations given on the dates shown in the table above in class. NO make-up midterm exam will be given. Any student who claims illness or compassionate grounds for missing the mid-term exam must obtain a certificate of illness or verification of compassionate reasons as outlined in the Undergraduate Calendar and give it to the course coordinator. If there is an adequate reason (a medical or compassionate exemption) for missing a mid-term exam, then the final will account for the sum of both exams. If you have no adequate reason for missing the exam then a mark of zero will be assigned for the mid-term exam. Students missing the final exam will need to formally apply for permission to write a deferred final examination during the Winter semester. The date and time for the examination will be set by Office of the Registrar. An INCOMPLETE will be submitted as a mark for those students unable to complete the final exam.

8 Department of Integrative Biology Statements

8.1 Academic Advisors

If you are concerned about any aspect of your academic program:

- Make an appointment with a program counsellor in your degree program. [B.Sc. Academic Advising](#) or [Program Counsellors](#)

8.2 Academic Support

If you are struggling to succeed academically:

- Learning Commons: There are numerous academic resources offered by the Learning Commons including, Supported Learning Groups for a variety of courses, workshops related to time management, taking multiple choice exams, and general study skills. You can also set up individualized appointments with a learning specialist. <http://www.learningcommons.uoguelph.ca/>
- Science Commons: Located in the library, the Science Commons provides support for physics, mathematic/statistics, and chemistry. Details on their hours of operations can be found at: <http://www.lib.uoguelph.ca/get-assistance/studying/chemistry-physics-help> and <http://www.lib.uoguelph.ca/get-assistance/studying/math-stats-help>

8.3 Wellness

If you are struggling with personal or health issues:

- Counselling services offers individualized appointments to help students work through personal struggles that may be impacting their academic performance. <https://www.uoguelph.ca/counselling/>
- Student Health Services is located on campus and is available to provide medical attention. <https://www.uoguelph.ca/studenthealthservices/clinic>
- For support related to stress and anxiety, besides Health Services and Counselling Services, Kathy Somers runs training workshops and one-on-one sessions related to stress management and high performance situations. <http://www.selfregulationskills.ca/>

9 University Statements

9.1 Email Communication

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

9.2 When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

Graduate Calendar - Grounds for Academic Consideration

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

Associate Diploma Calendar - Academic Consideration, Appeals and Petitions

<https://www.uoguelph.ca/registrar/calendars/diploma/current/index.shtml>

9.3 Drop Date

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all students (undergraduate, graduate and diploma) except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in their respective Academic Calendars.

Undergraduate Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>

Graduate Calendar - Registration Changes

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml>

Associate Diploma Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/diploma/current/c08/c08-drop.shtml>

9.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

9.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared

responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to book their exams at least 7 days in advance and not later than the 40th Class Day.

For Guelph students, information can be found on the SAS website
<https://www.uoguelph.ca/sas>

For Ridgetown students, information can be found on the Ridgetown SAS website
<https://www.ridgetownc.com/services/accessibilityservices.cfm>

9.6 Academic Integrity

The University of Guelph is committed to upholding the highest standards of academic integrity, and it is the responsibility of all members of the University community—faculty, staff, and students—to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff, and students have the responsibility of supporting an environment that encourages academic integrity. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

Undergraduate Calendar - Academic Misconduct
<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

Graduate Calendar - Academic Misconduct
<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

9.7 Recording of Materials

Presentations that are made in relation to course work - including lectures - cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

9.8 Resources

The Academic Calendars are the source of information about the University of Guelph's procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.

Academic Calendars

<https://www.uoguelph.ca/academics/calendars>
