

University of Guelph
College of Biological Science
Department of Integrative Biology
COURSE OUTLINE
Evolution, BIOL*2400
W16

Course description

BIOL*2400 Evolution F,W (3-0) [0.50]

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.

Prerequisites: BIOL*1040 or (BIOL*1070, BIOL*1090)

Restriction: BIOL*3400

Department: Department of Integrative Biology

Teaching team

Professor: Dr. Andrew McAdam

Office: SCIE 2457

Phone extension: 56826 email: amcadam@uoguelph.ca

Office hours: TBD

TAs: TBD

Course schedule

Monday/Wednesday/Friday, 12:30-1:20 pm THRN 1200

Learning goals and rationale

(1) Conceptual skills:

- (a) Differentiate Darwin's original theory from modern evolutionary theory.
- (b) Accurately define and describe terms and concepts such as evolution, adaptation and fitness.
- (c) Explain simple methods of phylogenetic tree estimation and interpretation.
- (d) Explain basic mechanisms of evolutionary change at the genetic, molecular and phenotypic levels.
- (e) Identify, differentiate, analyze and give examples of processes such as sexual selection, multi-level selection, life-history evolution, and co-evolution.
- (f) Identify species concepts and explain mechanisms of speciation.

(2) Inquiry skills:

- (a) Estimate a phylogenetic tree using the cladistic approach and apply the comparative method to explain character evolution.

(b) Elementary practice with model building and hypothesis testing.

(3) Basic skills:

- (a) Comprehension of scientific material.
- (b) Acquisition, filtering, and synthesis of scientific concepts, facts and methods.
- (c) Applied numeracy
- (d) Communicate scientific ideas.

Course Resources

Lectures: 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 will be expected to also supplement their learning 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 and primary literature readings are assigned. The textbook for the course is *Evolution: Making Sense of Life* (2nd edition) by C. Zimmer and D. Emlen and is on reserve in the main library or available for purchase at the bookstore. Assigned readings from the primary literature will be indicated in assignments or lecture.

Courselink: Lecture notes, assignments and other course materials will be posted here.

Top Hat: To facilitate discussion and to enhance your learning in and out of class, we will be using educational software called *Top Hat*. *Top Hat* allows you to answer questions and engage in discussion using your smartphone, tablet or laptop. You will need to purchase the *Top Hat* app and instructions will be provided by e-mail/*Courselink* with instructions for purchasing, downloading and setting up the *Top Hat* software. We will practice using *Top Hat* in class on January 13, 15, 18 and 20 before graded questions begin.

Course Content

General topics and their approximate coverage in the course are listed below. Readings refer to relevant sections of the course textbook, *Evolution: Making Sense of Life* (2nd edition) by C. Zimmer and D. Emlen.

	Topics	Readings
1	Darwin's Great Ideas	Chapters: 1, 2
2	History of Life and the Evolution of Complexity	Chapter 3
3	Phylogenies	Chapter 4
4	The Modern Synthesis	Chapter 5

5	The Genetic Basis to Evolutionary Change - <i>Population Genetics</i>	Chapter 6
6	Evolution in Action – Quantitative Genetics	Chapter 7, 8
7	Sexual Selection	Chapter 11
8	Co-operation and Multi-level Selection	Chapter 16
9	Life History Evolution	Chapter 12
10	Speciation	Chapter 13
11	Diversification and Extinction - Macroevolution	Chapter 14
12	Human Evolution	Chapter 17

Methods of Assessment

Top Hat: 5% of your final grade will be based on your graded responses as well as on your participation in *Top Hat* questions in class. Your lowest 6 grades for *Top Hat* questions will be deleted from your grade calculation so that you will not be penalized for illness or other occasional absences from class.

Assignments: There will be four assignments during the semester. These assignments will sometimes involve reflection, discussion, calculation or assessment of scientific papers. The subject matter of the assignments will be based on the relevant assigned readings, and lecture material. Assignments will be posted on Courselink one week prior to the due date.

Assignments must be uploaded to Dropbox on Courselink by 12:00PM (midnight) on their due date. Late assignments will be given a grade of zero. Assignments must be submitted in .txt or .pdf format.

Tests: There will be two tests during the semester. Both tests will take place in class during the regular lecture period for that day. Since the material presented in the class will be integrated, all tests will be comprehensive. The test with the lower grade will contribute 15% to the final grade, whereas the test with the higher grade will contribute 25% to the final grade.

Final Exam: The final exam will cover all material from the course and will take place during the regular examination period

Assessment				
Form of Assessment	Weight of Assessment	Due Date of Assessment	Course Content /Activity	Learning Outcome Addressed
Top Hat	5%	In class all	lecture, readings	All learning outcomes

Questions		semester		
Assignment 1	5%	February 5	lecture, readings	1a, 1b, 1c, 1f, 2, 3
Assignment 2	5%	February 26	lecture, readings	1a, 1b, 1d, 2, 3
Assignment 3	5%	March 11	lecture, readings	1a, 1b, 1d, 1e, 2, 3
Assignment 4	5%	March 25	lecture, readings	1a, 1b, 1d, 1e, 2, 3
Test #1	15% or 25%*	February 12	lecture, readings	All learning outcomes
Test #2	15% or 25%*	March 18	lecture, readings	All learning outcomes
Final Exam	35%	Saturday April 16 2:30PM - 4:30PM Room TBA	All material	All learning outcomes

Important Dates

February 12 – Test 1

March 11 – 40th class day (last day to drop course without penalty)

March 18 – Test 2

April 16 – Final Exam

Course and University Policies

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, and be prepared to provide supporting documentation. See the undergraduate calendar for information on regulations and procedures for Academic

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

Accessibility

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability

or a short-term disability should contact Student Accessibility Services (and Centre for Students with Disabilities) as soon as possible.

For more information, contact Student Accessibility Services at 519-824-4120 ext. 56208 or email <mailto:csd@uoguelph.ca> or see the website: <http://www.csd.uoguelph.ca/csd/>

Academic Misconduct

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 discourages misconduct. 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.

The Academic Misconduct Policy is detailed in the Undergraduate Calendar: <http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

E-mail Communication

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

Drop Date

The last date to drop one-semester courses, without academic penalty, is the 40th class day. To confirm the actual date please see the schedule of dates in the Undergraduate Calendar. For regulations and procedures for Dropping Courses, see the Undergraduate Calendar: <http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>

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.

Recording of Materials

Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, a

classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

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:

<http://www.uoguelph.ca/registrar/calendars/index.cfm?index>

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, 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:

- Student Accessibility Services (formerly Centre for Students with Disabilities) 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/csd/>