

**University of Guelph**  
**College of Biological Science**  
Department of Integrative Biology  
**COURSE OUTLINE**  
Evolution, BIOL\*2400  
W15

**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](mailto:amcadam@uoguelph.ca)

Office hours: TBD

TAs: Kelsey Halliwushka, Robert Young

**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* (1st 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.

### Course Content

The material presented in lecture will be based around a series of evolutionary questions. In order to explore these questions we will need to build a foundation of evolutionary concepts. Readings refer to relevant sections of the course textbook, *Evolution: Making Sense of Life* (1st edition) by C. Zimmer and D. Emlen. Weeks listed for each question are approximate.

Week	Question	Topics	Readings
1, 2	Will evolution be able to save species from climate change?	Darwin's theory, evolution & adaptation, phenotypic evolution	Chapters: 1, 2, 7, 8, 10
3	Why do we have sex and with whom do we have it?	Sexual selection	Chapter 11
4	If natural selection is 'survival of the fittest' then why is co-operation so common?	Multi-level selection, behavioural evolution	Chapters 8, 16
5	Why do organisms get old and die?	Life history evolution	Chapter 12
6	Why can't you marry your sibling?	Population genetics	Chapter 6
7	Winter break – no classes		

8, 9, 10	What is biodiversity and where does it come from?	Darwin's theory, species concepts, speciation, phylogenetics, history of life	Chapters 1, 2, 3, 4, 5, 9, 13, 14
11	Did humans evolve from chimps and are we still evolving?	Phylogenetics, molecular evolution, population genetics	Chapters 8, 17
12	What happens when the environment evolves?	Co-evolution, social evolution	Chapters 15, 16

### Methods of Assessment

Assignments: There will be five 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
Assignment 1	5%	January 23	lecture, readings	1a, 1b, 1d, 2b, 3
Assignment 2	5%	February 6	lecture, readings	1a, 1b, 1d, 1e, 2b, 3
Assignment 3	5%	February 27	lecture, readings	1a, 1b, 1d, 1e, 2b, 3
Assignment 4	5%	March 6	lecture, readings	1a, 1b, 1c, 1f, 2, 3
Assignment 5	5%	March 25	lecture, readings	All learning outcomes
Test #1	15% or 25%*	February 11	lecture, readings	All learning outcomes

Test #2	15% or 25%*	March 13	lecture, readings	All learning outcomes
Final Exam	35%	April 14 11:30AM - 01:30PM  Room TBA	All material	All learning outcomes

### **Important Dates**

February 11 – Test 1

March 6 – 40<sup>th</sup> class day (last day to drop course without penalty)

March 13 – Test 2

April 14 – 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 40<sup>th</sup> 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/>