

BIOL 3200 3.0 - Processes of Evolution

Can anything be more central to the subject of Biology than descent with modification? Since the mid-nineteenth century, evolution has been the major organizing concept for all branches of biology including genetics, cell biology, physiology, ecology, and behaviour. Students of biology understand the essence of the subject, but many details have been shown, in fact, to be poorly understood by undergraduate students. The over-arching objective of this course is to give students a solid foundation in all aspects of evolution to deepen students' understanding of biodiversity and other biological processes and patterns.

In recent years, this course has been taught by Professor Jan Sapp. He is on sabbatical this year. The winter 2013 version is likely to be distinctly different from recent iterations of the course.

Course Director: Professor Alex Mills

Where: Room 134 Chemistry Building

Phone: 416-736-2100 ext. 33609

Email: ammills@yorku.ca (Please include "BIOL 3200" in the subject line)

TAs: There are no labs or tutorials, so there are no TAs *per se*. There will be graduate student "TAs" who will be assisting with marking tests and exams.

Schedule

Lectures are Mon and Wed in SLH D for 75 minutes beginning at 11:30 am. There are no labs.

Course Material

The course will be delivered in three ways:

1. Information and ideas (including discussions, tangents, blackboard material) presented during our 150 minutes of lectures each week
2. Textbook readings (and occasionally other readings provided through the Moodle website)
3. Copies of PowerPoint presentations used during lectures

These are the general objectives of the course:

This is primarily a content-oriented (as opposed to skills-oriented) course. Students are expected to master course material that includes major evolutionary sub-topics such as natural selection, sexual selection, genetic drift, phylogeny, microevolution, macroevolution, speciation, adaptation, evolutionary milestones, paleontological evidence, molecular evidence, sexual conflict, and co-evolution. Students will be expected to apply this knowledge to novel fact scenarios and to draw linkages among genetics, contingencies, time, adaptation, and phylogeny.

Required Text: Zimmer, C. and Emlen, D.J. 2013. *Evolution: Making Sense of Life*. Roberst and Company. It is available in the York bookstore.

Website: The course will be managed through a *Moodle* site.

Prerequisites: *Genetics* (BIOL 2040), or permission from the course director.

Evaluation:

First midterm test (Wednesday, February 6 th at 11:30 am):	25%
First midterm test (Monday, March 11 th at 11:30 am):	25%
Final Exam (during April exam period):	50%

Important Dates:

Last day to DROP the course without a grade being submitted is March 15th, 2013.

Office Hours:

Tuesdays and Wednesdays from 1 to 3 pm

Specific Course Learning Objectives: Students will be able to...

Area 1. Fundamental Understanding:

- Use terminology appropriate to the field of evolution
- Demonstrate an understanding of the Hardy-weinberg conditions and articulate why evolution naturally flows from any breach of those conditions
- Articulate the structure of the argument for natural selection by reference to (a) demonstrable observations and (b) inferences that necessarily flow from those observations
- Describe the circumstances that are expected to lead to genetic drift
- Define neutral evolution and present an argument why it flows from the dynamics of the DNA-protein relationship
- Distinguish between vertical and horizontal evolution
- Describe methodologies that have been used to generate phylogenies
- Distinguish typological thinking from evolutionary thinking
- Identify the components of Linnaean classification that have been retained by evolutionists
- Identify spurious arguments based on a distortion of what biologists have demonstrated about evolution
- Understand refuted theories like acquired characteristics, blending inheritance, and group selection
- Place in chronological order major evolutionary milestones, and convey an indication of the time scale that matches that chronology
- Define types of selection including kin selection, frequency dependent selection, directional selection, stabilizing selection
- Interpret patterns at hybrid zones in terms of evolutionary history
- Integrate into evolutionary theory recent insights into epigenetics

Area 2. Critical Thinking Skills

- Present arguments that explain evolutionary phenomena such as sexual selection and sexual conflict
- Apply course content to new data sets
- Employ a metaphor for conveying the nature of time and its relationship to evolutionary milestones

Area 3. Problem Solving Skills

- Interpret phylogenetic hypotheses arranged visually

Area 4. Effective Communication

- On tests and exams, clearly construct written answers to questions and clearly construct written explanations or arguments for scenarios or fact situations

Please read these FAQs!

Are you soft-hearted? I am by nature, but not by policy! Courses move along more efficiently if people do what they ought to do from the outset. Attend class, don't put off to tomorrow what you should do today, communicate clearly, study efficiently, don't misrepresent absences, etc.!

Can I treat this course as a distance course? It is not designed as a distance course. It is not a course where you have to simply memorize material from a textbook or simply memorize PowerPoint slides! Some of the material will only be delivered during lecture. If you skip class, you will suffer accordingly, but that is up to you.

Then what is "the whole course"? Material delivered during lecture by me and your fellow students (therefore take notes!), PowerPoints posted on-line, links and journal papers posted on-line, and anything else indicated either in class or on the course website.

Are study notes posted on-line? PowerPoints used in lecture are posted on-line, usually prior to class, sometimes following class. Remember, these presentations do not constitute the whole course!

Can I surf the web while in class, or text friends, etc.? No! It is rude, and it is distracting to fellow students and to the lecturer. Avoid temptation by turning off your phones and wireless. Classes are only 100 minutes, and your undivided attention is helpful to you and to me. Abuses may result in a no-laptop policy for everyone!

If I miss a test, can I tell you when it suits me? No! Tell me right away! Within 24 hours of missing a test advise me by delivery or email. "Problems with my printer" or "problems with my email" do not justify lateness in notifying me.

Does that mean if I miss a test I will have a chance to write a make-up? Yes, if you let me know right away with adequate documentation. Otherwise, no!

Do you bump marks at the end of the course? Very rarely; presume that a 79 is a 79, not an 80, and that a 59 is a 59, not a 60! Don't aim for a 49!

Okay, but can I then do "extra assignments" at the end of the course to undo a weak performance? Sorry, but you cannot. So, perform to your ability level from the outset.

Boy, you sound crabby! Are you? No! I just want you to take responsibility for your own education and to approach university wisely. Be organized, attend class and labs, and be polite and organized! We'll get along well.

Accommodations:

Students who feel that there are extenuating circumstances that may interfere with the successful completion of their exams or other course requirements are encouraged to discuss their concerns with Professor Mills as soon as possible.

Students with physical, learning or psychiatric disabilities who require reasonable accommodations in teaching style or evaluation methods should discuss the matter with Professor Mills early in the term so that appropriate arrangements can be made.

Religious Observance Days:

Should any of the dates for tests or exams pose a conflict with a religious observance day for your particular religion, you must complete an **Examination Accommodation Agreement Form** (available online at Registrar's Office site) and submit it to the instructor **at least 3 weeks before the date of the test or 3 weeks before the start of the examination period.**

More details on missed Tests:

Students who miss a test or exam due to an illness or emergency must provide supporting documentation to the instructor as soon as possible. Tests and exams missed on the ground of medical circumstances must be supported by an Attending Physician's Statement, which can be downloaded from:

http://www.registrar.yorku.ca/pdf/petitions/attending_physician_statement.pdf, or a statement by a psychologist or counsellor. Students are NOT expected to disclose the nature of the illness. The document must specify: 1) date of

consultation; 2) contact information (e.g. phone number of the hospital; legible name of the health provider) that would allow verification of the document; 3) a statement that the student would not have been able to attend class (or carry out activities) during the relevant period of time. The documentation must be dated on the same day as the exam or earlier, or it will not be accepted. Appropriate documentation must be submitted to Professor Mills immediately after the test.

Academic Honesty:

York students are required to maintain high standards of academic integrity and are expected to be familiar with and to follow the Senate Policy on Academic Honesty (see <http://www.yorku.ca/secretariat/legislation/senate/acadhone.htm>)

Cheating and plagiarism are major academic offences and carry serious penalties, ranging from a failing grade on the work in question to expulsion from the university. Students should also complete the online tutorial available at that site.

Professionalism and Student / Instructor Conduct:

Students and instructors are expected to maintain a professional relationship characterized by courtesy and mutual respect and to refrain from actions disruptive to such a relationship and to the class. It is the responsibility of the instructor to maintain an appropriate academic atmosphere in the lecture hall, and the responsibility of the student to cooperate in that endeavour.

Remember that texting, chatting, and surfing websites during lectures is unprofessional and disruptive. (Abuses may result in a no-laptop policy for all).

I hope to make this course an enjoyable experience for everyone.