

Department of Biology Course Outline

SC/BIOL 3200 3.00 Processes of Evolution
Fall 2019

Course Description

The processes and principles of evolution, the mechanisms by which genetic change occurs, the patterns of genetic variation and molecular studies that relate the structure of organisms to their evolution are examined. Three lecture hours. One term. Three credits.

Prerequisites

SC/BIOL 2040 3.00.

Course Instructors and Contact Information

Professor Jan Sapp
Email: biol3200@yorku.ca
Office: Farquharson 306.
Office hours: Tuesdays 13:00-14:30 by appointment Biol3200@yorku.ca

Schedule

Class time: Tuesdays:14:30- 17:30
Location: VH B

Evaluation

Two in-term tests, and final exam during exam period.
Tests and exam are of equal value (1/3 each of total mark)
They are based on multiple choice and/or short answers.
The weight of one test cannot be transferred to another.

Final course grades may be adjusted to conform to Program or Faculty grades distribution profiles.

Important Dates

First class: September 10
Last date to drop course without receiving a grade November 8.
Test 1: October 10
Test 2: November 7
Last Class December 3
Final exam: Dates/times/rooms for exams are scheduled and published by the registrar's Office

Resources

Required Texts: Jan Sapp, *Genesis: The Evolution of Biology*, New York: Oxford University Press, 2003. Charles Darwin, *On the Origin of Species*, Murray, 1859. First edition.
<http://www.literature.org/authors/darwin-charles/the-origin-of-species/> Additional information and readings may be presented in class lectures. *See also the course website on Moodle for notices, lecture PPT presentations, and any other course readings.*

Course Moodle: Most of the lecture PowerPoint slides will be made available to the class through the course Moodle site. These slides are not a substitute for attending class or reading the book. You are responsible for information you may have missed in the lectures.

Class participation: Some lecture material ***will not be included*** on the moodle site for this course. You will know what that information is by having read the required reading for the lecture before attending class.

Learning Outcomes

Upon completing this course students should have acquired a critical understanding of the origin and development of evolutionary theory, and its relations with palaeontology and taxonomy, cell theory, embryology and developmental biology, genetics, and molecular biology and microbiology. In so doing they will have acquired an understanding of advancements in evolutionary biology from neo-Darwinian theory to molecular phylogenetics, epigenetics, lateral gene transfer and symbiomics.

Course Content

This course offers a critical overview of the development of evolutionary theory from the nineteenth century to the present. What is evolution? What is an organism? What is a gene? We explore these questions and the controversies that have surrounded them. In so doing you will study the formation of classical neo-Darwinian theory of the last century, the subsequent development of molecular phylogenetic methods, and ongoing advancements in our understanding of evolutionary processes today

The historical approach taken in this course is designed to enhance your understanding of the fundamental concepts that have shape evolutionary theory. The lectures and readings are divided into three parts: 1) the emergence of evolutionary thinking in the 19th century, and debates over the mode and tempo of evolutionary change; 2) the rise of experimental biology, the development of Mendelian genetics, populations genetics, and the emergence of neo-Darwinian theory in the 1930s and 40s; 3) concepts in molecular biology, the development of molecular phylogenetics, modes of evolutionary change beyond neo-Darwinian theory including epigenetic inheritance, and the fundamental importance of lateral gene transfer and symbiosis in evolution.

Lectures

Part I

September 10: Introduction: *Genesis* Preface; Evolution and Revolution, *Genesis* chapter 1. The *Origin* chapter 2
September 17: On the Origin of Species, *Genesis* chapter 2. The *Origin* chapter 3, Darwin's Champions, *Genesis* chapter 3.
September 24: Darwinism and Socio-politics, *Genesis* chapter 4. Mutualism, *Genesis*, chapter 5
October 1: Dissent from Darwin, *Genesis*, chapter 6, The *Origin* chapter 6.
October 8 Test 1.

Part II

October 22: The Cell Theory, *Genesis* chapter 7, The Body Politic. *Genesis* chapter 8 Evolving Embryology, *Genesis* chapters 9 and 10.
October 29: Mendel Redux, *Genesis* chapter 11. Emerging Genetics, *Genesis* chapter 12.
November 5 Darwinian Renaissance, *Genesis* chapter 13, Genes, Germs and Enzymes, *Genesis* chapter 14.
November 12: Test II.

Part III

November 19: Genetic Heresy and the Cold War, *Genesis* chapter 15 Conceiving a Master Molecule, *Genesis* chapter 16
November 26: Epigenetics *Genesis* chapter 17, Molecular Evolution and Microbial Phylogeny, *Genesis* chapter 18.
December 3: Lateral Gene Transfer and Symbiomics, *Genesis* chapter 19. The Evolution of Relationships. *Genesis* chapter 20 Synthesis and Epilogue

Fall exams begin Dec 5-20

Other Information

Students may see their tests by **appointment only, and within one week** after notification of test results at a time that is specified by the course TA. If you believe that an answer was marked incorrectly you must submit a written rationale. Note: Reassessing a test can result in mark for test being lowered, confirmed or raised. Final course grades may be adjusted to conform to Program or Faculty grades distribution profiles.

Course Policies

Missed mid-term Test: You must contact (email) me, or the course TA within two days (48 hours) of missing a midterm test. Please use the online documentation system at:

- <http://science.apps01.yorku.ca/machform/view.php?id=84113> If you miss a test with a legitimate documented reason, permission **may** be granted to take a **makeup test**. All documentation supporting your excuse for missing a test must be received **within one week of the missed test**.

Only a "York Attending Physician's Statement Form" (downloaded as part of the Petitions Package) or a similarly detailed doctor's note (i.e., not a form stating only that the student visited the clinic) will be accepted for medical excuses. Documentation must cover the date of the missed test. Death of an immediate family member requires a death certificate or letter from the funeral director. If appropriate documentation is not provided within one week, a zero will be earned on the missed midterm.

Makeup mid-term tests will generally be held within 10 days of the regular test. They typically differ in format from the original test (i.e., include more short/long answer questions). **There will be no second make up tests offered.**

Missed Final Exam

All students who miss the final examination must petition if they are seeking deferred standing. No student will be granted deferred standing by the professor via a Deferred Standing Agreement Form (DSA). Students must seek deferred standing by submitting a petition to their home faculty. It will be the Petition Committee's decision whether deferred standing is granted and, if granted, that committee will also set the deadline for writing the deferred examination.

The format of the make-up final exam for this course may be essay, short answer, and/or multiple choice.

Recording Lectures:

Photographs or video recordings of any portion of the lectures (including slides) are **PROHIBITED**. Images and material presented are subject to Canadian copyright law. Audio recordings are permitted provided they are used **ONLY** as a personal study aid, **and are NOT sold, passed on to others, or posted online**. The lectures are the intellectual property of the professor and cannot be distributed without his expressed permission.

University Policies

Academic Honesty and Integrity

York students are required to maintain the highest standards of academic honesty and they are subject to the Senate Policy on Academic Honesty (<http://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/>). The Policy affirms the responsibility of faculty members to foster acceptable standards of academic conduct and of the student to abide by such standards.

There is also an academic integrity website with comprehensive information about academic honesty and how to find resources at York to help improve students' research and writing skills, and cope with

University life. Students are expected to review the materials on the Academic Integrity website at - <http://www.yorku.ca/academicintegrity/>

Access/Disability

York University is committed to principles of respect, inclusion and equality of all persons with disabilities across campus. The University provides services for students with disabilities (including physical, medical, learning and psychiatric disabilities) needing accommodation related to teaching and evaluation methods/materials. These services are made available to students in all Faculties and programs at York University.

Students in need of these services are asked to register with disability services as early as possible to ensure that appropriate academic accommodation can be provided with advance notice. You are encouraged to schedule a time early in the term to meet with each professor to discuss your accommodation needs. Please note that registering with disabilities services and discussing your needs with your professors is necessary to avoid any impediment to receiving the necessary academic accommodations to meet your needs.

Additional information is available at the following websites:

Counselling & Disability Services - <http://cds.info.yorku.ca/>

Ethics Review Process

York students are subject to the York University *Policy for the Ethics Review Process for Research Involving Human Participants*. In particular, students proposing to undertake research involving human participants (e.g., interviewing the director of a company or government agency, having students complete a questionnaire, etc.) are required to submit an *Application for Ethical Approval of Research Involving Human Participants* at least one month before you plan to begin the research. If you are in doubt as to whether this requirement applies to you, contact your Course Director immediately.

Religious Observance Accommodation

York University is committed to respecting the religious beliefs and practices of all members of the community, and making accommodations for observances of special significance to adherents. Should any of the dates specified in this syllabus for an in-class test or examination pose such a conflict for you, contact the Course Director within the first three weeks of class. Similarly, should an assignment to be completed in a lab, practicum placement, workshop, etc., scheduled later in the term pose such a conflict, contact the Course director immediately. Please note that to arrange an alternative date or time for an examination scheduled in the formal examination periods (December and April/May), students must complete an Examination Accommodation Form, which can be obtained from Student Client Services, Student Services Centre or online at

http://www.registrar.yorku.ca/pdf/exam_accommodation.pdf (PDF)

Student Conduct in Academic Situations

Students and instructors are expected to maintain a professional relationship characterized by courtesy and mutual respect. Moreover, it is the responsibility of the instructor to maintain an appropriate academic atmosphere in the classroom and other academic settings, and the responsibility of the student to cooperate in that endeavour. Further, the instructor is the best person to decide, in the first instance, whether such an atmosphere is present in the class. The policy and procedures governing disruptive and/or harassing behaviour by students in academic situations is available at - <http://secretariat-policies.info.yorku.ca/policies/disruptive-and-or-harassing-behaviour-in-academic-situations-senate-policy/>