Course Description

An introduction to the genetic mechanisms of population differentiation and evolutionary change— from molecules to species. The genetical theory of evolution is also applied to problems involving conservation, biotechnology, and the evolution of disease.

Overview

The goals of Biology 206 are to provide students with a broad overview of modern evolutionary biology and how and why scientists study evolution. The course integrates the two major organizing principles of biological systems, genetics and evolution. Genes encode information in sequencing the phenotype from biochemistry to behaviour, while evolutionary forces shape the sequence of genes and how they are expressed. We will discuss how the genetic machinery produces and stores genetic variation as the raw material for evolution. We will introduce the major mechanisms of evolutionary change: natural selection, random evolutionary processes, and gene flow and how these processes work together to create biodiversity. In each case, we'll explore concepts through experimental and comparative case studies. We will teach you as much about how research is done as what has been discovered. And we will show you that evolutionary biology as a field is the most profound and significant in all of science. No other discipline comes close to addressing as many essential and exciting philosophical and empirical topics. Topics covered will include Introduction to evolution theory, The Hardy-Weinberg principle and its assumptions, Random evolutionary processes and gene flow, Population subdivision, Types of natural selection, Causes and consequences of linkage disequilibrium, Evolution of complex (quantitative) traits, Adaptation, The evolution of sex, Sexual selection & mate choice, Social evolution, Speciation, Species Interactions, Human evolution, Rapid evolution.

Course Materials

There is a required textbook for this course. You can purchase a hard-copy or digital (e-book) version from the Campus Bookstore.

- Herron & Freeman 2014. Evolutionary Analysis, 5th Edition. Pearson. Specific readings will be posted with each lecture.

Additional course materials will be provided online via OnQ

Suggested Time Commitment

Students can expect to spend approximately 10 hours a week in study/practice and online activity for this course.

Topics

- Introduction to evolution theory
- The Hardy-Weinberg Principle and its assumptions
- Random evolutionary processes and gene flow
- Types of natural selection
- Causes and consequences of linkage disequilibrium, including the evolution of sex
- Evolution of complex (quantitative) traits
- Adaptation
- Sexual selection & mate choice
- Social evolution
- Speciation & the evolution of biodiversity
- Biogeography
- Human evolution
- Conservation genetics

Assessments

Online Quizzes (3 x 4% each)	12%
Tutorials / Assignments (Best 7 of 8 x 4%)	28%
Midterm 1	15%
Midterm 2	15%
Final exam	30%

Assessments and Activities Description

Midterms – Two, each worth 15%. Tests will be conducted in class. Tests are designed to take 30 minutes, but you will have 50 minutes to complete them. Tests will comprise multiple choice questions. Test 1 will cover the first unit (approx. weeks 1-4), Test 2 will cover the second unit (approx. weeks 5-8).

Final Exam – 30%. The final exam will be scheduled by FAS, during the exam period (mid-April, 2022). The exam will be multiple choice with a few short answer questions. The final exam will be cumulative, with emphasis on the third unit (approx. weeks 9-12).

Quizzes – 12%. There will be three quizzes on OnQ, one each in approx. weeks 3, 7 and 11. Each quiz will consist of 5 questions. Each quiz will be open for several days, but once you begin a quiz, it must be completed within 60 minutes. Quizzes will cover lecture content, readings, and videos from the preceding two weeks.

Tutorials - 28% - There will be 8 tutorials over the course of the semester, each worth 4% (see Timeline for specific schedule). Your best 7 will count towards your final mark in the course; the lowest mark will be dropped. Tutorials will be run as synchronous sessions: students are expected to attend the tutorial session in which they are registered, and are expected to actively participate throughout the entire tutorial. During tutorial sessions, students will work in groups to complete a worksheet. Each group will hand in one completed assignment in OnQ, and all group members will receive the same grade. Although worksheets are designed to be completed within the tutorial session, there is a 24-hour grace period to accommodate electronic submissions to onQ (i.e. submissions received within 24 hours of the end your tutorial session will be considered as on time). Submissions received after the grace period will be subject to a 10% penalty for each 24-hour period (or part thereof), up to a maximum of 5 days, after which the assignment will not be accepted. Late penalties apply to all group members.

Lectures - Lectures will be presented live at the designated lecture times. Slides will be available on OnQ before lectures.

Absences and missing assignments:

Please refer to the Step-by-step procedures for Academic Accommodations and Considerations document on the Course Home page.

Quizzes and **tests** have to be conducted during the window provided unless you have an approved academic consideration.

If you miss a test (midterm or final exam) you must apply for academic consideration to be eligible to write the deferred test at a later date. If you are also unable to write a deferred midterm, the weight of the test will be transferred to the final exam. Deferred tests may not follow the same structure as the original test, and may consist of more short answer questions.

Tutorials

If you are unable to attend your scheduled tutorial, you will need to submit a request for academic consideration through the Faculty of Arts and Science portal. You will then need to submit your FAS approved consideration request to the courses consideration system (see blue button on the top right side of the course onQ home page) within 4 days of the missed tutorial. Once we receive your FAS approved consideration request, a member of the teaching team will send you the materials necessary to complete the tutorial independently. Missed assignments will be due 1 week following the respective tutorial section. If you were unable to submit your academic consideration within 4 days, or for academic considerations of 4 days or longer, please email biol206@queensu.ca.

Grading

All components of this course will receive numerical percentage marks. The final grade you receive for the course will be derived by converting your numerical course average to a letter grade

according to Queen's Official Grade Conversion Scale:

Queen's Official Grade Conversion Scale

Grade	Numerical Course Average (Range)
A+	90-100
A	85-89
A-	80-84
B+	77-79
B	73-76
B-	70-72
C+	67-69
C	63-66
C-	60-62
D+	57-59
D	53-56
D-	50-52
F	49 and below

Contacting the Teaching Team

The teaching team contact information is located on the Homepage of the course (see "Teaching Team"). We prefer that students use the course email and forums rather than contacting instructors directly.

For general questions about the course, please post to the Course Questions Forum, (located under Help in the navigation bar). For questions about course content (lectures, quizzes, etc) please post to the Course Content Forum (located in the Communications tab). Feel free to help answer your peers' questions on these forums. Most questions are answered within 24 hours (Monday - Friday).

Please use your Queen's email for inquires that are more personal in nature, or for issues such as academic accommodations or marking. If you need to have a more detailed conversation, please contact your instructor.

Etiquette

You are expected to maintain respect in your dealings with fellow students and the teaching team

in any course. The following guidelines are a reference to guide your online communication in this course.

1. Make a personal commitment to learn about, understand, and support your peers.

2. Give others the benefit of the doubt.

3. Ensure your writing is respectful and inclusive.

4. Recognize and value the experiences, abilities, and knowledge that each person brings.

5. Carefully re-read your writing before posting or sending to others.

6. It's okay to disagree with ideas, but personal attacks will not be tolerated.

Queen's Email

The university communicates with students via Queen's email. Please check your email regularly to ensure you do not miss important information related to your course. Be sure to sign up for Announcements as well, as important information (e.g. readings, canceled lectures) will be communicated this way.

Copyright

Course materials created by the course instructor, including all slides, presentations, handouts, tests, exams, and other course materials are the intellectual property of the instructor. It is a departure from academic integrity to distribute, publicly post, sell, or otherwise disseminate an instructor's course materials or to provide an instructor's course materials to anyone else for distribution, posting, sale, or other means of dissemination, without the instructor's consent. A student who engages in such conduct may be subject to penalty for a departure from academic integrity and may also face legal consequences for infringement of intellectual property rights.

Accessibility/Accommodations

Queen's University is committed to achieving full accessibility for all students. Part of this commitment includes arranging academic accommodations for students with disabilities to ensure they have an equitable opportunity to participate in all of their academic activities. The Senate Policy for Accommodations for Students with Disabilities was approved at Senate in November 2016.

If you are a student with a disability and think you may need academic accommodations, you are strongly encouraged to contact the Queen's Student Accessibility Services (QSAS) and register as

early as possible. For more information, including important deadlines, please visit the QSAS website (click here).

To register your academic accommodation for this course, please select the Accommodations button on the course homepage and follow the instructions.

Note that principles of universal design have been built into the quizzes and tutorial assignments so extra time will not be provided and no extensions will be granted. Individual extra time accommodations will be applied to the midterm tests and final exam.

Academic Considerations for Students in Extenuating Circumstances

Queen's University is committed to providing academic consideration to students experiencing extenuating circumstances that are beyond their control and are interfering with their ability to complete academic requirements related to a course for a short period of time. Click here to view the Senate Policy on Academic Consideration for Students in Extenuating Circumstances.

Please see the Academic Consideration Requests button on the course homepage to apply for an academic consideration in this course. Note that you will be taken to the student request portal where you will be required to provide the name and email address of the instructor/coordinator. For this course, please be sure to use the following email address: biol206@queensu.ca.

For more information about missing an assessment, please refer to the section "Assessments and Activities Description".

Academic Integrity

Academic integrity is constituted by the six core fundamental values of honesty, trust, fairness, respect, responsibility, and courage.

Students are responsible for familiarizing themselves with the regulations concerning academic integrity and for ensuring that their assignments conform to the principles of academic integrity. Information on academic integrity is available in the Arts and Science Calendar (see Academic Regulation 1), on the Arts and Science website, and from the instructor of this course.

Departures from academic integrity include plagiarism, use of unauthorized materials, facilitation, forgery and falsi cation, and are antithetical to the development of an academic community at Queen's. Given the seriousness of these matters, actions which contravene the regulation on academic integrity carry sanctions that can range from a warning or the loss of grades on an assignment to the failure of a course to a requirement to withdraw from the university.