

Genetics, Behaviour & Evolution

Course #: 4S03

Time: Thursdays, 9:30am-12:20pm

Location: PC 204

Instructor: Paul Andrews

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Office Hour: Arranged on an individual basis, PC313

TA: Olivia Jon

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Office Hours: Arranged on an individual basis

TA: Nadia Wong

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Office Hour: Arranged on an individual basis

The course website is accessible via Avenue to Learn: <http://avenue.mcmaster.ca>

Course Description and Objectives

The organizing theme of the course involves understanding how to use genetic evidence to test for signs of selection and adaptation, with particular focus on applying to the study of psychology and behaviour. Examples will involve both human and non-human animals. The course will be a seminar with a combination of lecture and readings. Some mathematics is involved in the class, but nothing beyond basic algebra.

Communication Policy

E-mail communications must originate from your designated McMaster e-mail account (i.e. mcmaster.ca account). Should we need to communicate with you about individual matters, the email will be sent to your mcmaster.ca account. You should monitor this account regularly. Email sent from third-party providers (yahoo, hotmail, cogeco, sympatico, etc.) will not be received. We have this policy for three reasons: 1. Reduce the amount of incoming spam to our accounts; 2. Ensure that we know with whom we are communicating; 3. Teach the professional use of e-mail. Please note that instructors cannot return long distance telephone calls. Please consider that email is a formal means of communication. You are expected to address your emails to the instructor formally, use coherent complete sentences, and should be signed with your name and student number.

Grading Policy

Grades will be determined by attendance (5%), six pop quizzes (30%), a midterm exam (30%) and a final exam (35%).

Attendance

Students are expected to attend every class. Because the course meets once a week for 3 hours, missing one course is like missing three one hour lectures in a traditional course. Five percent of the final grade will be based on attendance. Students who attend every class will receive the full five percent. Attendance can be taken any time during class.

Quizzes

The purpose of the quizzes is to ensure that students review their notes from the preceding week, learning information that will be important for the rest of the course and the exams. Consequently, the quizzes will focus on the lectures from the preceding week. However, the instructors may also ask questions on the reading material for the current week. There will be no makeups for missed quizzes. In general, missed quizzes will receive a score of zero. However, at the instructors' discretion (usually based on a Very Good Excuse), the value of the final exam may be increased by the amount of the missed quiz.

Midterm

The midterm will cover all the material discussed in lecture up to that time. Normally, a missed midterm will receive a score of zero. However, at the instructors' discretion (usually based on a Very Good Excuse), the value of the final exam may be increased by the amount of the missed midterm.

Final Exam

The final exam will cover all the material discussed in lecture over the entire term.

Final grade

Students will be assigned a grade from the McMaster University Grading Scale based on an overall assessment by the professor on the work submitted. To pass the course, the student will achieve a passing grade on all graded portions of the course (including attendance). Grades will be computed out of 100 points and converted to a letter grade as follows:

90-100 = A+

85-89 = A

80-84 = A-

77-79 = B+

73-76 = B

70-72 = B-

67-69 = C+

63-66 = C

60-62 = C-

57-59 = D+

53-56 = D

50-52 = D-

< 50 = F

However, the instructors reserve the right to adjust final marks up or down, on an individual basis, in the light of special circumstances and/or the individual total performance in the course. The instructors also reserve the right to adjust the final marks of the entire class based on the overall performance of the class (i.e., we reserve the right to assign grades based on a 'curve').

Missed Work Policy

If you are absent from the university for a temporary medical issue (e.g., the flu), lasting fewer than 5 days, you may report your absence using the McMaster Student Absence Form (MSAF): <https://pinjap01.mcmaster.ca/msaf/>. Absences for a longer duration or for other reasons must be reported to your Faculty/Program office, with documentation. When using the MSAF,

report your absence to pandrews@mcmaster.ca. You must be in contact with the instructor within 5 business days.

Readings

Readings will be posted on Avenue. Readings are designed to introduce or supplement material that will be presented in class. However, they are not a replacement for material presented in class. We will provide you with full references for papers available at the McMaster libraries. You will be expected to obtain these papers from Avenue and read them before the next class.

Other

The professor reserves the right to change any and all course requirements if the need should arise. Any change in the course requirements will be posted on Avenue and the details will be announced in class. Any concerns about announced changes should be addressed with the professor as soon as the changes are announced.

Academic Integrity

Students are expected to be familiar with McMaster's policies on academic integrity as found in the Senate Policy Statements distributed at registration and available in the Senate Office (see <http://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicIntegrity.pdf>). Any student who infringes one of these resolutions will be treated according to the published policy.

Any instance of plagiarism will be dealt with in the most severe terms allowable by the Senate Policy on such matters.

Policy Regarding Video or Audio Recording the Lectures

You may not record lectures without prior permission from the instructor. You also may not post any recordings of any lecture on the internet.

Some of the Course Topics

1. Basic concepts
 - a. History
 - b. Neo-Darwinian synthesis
 - c. Evolutionary forces
 - d. Meiosis
 - e. DNA structure and replication
 - f. Transcription and translation
2. The Hardy-Weinberg Principle
3. Heritability, selection and population size
4. Neutral evolution theory
5. Molecular signatures of selection
 - a. Selection on honey bees
 - b. Selection on pain mechanisms
6. The genetics of sexual selection
 - a. Genetics of female choice in *Drosophila*

- b. MHC and selection for genetic dissimilarity
 - c. Selection against harmful mutations
- 7. Mutation-selection balance
- 8. Epigenetics
- 9. Maternal-fetal conflict
- 10. Epistasis