

BIOL3007W: EVOLUTION

Lecturer: TBA

Location: TBA

Wednesday: Lectures/Practicals/Excursions - TBA

Office Hours – TBA

Course Webpage: Blackboard

AIMS OF THE COURSE

"*Nothing in Biology Makes Sense Except in the Light of Evolution*". Evolutionary theory and methods are essential in all branches of modern biology. This course will provide a broad overview of current evolutionary thought, including the mechanisms of evolutionary change, adaptation and the history of life, and will involve lectures and associated practicals.

GRADING POLICY

The course will follow a mixed format, with lectures accompanied by practicals, excursions and guest speakers illustrating real-world applications of evolutionary thinking. Questions from guest lectures will be included on the final exam. Students will be required to complete lab reports associated with each of the three practicals (30%), which are to be handed in a maximum of one week after the practical takes place. **Late assignments cannot be accepted**, providing a strong incentive to meet submission deadlines!

BIOL3007W is classified as a writing-intensive course, and students will complete a 5-page single-spaced typewritten essay (12ppt) illustrating the practical application of evolutionary principles outside the classroom, as their major project for the semester. These essays are expected to be based on independent research, and should reference a **minimum of 8 papers** from the primary literature in describing the advantages and limitations of an evolutionary approach to the topic of interest – a list of suggested topics accompanies the course syllabus. The creative use of figures/tables is welcome as supplementary appendices to the main document. A one-page paper proposal (10%) will be submitted outlining the major components of the term paper, and following its approval, a first draft of the paper will be submitted for review. Paper drafts will be peer-reviewed as part of an in-class assignment, and revisions based on comments/suggestions will be submitted as a second draft (10%). Following a second round of review and revision, the final version of your essay will comprise **20%** of your final grade. **Late essays cannot be accepted**. All essay drafts will be submitted via Safeassign, and any instances of plagiarism in the final draft will be reported as academic misconduct and result in a failing grade for the assignment. See <http://brooklyn-wac.org/wp-content/uploads/2012/04/Avoiding-Plagiarism.pdf> for the appropriate use of citations in a scientific paper.

Course participation is worth **10%** of your final grade, and includes both pre-class quizzes, in-class participation and contributions to the course discussion group, hosted on Blackboard. Discussion group contributions can include responses to the questions of fellow students, personal reflections on course materials, and/or links to supplementary readings of relevance to the course. All students are encouraged to actively participate in online discussions, and to use this forum to explore topics they may have found particularly interesting and/or challenging during lectures. The instructor will regularly monitor discussions and offer feedback as needed.

A two-hour exam during the final week of the course will be used to evaluate students' understanding of evolutionary theory, and their ability to synthesize material covered in the course lectures (**20%**). This exam will consist of 2-3 essay questions, and students will be permitted to refer to course materials in the preparation of their answers. Laptops and/or other electronic devices are not permitted for the final exam.

ATTENDANCE

Classroom participation is a key component of the course, and attendance is mandatory at all class meetings. Attendance and lateness will be recorded in every class – each unexcused absence will be penalized by a 1% deduction from your overall grade, and each late arrival will be penalized by 0.5%; it is possible to receive a failing grade in the course due to these penalties. Absences can be excused for religious observances if notification is provided at least a week ahead of time, but students are responsible to complete all activities, and to contact colleagues for information on material they may have missed. A note from Student Health Services is required for all health-related absences.

STUDY TIPS

BIOL3007W is based around *Evolutionary Analysis* (5th edition), a textbook by Freeman and Herron. A copy of this textbook is available in the library, and personal copies can be purchased online (MSRP: \$112). Each lecture will be based on a chapter of the text, which will be a valuable resource for exploring topics covered in class. Students are strongly encouraged to read the relevant chapter and supplementary reading(s) before each lecture. Lecture notes and suggested background readings will be posted on the Course homepage and may be accompanied by web material including online exercises and activities (http://wps.aw.com/bc_freeman_evol_5/239/61342/15703573.cw/-/t/index.html).

BIOL3007W – PRELIMINARY SCHEDULE					
WEEK	DATE	LECTURES (Ingersoll 3413N)	TEXTBOOK	TERM PAPER	PRACTICAL / GUEST (Location)
1		LECTURE 1: The Pattern of Evolution	Chapter 2		
2		LECTURE 2: Natural Selection	Chapter 3	Preliminary Research Due	Library Research (Mariana Regalado, Library 122L)
3		LECTURE 3: Sexual Selection	Chapter 11		
4		LECTURE 4: Molecular Population Genetics	Chapter 6	Proposal Due	PRACTICAL (Library 383)
5		LECTURE 5: Mutation/Genetic Drift	Chapter 7		
6		LECTURE 6: Heritability/Quantitative Genetics	Chapter 9		
7					<i>Excursion: NYC Forensic Lab</i>
8		LECTURE 7: Speciation/Hybridization	Chapter 16	First Draft Due	PRACTICAL: Peer Review
9					<i>Excursion: Prospect Park Zoo</i>
		Spring Recess: No Class			
		Conversion Day (Friday Schedule): No Class			
10					<i>Excursion: NYC Public Health Lab</i>
11		LECTURE 8: Phylogenetics	Chapter 4	Second Draft Due	PRACTICAL (Library 383)
12		LECTURE 9: Human Evolution	Chapter 20		
13					<i>Excursion: NY Genome Center</i>
14		LECTURE 10: Macroevolution	Chapter 18	Final Draft Due	
		FINAL EXAM (1-3pm)			

BIOL3007W – GOALS AND OBJECTIVES	
CORE BIOLOGICAL KNOWLEDGE	
Cellular and Molecular Biology	<ul style="list-style-type: none"> • Describe how differential gene expression regulates aspects of animal development
Genetics	<ul style="list-style-type: none"> • Demonstrate an understanding of Mendelian genetics • Demonstrate an understanding of pedigree analysis • Distinguish between autosomal inheritance and sex-chromosome linked inheritance
Evolution	<ul style="list-style-type: none"> • Describe the key components of natural selection • Explain how natural selection has contributed to evolution and diversity of life forms • Describe the agreement between molecular, genetic and organismal-based theories of evolution • Demonstrate familiarity with evolutionary mechanisms • Describe evidence from microevolution that supports the theory of evolution • Describe evidence from macroevolution that supports the theory of evolution
Organisms and Ecology	<ul style="list-style-type: none"> • Describe diversity, body plans and evolutionary relationships among animals • Describe major biotic and abiotic factors that determine the distribution of plants and animals • Demonstrate an understanding of population genetics and demography • Define the major types of intra- and interspecific interactions
PRACTICAL COMPETENCIES	
	<ul style="list-style-type: none"> • Independently investigate biological phenomena using the scientific method • Develop familiarity with laboratory and research procedures by formulating hypotheses, reading the scientific literature, designing and executing experiments and preparing results in tabular / graphical form • Communicate scientific results in written form
PROFESSIONAL DEVELOPMENT / ETHICS	
	<ul style="list-style-type: none"> • Adhere to the highest professional standards of the scientific community • Evaluate important technological advances and discoveries with respect to their impact on society and the environment