

Syllabus, BISC 583, Spring 2016

Evolution & Adaptation of Marine Organisms

Course overview

BISC 583 is a 4-unit course covering fundamentals of evolutionary patterns and processes in the marine environment, with emphasis on rates of adaptation to a changing ocean. It is primarily intended for first-year students in the Marine Biology and Biological Oceanography (MBBO) Graduate Program. Prerequisites are admission to the MBBO program or permission from the instructors.

Course objectives

This is the second core course in the MBBO program and serves as preparation for a portion of the First Year Screening Exam. Students will gain background in the essentials of evolution and adaptation in marine microbes and metazoans. They will also gain experience in critiquing the current literature through both oral and written presentations.

Faculty

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Format

The course will meet in AHF 205 from 9:30 to 10:50 am on Tuesdays and Thursdays, with Tuesdays largely devoted to faculty lectures and Thursdays largely devoted to student-led discussions of primary literature. Course content will be posted on Blackboard (<https://blackboard.usc.edu/>).

Textbooks

Barton et al. 2007. Evolution. Cold Spring Harbor Press. ISBN-13: 9780879696849

Grading

Letter grades will be based on student-led discussions (10%), three writing assignments (15% each), a final examination (40%) and overall participation (5%).

Student-led discussions: Students will alternate leading discussions of journal papers throughout the semester. All students should come to class prepared to lead, and the leader will be chosen in class. For each article students should be prepared to (1) state the central question or hypothesis of the article, (2) explain the main conclusion(s), (3) review key evidence supporting the conclusion(s), and (4) provide specific questions for general group discussion.

Writing assignments: Each student will write three reviews of journal articles presented in class, as if the articles were manuscripts being submitted for publication. Reviews should be brief (~3 pages) and should follow guidelines discussed in class. The three papers are due on Feb 16, Mar 29, and May 4, respectively; no late papers will be accepted.

Final examination: The final exam will be comprehensive and will include a combination of short answer questions, calculations and essay questions. The format is intended to be a preview of the kinds of questions that will be asked in the Screening Exam.

Overall participation: Participation scores are determined by the frequency of contributions to class discussions.

Statement for Students with Disabilities

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me (or to TA) as early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m.–5:00 p.m., Monday through Friday. The phone number for DSP is (213) 740-0776.

Statement on Academic Integrity

USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one’s own academic work from misuse by others as well as to avoid using another’s work as one’s own. All students are expected to understand and abide by these principles. Scampus, the Student Guidebook, contains the Student Conduct Code in Section 11.00, while the recommended sanctions are located in Appendix A:

<http://www.usc.edu/dept/publications/SCAMPUS/gov/>. Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review, should there be any suspicion of academic dishonesty. The Review process can be found at: <http://www.usc.edu/student-affairs/SJACS/>.

Schedule:

Meetings	Subject	Instructor(s)
	<i>Evolutionary Processes</i>	
T Jan 12	Introduction to Population Genetics and Sources of	Edmands
Th Jan 14	Variability Barton et al. ch. 1, pp. 9-36 (<i>The History of Evolutionary Biology</i>), ch. 12, pp. 325-352 (<i>Generation of Variation</i>) and ch. 13, pp. 355-379 (<i>Variation in DNA and Proteins</i>) Journal readings TBA	
T Jan 19	Genetics of Complex Traits	Edmands
Th Jan 21	Barton et al. ch. 14, pp. 381- 412 (<i>Variation in Genetically Complex Traits</i>) Journal readings TBA	
T Jan 26	Genetic Drift and Population Structure	Edmands
Th Jan 28	Barton et al. ch. 15, pp. 413-437 (<i>Random Genetic Drift</i>) and ch.16, pp. 439- 455 (<i>Population Structure</i>) Journal readings TBA	
T Feb 2	Natural Selection I	Edmands
Th Feb 4	Barton et al. ch 17, pp. 457-487 (<i>Selection on Variation</i>) and ch. 18, pp. 489- 519 (<i>The Interaction between Selection and Other Forces</i>) Journal readings TBA	
T Feb 9	Natural Selection II and Speciation	Edmands
Th Feb 11	Barton et al. ch. 18 (above) and ch. 22, pp. 619-655 (<i>Species and Speciation</i>)	

Journal readings TBA

Evolutionary Patterns

T Feb 16	Origin of Life	Heidelberg
Th Feb 18	Barton et al. ch. 4, pp. 87-108 (<i>Origin of Life</i>) Journal readings TBA	
T Feb 23	Tree of Life	Heidelberg
Th Feb 25	Barton et al. ch. 5, pp. 109-136 (<i>The Last Universal Common Ancestor and the Tree of Life</i>) Journal readings TBA	
T Mar 1	Bacteria/Archaea	Heidelberg
Th Mar 3	Barton et al. ch. 6 and 7, pp. 137-193 (<i>Diversification of Bacteria and Archaea I: Phylogeny and Biology and II: Genetics and Genomics</i>) Journal readings TBA	
T Mar 8	Eukaryotes/Multicellularity	Gracey
Th Mar 10	Barton et al. ch. 8, pp. 195-224 (<i>The Origin and Diversification of Eukaryotes</i>) and ch. 9, pp. 225-251 (<i>Multicellularity and Development</i>) Journal readings TBA	

Mar 14-18 Spring Recess

T Mar 22	Evo/Devo	Gracey
Th Mar 24	Barton et al. ch. 11, pp. 287-321 (<i>Evolution of Developmental Programs</i>) Journal readings TBA	

Selective Agents

T Mar 29	Temperature & Pressure	Gracey/
Th Mar 31	Journal readings TBA	Heidelberg
T Apr 5	Temperature & Pressure	Gracey/
Th Apr 7	Journal readings TBA	Heidelberg
T Apr 12	Homeostasis	Gracey/
Th Apr 14	Journal readings TBA	Heidelberg
T Apr 19	Water & Nutrients	Gracey/
Th Apr 21	Journal readings TBA	Heidelberg
T Apr 26	Atmospheric gases	Gracey/
Th Apr 28	Journal Readings TBA	Heidelberg

Final Exam: Tuesday May 10 2016, 8-10am