(BIOL 314) Biodiversity of the Galapagos Spring-Summer 2013

Instructors

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Course Schedule

March 27- May 1 meet on Wednesdays 2:30-3:45, ISC 137
May 21-June 2 Galapagos Islands
June 3-June 28 Stateside- Work on research report, final exam

Course Description

This course will introduce students to the diverse range of aquatic and terrestrial species and ecosystems found in the Galapagos Islands, Ecuador. We will survey the many unique plant and animal species of the Galapagos and study their ecological and evolutionary relationships. In addition, a historical approach to the foundations of natural selection will be emphasized in class and field activities. This three-credit course will run for the second half of the spring semester 2013 and over Summer Session I, from May 20 to June 28 that will include a 10-day trip to the Galapagos and mainland Ecuador. Pre-departure classes will be held to acquaint students with the biodiversity of the islands and the ecological and evolutionary processes that contributed to this diversity. Prerequisites: BIOL 117 and BIOL 119. Credits: 3 (2-3)

Readings: The required textbook is "Wildlife of the Galapagos" by Fritter and colleagues, Princeton University Press, 2000 ($19.95). The instructors will also assign readings from the scientific literature.

Learning Outcomes:

At the end of this course students will be able to

- Discuss the concept of biodiversity and the ways in which biodiversity is important to the structure and function of ecological systems, and to human health and society
- Describe the ways in which geologic history, biogeography and natural selection have played a role as determinants of biodiversity in the Galapagos Island system
- Identify the roles of biotic and abiotic forces as agents of evolution by natural selection and explain how these forces have shaped the evolutionary history of the Galapagos
- Discuss the ways in which human activities influence the biodiversity of the Galapagos, and evaluate potential strategies for management and mitigation of such problems
- Compile, select and synthesize current knowledge of a particular problem affecting the ecology or biodiversity of the Galapagos and give an oral presentation on this topic
- Develop an observational project to test a hypothesis, collect appropriate data while in the field, and submit a report on the major results and conclusions of the study

Presentations: Students working in pairs or individually are responsible for giving a 12-15 min presentation on a topic centered on the diversity of the Galapagos.

Discussion: Students working in pairs or groups of three will lead a class discussion of an assigned scientific paper.

Research Project: Students will formulate a hypothesis, develop a research plan and test the hypothesis by collecting data while in the Galapagos. The results of the study will be compiled in a science journal-style report to be submitted by 5 PM Friday, June 14.

Final Exam: Over the penultimate week of the course students will be asked to complete a final take-home exam consisting of several essay type questions on ecology and evolution (due 5 PM Friday, June 28).

Participation: includes preparation for class and field activities, enthusiasm for the course, and cooperation with instructors and classmates in executing planned activities and attaining goals established for the class.

Total Score	Grade Scheme
93-100 %	A
89 - 93	A-
86 - 89	B+
82 - 86	B
79 - 82	B-
76 - 79	C+
71 - 76	C
66 - 71	C-
61 - 66	D
< 61	E

Assignments and Grading	Due Dates	Pts
Lead Discussion	April TBD	5
Research Project/ Report	June 14 5 PM	25
Participation in Class		5
Participation in Field		20
Research Presentation	In the Galapagos	25
Final Exam	June 28 5 PM	20

Readings from Science Literature

1. Losos, J.B., and R.E. Ricklefs. Adaptation and Diversification on Islands. 2009. *Nature* vol 457, pp: 830-835
2. Grant, P.E. and B.R. Grant. 2006. Evolution of Character Displacement in Darwin's Finches. *Science* vol 313, pp: 224-226
3. Caccone, A., et al. 2002. Phylogeography and History of Giant Galapagos Tortoises. *Evolution*, vol 56: 2052-2066
4. Hata, H., and M. Kato. 2006. A novel obligate cultivation mutualism between damselfish and Polysiphonia algae. *Biol. Lett.* vol 2 pp 593-596
5. Sonnenholzner, J.I. et al. 2009. Cascading effects of fishing on Galapagos reef communities: reanalysis using corrected data. *Marine Ecology Progress Series* vol 375 pp: 209-218
6. Wikelski, M. 2005. Evolution of body size in Galapagos marine iguana. *Proceedings of the Royal Society B.* vol 272 pp 1985-1993
7. Wolf, Mawdsley, Trillmach, and James. 2007. Social structure in a colonial mammal: unravelling hidden structural layers and their foundations by network analysis. *Animal Behaviour* vol 74: 1293-1302.