SEMESTER AT SEA COURSE SYLLABUS

Voyage: Spring 2014
Discipline: Biology
BIOL 1559-103: Evolution
Division: Lower
Faculty Name: Jon Kastendiek

Pre-requisites: None

COURSE DESCRIPTION:

This course is designed to provide the student with an understanding of evolutionary biology, the unifying context for the understanding of all other biological and medical sciences. The course will present the evidence that living species are the result of evolutionary processes. The course will also discuss the mechanisms of evolutionary change (natural selection, genetic drift, etc.) as they are occurring today. Other topics will include the nature and philosophy of science, the relationship between adaptation and natural selection, the origin of new traits, and the mechanisms that result in new species. The course will also examine the nature of the fossil record, the causes of ancient and modern extinctions and the implications for conservation of modern species. Finally, the history of evolutionary thought and societal responses to it will be discussed.

COURSE OBJECTIVES:

1. To teach students basic principles of evolutionary biology.
2. To have students understand the philosophy and methods of science
3. To demonstrate the role of new scientific technologies in furthering our understanding of evolution
4. To address the misunderstandings the general public has about evolutionary science

REQUIRED TEXTBOOKS:

AUTHOR: Hall, Brian K.
TITLE: Evolution: principle and processes
PUBLISHER: Jones and Bartlett
ISBN #: 9780763760397
DATE/EDITION: 2011/ 1st

TOPICAL OUTLINE OF COURSE

A1- January 12: Introduction to evolution and the nature of science. Reading: Chapter 1 of text

A2- January 14: Evidence for change in time. Reading: Chapter 1 of text

January 20-21: Hilo

A3- January 16: Evidence for common descent. Reading: Chapter 2 of text

January 17: Hilo

A4- January 19: "Darwinism" pt 1. Reading: Chapter 6 of text

A5- January 22: "Darwinism" pt 2. Reading: Chapter 6 of text**.**

A6- January 25: Natural selection. Reading: Chapter 15 of text.

A7- January 27: First Exam

January 29-February 3 Yokohama-Kobe

A8- February 4: Nature of inheritance. Reading: Chapter 12 of text.

February 6-11: Shanghai-Hong Kong

A9- February 12: Maintenance of genetic variability. Reading: Chapter 13 of text.

February 14-19: Ho Chi Minh City

A10- February 20: Evolution of populations. Reading: Chapter 14 of text

February 22-23: Singapore

A11- February 24: Adaptation. Reading: Chapter 14 of text. Research paper assigned.

February 27 March 4: Rangoon

A12- March 5: Sexual selection pt 1. Reading: Chapter 15 of text

A13- March 7: Sexual selection pt 2. Reading: Chapter 15 of text

March 9-14: Cochin

A14- March 15: Kin selection. Reading: Chapter 15 of text

A15- March 18: Evolution of social behaviors**.** Chapter 15 of text

A16- March 20: Second exam

March 21: Port Louis

A17- March 23: History of life. Reading: Chapter 16 of text

A18- March 26: Speciation 1. Reading: Chapter 17 of text

March 28-April 2: Cape Town

A19- April 3: Speciation 2. Reading: Chapter 17 of text

A20- April 5: Human evolution 1. Reading: Chapter 19 of text.

April 10-14: Takoradi-Tema

A21- April 8: Human evolution 2. Reading: Chapter 19 of text. Research paper due.

A22- April 15: Evolution and human health 1. Reading: Chapter 21 of text

A23- April 17: Evolution and human health 2 Reading: Chapter 21 of text

A24- April 20: Evolution the societal issue. Reading: Chapter 21 of text

April 23-27: Casablanca

A25- April 28: A Day Final

May 2: Arrive in Southampton

FIELD WORK

FIELD LAB (*At least 20 percent of the contact hours for each course, to be led by the instructor.*)

The purpose of the field assignment is to reinforce course topics discussed in class and to allow students to have a personal experience of the evidence for evolution. The basic goals of the field assignments are to (1) generate testable hypotheses about evolutionary processes, (2) observe first-hand structural or behavioral adaptations exhibited by living or fossil organisms, (3) appreciate the diversity of life.

Field lab: Day at Singapore Zoo and Botanical Garden

Students will tour the zoo and gardens and observe and discuss the adaptations exhibited by plants and animals from various habitats. The students will discuss concepts of convergence and adaptive radiation among groups of plants and animals. Students will discuss plant-animal interactions and their role in evolution. The students will also pose evolutionary questions arising from what we see.

Academic Objectives:

1. Relate evolutionary concepts described in lecture to living organisms.
2. Discovery the diversity of organisms arising from evolutionary processes.
3. Learn to pose scientific hypotheses concerning evolutionary processes.

FIELD ASSIGNMENTS

Students will prepare field reports (logs) after the field lab that to integrate classroom materials and field experiences as well as questions that come to mind. Students will be evaluated on the degree to which they relate their own observations and experiences to material discussed in the classroom.

METHODS OF EVALUATION / GRADING RUBRIC

Grading in this course will be based upon performance on 2 midterms (100 pts each) and final (100 pts) exams, a research paper (100 pts) and a field notebook (100 pts). The research paper is an exercise to demonstrate how evolutionary science is performed. The task will be for the student to pick an apparent adaptation exhibited by a plant or animal observed on the trip and to describe how it was determined scientifically that it was indeed an adaptation.

RESERVE LIBRARY LIST

None needed

ELECTRONIC COURSE MATERIALS

None needed

ADDITIONAL RESOURCES

None needed

HONOR CODE

Semester at Sea students enroll in an academic program administered by the University of Virginia, and thus bind themselves to the University's honor code. The code prohibits all acts of lying, cheating, and stealing. Please consult the Voyager's Handbook for further explanation of what constitutes an honor offense.

Each written assignment for this course must be pledged by the student as follows: "On my honor as a student, I pledge that I have neither given nor received aid on this assignment." The pledge must be signed, or, in the case of an electronic file, signed "[signed]."