

SEMESTER AT SEA COURSE SYLLABUS

Voyage: Spring 2013

Discipline: Biology

Course Title: Biology in the New Millennium

Proposed as Upper or Lower Division: Lower Division

Faculty Name: Reginald H. Garrett

Pre-requisites: none

Course Description

Biology in the New Millennium is designed to familiarize non-scientists with the dramatic developments taking place in biology. These scientific advances are already impacting our lives in surprising ways, and the influence of biology on contemporary life will continue to increase with each passing year. It is important that citizens understand the science behind these developments and their potential for changing the trajectory of everyday experience, influencing cultural norms, and modifying societal values. This course will cover emerging paradigms in the biological sciences and medicine, conveying the material at a level where students not trained in science can grasp the essential truths and consider the intellectual and ethical implications.

Course Objectives

The difficulty faced by the general public in attempting to comprehend and appreciate science and its implications can too often be traced to the failure of scientists to communicate the significance of their work. It is essential to properly inform the citizenry about emerging scientific discoveries and the principles that underlie them, and, by this information, strengthen the interface between science and society. The principal objective is that students will leave the course with enough knowledge and awareness to understand the implications of new biological and medical developments.

Materials

There is no textbook covering the gamut of topics described in the course syllabus. In place of a textbook, scientific articles written for the general public will be provided in the course folder as readings for each of the lectures. Students will be provided with this material prior to lecture and are expected to read it beforehand.

Syllabus Biology in the New Millennium

Lecture

01	Some fundamentals: DNA → RNA → protein
02	The Human Genome Project
03	Human evolution – who are we, where did we come from
04	Cloning
05	QUIZ 01
06	Genetically modified organisms (GMOs) - plants
07	Genetically modified organisms (GMOs) - animals
08	Biological solutions to the energy crisis
09	The obesity epidemic
10	QUIZ 02
11	Cancer
12	Viral diseases – AIDS, SARS, Ebola
13	Influenza and the H5N1 controversy
14	Malaria
15	QUIZ 03
16	Nitrogen fixation and the strange life of Fritz Haber
17	The consequences of climate change: Rain forest dynamics
18	The consequences of climate change: Coral reef dynamics
19	Synthetic life
20	QUIZ 04
21	Neurobiology and behavior
22	Neurodegenerative diseases and aging
	Final Exam

Field Work

Field Lab - The field lab will occur on Wednesday, 20 February. Attendance is mandatory.

The purpose of the field lab will be to explore the concerted efforts of government and industry to advance biomedical research and benefit from its discoveries. We will visit Biopolis, Singapore's internationally renowned biomedical science research center. There we will see firsthand scientific research facilities that are the equal of any in the world, highlighting for the students the advanced state of biomedical research outside the U.S. Biopolis was established to position biomedical research as a major sector of the Singapore economy. It is home to both government and corporate research laboratories. Over 2,000 scientists, researchers, technicians, and administrators are employed there. They have made significant scientific discoveries, earning Biopolis international acclaim. Biopolis seeks to translate research advances into tangible benefits in manufacturing and healthcare delivery. Following our visit, scientists and students from Biopolis will join us aboard the MV Explorer for lectures about significance of their work for Singapore and for society at large, and for informal discussions with the SAS students enrolled in this course.

Field Assignment

The Field Laboratory Report will be a 1,000-word student essay on a scientific research topic related to our field experiences in Singapore. Students must submit their topic for instructor approval before writing the report. The report should provide background information reviewing the status of present knowledge, the particular scientific problem the research aims to solve, and the benefits anticipated from the results of the research.

Evaluation:

Midterm exam: 100 points

Final examination: 100 points

Field Laboratory Report: 50 points

TOTAL: 250 points

The midterm and final exam: Each will consist of 50 multiple-choice questions and a short essay question.

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]."