SEMESTER AT SEA COURSE SYLLABUS

Voyage: Spring 2014
Discipline: Biology
BIOL 1559-101: Biology for the New Millennium
Lower Division
Faculty Name: Reginald H. Garrett

Pre-requisites: None.

Course Description
Biology for 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.

Tentative Syllabus Biology in the New Millennium
Lecture
A1 Introduction: DNA – the molecule
A2 Some fundamentals: DNA → RNA → protein
A3 The Human Genome Project
A4 Human evolution I – who are we, where did we come from
A5 Human evolution II – who are we, where did we come from
A6 Cloning
A7 Genetically modified organisms (GMOs) - plants
A8 Genetically modified organisms (GMOs) - animals
A9 Biological solutions to the energy crisis
A10 The obesity epidemic
A11 Heart disease
A12 Cancer
A13 **MIDTERM**
A14 Viral diseases – AIDS, SARS, Ebola
A15 Influenza and the H5N1 controversy
A16 Malaria
A17 Nitrogen fixation and the strange life of Fritz Haber
A18 The consequences of climate change: Rain forest dynamics
A19 The consequences of climate change: Coral reef dynamics
A20 Synthetic life
A21 DNA for information storage
A22 Student Presentations I
A23 Student Presentations II
A24 Student Presentations III
A25 Final Exam

Field Work
Field Lab - The field lab will occur on Saturday, 22 February. Attendance is mandatory.

The purpose of our field lab is to visit Science Centre Singapore, which is acclaimed as one of the top science centers in the world. Among the exhibitions we will see there are the Bioethics Exhibition, the Genome Exhibition, and the Living with Viruses Exhibition. These exhibitions explore newly emerging biomedical discoveries and raise questions about the social, legal, and ethical implications that accompany such scientific advances. The goal of our class is familiarize non-science students with the remarkable progress made in biological research so that they can make informed decisions that will affect their own lives. Indeed, the subject matter covered Biology in the New Millennium parallels themes featured at the Science Centre Singapore. Thus, our visit there is truly an extension of our classroom.

Field Assignment
The Field Laboratory Report will be a 1,000-word student essay on a scientific research topic related to our Science Centre Singapore tour. 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.

Student Presentation
Each student will be required to present a 10-minute talk on some aspect of contemporary research in biology. Possible topics include regenerative medicine, embryonic stem cells, the biology of learning and memory, cancer chemotherapy, AIDS, SARS, smallpox, etc. The instructor will provide a list of possible topics; students may suggest another topic, subject to instructor approval. Each presentation will be followed by a 5-minute question-and-answer discussion period. Attendance at all student presentations is mandatory. Failure to attend will lead to reduction of a student's grade for their presentation.

Evaluation:
Midterm exam: 100 points (10 short-essay questions)
Student Presentation: 100 points
Field Laboratory Report: 50 points
TOTAL: 250 points
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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]."