Course Number: MCELLBI C44 2-22-13
Biology for Future Voters -Course Description

Description: 486 characters

MCELLBI C44 is a Discovery Course for non-Biology majors designed to introduce lower-division college students to biology through the lens of the contemporary problems facing people, the planet and the species of the planet. Modern genetic contributions will be presented on such issues as genetic engineering of plants and animals, the emergence of new pathogens, the role of genetic variation among individuals, and the extent to which DNA is and isn't destiny. Each week will close with the presentation and discussion of a defining biological challenge facing the world.

Course Number: MCELLBI C44
Course Title: Biology for Future Voters
Grading: Letter or P/NP
Units: 3
Course Format: Two 1 1/2 hours Lec & 1 Hour Dis
Offered: Spring, 2014
Courses that will restrict credit: None
Instructors: Jasper Rine and Fyodor Urnov
Prereqs: None
Repeatable for credit: No
Enrollment restricted: UG
Room and time: Tu Th 8:00- 9:30

Expanded Course Description

Science plays an every increasing role in the decisions of all people as they go about their daily business, and as they select representative leadership in a democracy. Above all, Science is a way of knowing, with knowledge emerging from experimental tests that winnow false ideas from those with predictive value. Biology is unusual among the sciences in that there are few fundamental laws, actually only three that rise to the status of "law" and enormous variation. The Human Genome Project has brought biology to the personal level. All graduates of UC Berkeley can expect to have their genome sequence determined in the coming years and the information in that sequence used for many health-related activities. But the human genome sequence is just the beginning of a technological revolution that is remaking Biology, and bringing its impact to many of the pressing problems of our age. How should one think about the controversy surrounding genetically modified organisms, including animals and even human cells? What is a rational reaction to the risks of new

pandemic disease? How does hunger lead to obesity, and how can we address the exploding health care costs that consume 16% of the nation's GDP? These are a subset of the questions addressed in this course. The mathematician Hilbert defined a set of questions whose solution would require fundamental advances in mathematics. Each week we will address on issue from the "Hilbert set for Biology".

The learning objectives are, at one end, to understand what an experiment is, how it is controlled and what does one need to know about an experiment to be able to rely upon any conclusion. That is the fundamental issue in all science, and is frequently overlooked in many media accounts of science.

A second objective is to learn enough of the language of biology to be able to ask the kind of informed questions that we would want all elected representatives to pay attention to.

A third objective is for students to cultivate confidence that through non-specialized information sources that they can become informed consumers of contemporary scientific thought, and to develop those habits of intellect to think about evidence in a scientific manner.

A fourth objective is for students to enjoy the abundance of high quality books, articles and multimedia that will enable a lifetime of discovery outside the structure of a college course.

A fifth objective is for students to understand the art and sociology of modern science. Throughout the course, we will deal with how disagreements among scientists are resolved for that is the essence of how science progresses. But the often overlooked issues of who gets to decide what research is done and on what topics, and how power is exercised in the scientific endeavor, will be the subject of an entire class near the end of the course, when students have learned enough examples which will then be used to illustrate these points.

The course is aimed at those who do not plan on additional college science courses, though we hope that some of the students in the course will subsequently elect to take additional science courses.

Requirements:

The course will have two midterms and a final with multiple choice questions. 20% of the grade will be based on each midterm, 30% on the

final, 10% for performance in section, and 20% for participation in class, as monitored in part by clickers. Attendance will be expected as the course is designed to be highly interactive, with clicker technology used continuously to monitor progress and comprehension. There will be two midterms and a comprehensive final. The midterms will be designed to be multiple choice, graded on a Scantron. In addition, each student will be expected to identify at least one publically accessible resource at a level appropriate to the level of the class for creation of resource file on bspace. Mastery of 70% of the material as judged by the exams will be considered a passing grade.

Out of class work-load expectations are 3 hours of engagement with the assigned material per hour of class. The assigned material is a mix of articles of the New Yorker, Scientific American and NY Times level, as well as selections of the highly relevant Radio Lab, Nova and PBS offerings as described in the week-by-week reading and media listings. On average, one of those hours will be reviewing an audio program or video. These materials are all accessible on the web, so no textbook purchase will be required. Selected reading assignments from freely accessible textbooks on the PubMed web site will be used for relevant background reading. A bspace site has been set up to provide access to additional resources. While no textbook is required, regular access to the internet will be assumed.

Students will be expected to attend one discussion section per week led by a GSI.

Feedback: The clicker technology will provide students instant in-class feedback on their level of understanding. Feedback from students to instructors will be via office hours and through bspace chats.