

# Biology 355 – Science, Ethics, and Society

## Cedar Crest College Fall 2009 Syllabus

Section	Room	Instructor	Office Hours, office, phone, email
01 Mon 2:30 – 4:00 PM	Miller 20	Dr. Audrey Ettinger	Monday, Friday 10:30-12:00 and by appointment ajetting@cedarcrest.edu Science Center 108, x3512
02 Tue 2:30 – 4:00 PM	Miller 20	Dr. Amy Reese	Monday, Thursday 4:00-4:50, Tuesday 1:30-2:20, Wednesday 10:00-10:50 ajreese@cedarcrest.edu Science Center 110, x3517

### Required texts:

*A Feeling for the Organism: The Life and Work of Barbara McClintock* by Evelyn Fox Keller. 10<sup>th</sup> Anniversary Edition (ISBN# 0-8050-7458-9)

*The Cutter Incident: How America's First Polio Vaccine Led to the Growing Vaccine Crisis* by Paul A. Offit. (ISBN# 0-300-10864-8)

### COURSE DESCRIPTION

#### **BIO 355 Science, Ethics and Society 2 credits**

This course provides science majors with an opportunity to form connections between their scientific background and society as a whole. Students will gain an understanding of the role of science in society and the importance of ethics within science. This course is part of the capstone requirement for all majors in the Department of Biological Sciences and is normally taken in the senior year. Prerequisite: BIO 350.

### COURSE THEMES AND OBJECTIVES

This course enters into basic questions that scientists face continuously, from our responsibilities to the human and animal subjects of our research, to the social consequences of our discoveries, to the treatment of individual scientists within the greater scientific community.

**Scientists in Society:** Scientific research takes place within the context of history and our current society. In this section of the course, we will address issues where science and public discourse intersect. We will consider the role of scientists in responsibly conveying science to the public and incorporating modern scientific discoveries into societal practice.

**Women in Science:** Numerous studies have addressed the relatively low numbers of women who have reached the highest echelon of the scientific professions. Despite this methodical approach, the notion that women are less capable of scientific thought is still asserted as an explanation for the data. We will approach this question from a scientific perspective, considering the available data on these issues.

**Ethics in Science:** The scientific community's experience in dealing with ethical issues in research has demonstrated that faculty and students need a forum in which to discuss the ethical issues that may arise in a scientist's career.

Two non-fiction works, a biography of the scientist Barbara McClintock, entitled A Feeling for the Organism, and The Cutter Incident, the history of developing the first polio vaccine, weave together the three themes, and will be read over the course of the semester.

## **COURSE OUTCOMES AND ASSESSMENT**

Upon successful completion of this course, students will:

1. Demonstrate an understanding of the scientist's role within the larger society.  
Assessment: in-class discussions, online discussions, written assignments.
2. Demonstrate an understanding of how individual scientists are treated within the scientific community by interpreting the data regarding women scientists' careers.  
Assessment: in-class discussions, online discussions, written assignments.
3. Demonstrate an understanding of ethical issues in science, their background and the dilemmas they present. Assessment: in-class discussions, online discussions, written assignments.
4. Demonstrate the ability to communicate clearly and effectively, using both oral and written formats and to target communication specifically to either other scientists or to the general public. Assessment: in-class discussions, informal oral presentation, written assignments, peer editing, and online discussions.

## **COURSE SCHEDULE**

The course schedule is subject to change and should be read as a general guideline. Topics may be added or deleted based on student interest. Readings must be completed before class on the date they are listed.

<b>Course Schedule</b>		
<b>Class</b>	<b>Date</b>	<b>Topics / Assignments</b>
<b>UNIT 1: SCIENTISTS IN SOCIETY</b>		
1	M Aug. 24 T Aug. 25	Course introduction
2	M Aug. 31 T Sept. 1	The Collision of Science and Society: Creationism – Why Intelligent Design is Not Science Stem Cells – Who Controls Science? <b>Topic selection for “Conveying Research to the Public” DUE</b> <i>Reading: The Cutter Incident Prologue, Intro, Chapters 1-2 (p. xi-43)</i>
--	M Sept. 7	Labor Day – no Monday class
3	T Sept. 8 M Sept. 14	Science and Scientists Out of Context: James Watson, <i>The Bell Curve</i> , and Racism <i>Reading: The Cutter Incident Chapters 3-4 (p. 44-82)</i>
4	T Sept. 15 M Sept. 21	Animal Use in Scientific Research <b>Draft of “Conveying Research to the Public” DUE</b> <i>Reading: The Cutter Incident Chapters 5-7 (p. 83-153)</i>
5	T Sept. 22 M Sept. 28	Human Subjects Use in Scientific Research <b>Peer Review of “Conveying Research to the Public” DUE</b> <i>Reading: The Cutter Incident Chapters 8-9, Epilogue (p. 154-193)</i>
<b>UNIT 2: WOMEN, SCIENCE, AND ETHICS</b>		
6	T Sept. 29 M Oct. 5	Women in Science: Is there a problem? <b>Draft of Letter assignment DUE; Peer Review in class</b> <i>Reading: A Feeling for the Organism Forward, Preface, Chapters 1-3 (p. xi-61)</i>
7	T Oct. 6 M Oct. 19	Women in Science: Career issues <b>ESSAY 1 DUE</b> <i>Reading: A Feeling for the Organism Chapters 4-6 (p. 63-105)</i>
--	M Oct. 12 T Oct. 13	Fall Break - no class
8	T Oct. 20 M Oct. 26	Women in Science: Families and work-life balance <b>First revision of “Conveying Research to the Public” DUE</b> <i>Reading: A Feeling for the Organism Chapters 7-9 (p. 107-151)</i>
9	T Oct. 27 M Nov. 2	Scientific approaches to gender differences <b>Final version of Letter assignment DUE</b> <i>Reading: A Feeling for the Organism Chapters 10-12 (p. 153-207)</i>

10	T Nov. 3 M Nov. 9	Diversity and Leadership <b>Final version of “Conveying Research to the Public” DUE with 2 drafts, 2 reviews attached</b>
		<b>UNIT 3: SCIENTIFIC ETHICS</b>
11	T Nov 10 M Nov. 16	Authorship and Plagiarism <b>ESSAY 2 DUE</b>
12	T Nov. 17 M Nov. 23	Granting, Funding Disclosures, Industry-Funded Studies
13	T Nov. 24 M Nov. 30	Fabrication of data
14	T Dec. 1 M Dec. 7	Course Conclusions <b>ESSAY 3 DUE</b>
	TO BE SCHEDULED	MAJOR FIELDS ASSESSMENT TEST WILL BE SCHEDULED DURING THE FINAL EXAM PERIOD

### ASSIGNMENTS

**Readings** will be distributed at most class meetings. You are responsible for completing the readings before the next class EVEN IF you are absent from class on a given day. Additional readings may be posted on the class eCompanion site. Readings from the assigned books are listed on the syllabus and should be completed BEFORE class on the date that they are listed.

Additional information about each assignment may be distributed in class.

**Conveying Research to the Public** [10% final document, 5% writing peer review, 5% responding to reviewers’ comments with corrections and submitting both reviews with final draft]

Can you make your research seem interesting and important to a non-scientist, general public reader? This assignment will give you an opportunity to find out. You will write a one page description of your senior research (or, for those not conducting research, on an instructor-approved alternate topic), and then comment on the writing of one of your peers. After you incorporate her input, you will identify an additional, non-scientist reader and ask that individual to comment on your paper. The key to success with this assignment is successful incorporation of both sets of external comments. You might ask a Cedar Crest student or someone in your family. Guidelines for the reviewers will be discussed in class. The best examples of student work may be utilized in departmental or College literature.

**Attendance and participation** [20%]

Because this course is discussion-based, attendance and class participation are crucial. One unexcused absence will be permitted without penalty; any further absences must be documented through the Dean of Student Affairs.

Your class participation will be graded according to the following criteria.

<b>GRADE</b>	<b>CRITERIA</b>
<b>A</b>	<ul style="list-style-type: none"><li>• Demonstrates excellent preparation; shows evidence of having identified and analyzed the key issues raised in the readings.</li><li>• Volunteers contributions to discussions which reflect a systematic effort to utilize the ideas, interpretations and information presented in the readings as an opportunity to raise ideas and questions that go beyond those found in the readings.</li></ul>
<b>B</b>	<ul style="list-style-type: none"><li>• Demonstrates good preparation; shows evidence of having identified and analyzed the key issues raised in the readings.</li><li>• Typically does not volunteer contributions to discussions, but will contribute when called upon; contributions consistently draw upon or reference the ideas, interpretations and information presented in the readings.</li></ul>
<b>C</b>	<ul style="list-style-type: none"><li>• Demonstrates adequate preparation; shows familiarity with the key issues raised in the readings.</li><li>• Typically does not volunteer contributions to discussions, but will contribute when called upon; contributions do not consistently draw upon or reference the ideas, interpretations and information presented in the readings.</li></ul>
<b>D</b>	<ul style="list-style-type: none"><li>• Demonstrates minimal preparation; shows familiarity with few of the key issues raised in the readings.</li><li>• Does not volunteer contributions to discussion and has little to say when called on; contributions do not reference the ideas, interpretations or information presented in the readings.</li></ul>
<b>F</b>	<ul style="list-style-type: none"><li>• Demonstrates little preparation; shows no evidence of having read the material.</li><li>• Does not volunteer contributions to discussion; does not respond when called on.</li></ul>

**Online Discussion** [15%]

An eCompanion site has been established for this course. A discussion board will be used for discussion of A Feeling for the Organism, The Cutter Incident, and for extending in-class discussions on selected topics. Discussions will generally last for one week. Participation in each discussion requires, at a minimum, one “original” posting and one response to a classmate. Topics for discussion and posting deadlines will be announced in class and posted on the site.

**Letter to an elected representative or to the press** [10% for final product, 5% for providing and responding to peer comments]

This assignment is designed to give you an opportunity to write about a science-related issue that interests you, and to make that assignment useful: we expect you to actually submit your letter to the elected representative or to a press source. You will also have the opportunity to act as a peer reviewer. You are strongly encouraged to use this letter to apply for the 2009 Pearson Biology Prize Scholarship (see the eCompanion site for details).

**Oral presentation** [10%]

Each student will give one or two 5-10 minute oral presentation(s) about an article related to one of the course topics. Articles for presentation will either be distributed in class, or students will be asked to identify an appropriate supplementary reading. Your job will be to lead the discussion of the paper by introducing the article, by posing questions to your classmates and by facilitating discussion.

**Essays** [20% - 3 essays total, one per unit]

The essays will provide an opportunity for you to consider your own reaction to the topics discussed in class. Essay 1 will address science and the media, Essay 2 will focus on women in science issues, and Essay 3 will analyze an ethics case study.

**Major Fields Assessment Test (MFAT)**

As part of the ongoing effort in the Department of Biological Sciences to assess student learning, all students enrolled in BIO 355 are required to take the MFAT, which enables comparisons to peer institutions. You do not need to study for this test, but you **MUST** complete it in order to pass this course. The date and time will be scheduled by the Registrar during the final exam period.

The Department appreciates your support of this endeavor; the recent changes in the Principles of Biology labs and the development of the new sophomore core courses are a direct result of student performance on this exam.

## **POLICIES**

### **Grading**

Your grade will be based on the assignments described above. Please take some time to examine the due dates for assignments, which are listed in the table on pages 3-4, and discuss any anticipated conflicts with the instructor well in advance. Unexcused late work, including electronic bulletin board submissions, will be penalized 5% per day. Letter grades will be assigned as follows:

93.0-100% A	90.0-92.9% A-	87.0-89.9% B+	83.0-86.9% B
80.0-82.9% B-	77.0-79.9% C+	73.0-76.9% C	70.0-72.9% C-
67.0-69.9% D+	60.0-66.9% D	less than 60.0% F	

The instructor reserves the right to “curve” grades to your benefit.

### **Honor Code**

We fully support the Cedar Crest College Honor Code and the associated Community Standards for Academic Conduct. We adhere to its positions on Academic Misconduct, Academic Dishonesty or Plagiarism, Classroom Protocol, and Attendance. Students are responsible for reading the current versions of these documents in “A Student’s Guide to Cedar Crest College.”

**Students with documented disabilities** who may need academic accommodations should discuss these needs with their instructor during the first two weeks of class. Students with disabilities who wish to request accommodations should contact the Advising Center.