

Liberal Studies 304

Science in the Modern World

Prof. Craig McConnell • Summer 2007

This course examines the content and culture of the natural sciences in the modern period. Content will include relativity theory, quantum theory, nuclear physics, the standard model in particle physics, advances in astrophysics and cosmology, genetics, the evolutionary synthesis, molecular biology, and work on genome sequences. As these bodies of knowledge are examined, we will also consider the culture of science, individual and collective styles of working in science, the role of the scientist in the culture at large, and the larger cultural and philosophical relevance of scientific knowledge.

In the course of the semester, you will be exposed to the core concepts of modern science, you will be introduced to a number of perspectives from which science can be studied, and you will critically discuss the content and the context of modern science.

Schedule of Topics and Reading Assignments

May 29		Introductions, Course Themes
May 30		Thomas Kuhn and the Structure of Scientific Revolutions
	Read	<input type="checkbox"/> Kuhn I
		<input type="checkbox"/> Kuhn II
		<input type="checkbox"/> Kuhn III-IV
		<input type="checkbox"/> Kuhn V
		_____ Hazen and Trefil, Introduction & Ch. 1
May 31	Read	<input type="checkbox"/> Kuhn VI-VIII
		<input type="checkbox"/> Kuhn IX-X
		<input type="checkbox"/> Kuhn XI-XIII
		_____ Hazen and Trefil, 2-4
June 5		Paul Feyerabend <i>Against Method</i>
	Read	<input type="checkbox"/> Feyerabend 1-3
		<input type="checkbox"/> Feyerabend 4-6
		<input type="checkbox"/> Feyerabend 7-8
		_____ Hazen and Trefil, 5-6
June 6	Read	<input type="checkbox"/> Feyerabend 9-11
		<input type="checkbox"/> Feyerabend 12-13
		<input type="checkbox"/> Feyerabend 14-15
June 7		Exam I

June 12	Ernst Mayr and the Philosophy of Biology
	Read <input type="checkbox"/> Mayr 1
	<input type="checkbox"/> Mayr 2
	<input type="checkbox"/> Mayr 3
June 13	Read <input type="checkbox"/> Mayr 4
	<input type="checkbox"/> Mayr 5
	<input type="checkbox"/> Mayr 6
	_____ Hazen and Trefil, 15-16
June 14	Read <input type="checkbox"/> Mayr 7
	<input type="checkbox"/> Mayr 8
	<input type="checkbox"/> Mayr 9
	_____ Hazen and Trefil, 17-18
June 19	Molecular Biology
	Read <input type="checkbox"/> Kay 1
	<input type="checkbox"/> Kay 2
	<input type="checkbox"/> Kay 3
June 20	Read <input type="checkbox"/> Kay 4
	<input type="checkbox"/> Kay 5
	<input type="checkbox"/> Kay 6
	<input type="checkbox"/> Kay 7
June 21	Exam II
June 26	Particle Physics
	Read <input type="checkbox"/> Galison 1
	<input type="checkbox"/> Galison 2
	_____ Hazen & Trefil 8-9
June 27	Read <input type="checkbox"/> Galison 4
	<input type="checkbox"/> Galison 5.1
	_____ Hazen & Trefil 12
June 28	Read <input type="checkbox"/> Galison 5.2
	<input type="checkbox"/> Galison 6
July 3	Read <input type="checkbox"/> Galison 8
	<input type="checkbox"/> Galison 9
July 4	Independence Day – Campus Closed
July 5	Exam III

Contact Information:

I am here to help you do well in this course. I am available to help you during office hours and by appointment. Don't hesitate to ask for an appointment—problems are easiest to resolve when they are brought up early. Don't feel like you need to have a problem in hand to come see me.

Office: H 223C
Office Hours: by appointment
Office Phone: (714) 278-3935 (**24-hour voice mail**)
email: cmcconnell@fullerton.edu
online resources: <http://faculty.fullerton.edu/cmcconnell/304/TResources.htm>

Required Texts:

- Robert Hazen and James Trefil, *Science Matters* (Doubleday, 1991).
Thomas Kuhn, *The Structure of Scientific Revolutions* (Chicago, 3rd ed., 1996).
Paul Feyerabend, *Against Method* (Verso, 3rd ed., 1993).
Ernst Mayr, *This is Biology* (Harvard, 1997).
Lily Kay, *Who Wrote the Book of Life?* (Stanford, 2000).
Peter Galison, *Image and Logic* (Chicago, 1997).

Assessment:

Each student's performance will be assessed in three distinct ways:

- § 1. Reading Journal Entries. For each reading assignment listed above that is marked with a box (□), you will prepare a reading journal. A blank form is available for download at the course web site. Read the accompanying guidelines (available on the web, and on page 4 of the syllabus) carefully. Your grade will be lowered if your journal entries are late, incomplete, or hand-written. If using a word processor for this assignment is a logistical problem, it is your responsibility to discuss this with me before drop date. Your journal entries will make up 30% of your final grade.
- § 2. Exams. Three times in the course of the semester, you will write an exam comprised of short answer and essay questions based on our shared reading and discussions. Each exam will make up 15% of your final grade.
- § 3. Class Participation. Your contribution to the learning community includes active engagement during our classroom discussions of assigned reading. Active participation in all facets of the course will make up 25% of your final grade.

Final grades submitted to the registrar will include +/- as appropriate. There are no extra credit options in this course.

For computational purposes, A+ = 98-100, A = 93-97, A- = 90-92, B+ = 88-89, B = 83-87, B- = 80-82, C+ = 78-79, C = 73-77, C- = 70-72, D = 60-69, F = 0-59.

Absenteeism:

The purpose of this course is to expose you to a variety of perspectives and issues in contemporary science. Many of our discussions will rest on foundations built in earlier sessions. Excessive absenteeism will be disruptive to your ability to integrate the material presented.

Guidelines for Preparing Journal Entries:

Download the blank form (A Microsoft Word document) from the course web site.

You will prepare a separate entry for each reading assignment on the syllabus indicated with an open box (□); do not need prepare entries for reading assignments marked with a blank ().

1. Be sure to replace the *italicized text* with the appropriate information.
2. Do not change the font (Times New Roman, 12) or the size of the boxes.
3. Be sure that the entry prints onto one page.

Your reading journal should serve three purposes:

1. It should help you read more carefully.
2. It should help you come to class prepared to take an active role in our discussions.
3. It should help you convince me that you've done a careful job of reading. (This shouldn't be your primary concern, but you should keep it in mind while preparing your entries).

To that end, please take careful note of the following guidelines:

1. You are to prepare these journals alone. You may not collaborate with your classmates when preparing your journal.
2. You are to write them exclusively in your voice. You may not quote from the book that you are reading. You may not use outside resources (book reviews, published summaries, web sites, etc.).
3. For full credit, they need to be typed, on time, complete, and thoughtful.

Academic Integrity

It is your responsibility to review the CSUF policy on academic dishonesty, which is printed on page 558 of the 2005-2007 Catalog and available on the web at the following site:

<http://www.fullerton.edu/senate/PDF/300/UPS300-021.pdf>

Plagiarism will not be tolerated. If you are unsure of how to avoid plagiarism, come talk to me or refer to the following web site:

<http://www.fullerton.edu/deanofstudents/Judicial/Plagiarism.htm>