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

Week 1  **Introductions, Science Literacy**
8/21  Introductions and Semester Preview
8/23  Read  McConnell (R1, or read on web)
      Hazen (read on web)
      Kuhn  I
      Kuhn  II

Week 2  **Philosophy of Science**
8/28  Read  Kuhn  III-IV
      Kuhn  V
      Kuhn  VI-VIII
8/30  Read  Kuhn  IX-X
      Kuhn  XI-XIII
      Mayr “Does Science Advance?” (R4)

Week 3  9/4  [Labor Day]
9/6  Read  Feyerabend  1-3
       Feyerabend  4-6
       Feyerabend  7-8

Week 4  9/11  Read  Feyerabend  9-11
          Feyerabend  12-13
          Feyerabend  14-15
9/13  Read  Feyerabend  16
       Feyerabend  17-20
       Brush, “Should the History of Science Be Rated X?” (R3)

**Essay #1 Due 9/20**
Week 5  Sociology of Science
9/18 Read Hazen & Trefil 2, 6, 7, 8
Collins & Pinch 1
Collins & Pinch 3
Collins & Pinch 6

9/20  Lecture: Special Relativity
Read Hazen & Trefil 12
Einstein, “On the Electrodynamics of Moving Bodies”

Essay #1 Due

Week 6  9/25 Read Collins & Pinch 2
        Collins & Pinch 5
        Collins & Pinch 7

Physical Sciences in the Twentieth Century
9/27 Read Galison 1
        Galison 2
        Galison 3

Week 7  10/2 Read Galison 4
        Galison 5
        Galison 6

10/4  Lecture: General Relativity
Read Time’s Person of the Century (R7)

Week 8  10/9 Read Greene 1
        Greene 2
        Greene 3

10/11  Lecture: Quantum Theory
Read Hazen & Trefil 3, 4, 5

Week 9  10/16 Read Greene 4
        Greene 5
        Greene 6

10/18 Read Hazen & Trefil 10, 11
        Greene 7
        Greene 8
        Greene 9

Week 10  10/23 Read Greene 10
         Greene 11
         Greene 12

Essay #2 Due 11/1

10/25  Lecture: The Standard Model
Read Hazen & Trefil 9
Traweek, “Pilgrim’s Progress” (R10)
Week 11  
**The Biological Sciences in the Twentieth Century**

10/30 Read  Hazen & Trefil 17, 18
Young, “Synthesis and Species,” (R8)
Gould 1
Gould 2

**Essay #2 Due**

11/1 Read  Gould 3 (79-107)
Gould 3 (“Act 1”; pp. 107-124)

Week 12  
11/6 Read  Gould 3 (“Act 2”; pp. 124-136)
Gould 3 (“Act 3”; pp. 136-164)
Gould 3 (“Act 4”; pp. 164-172)
11/8 Read  Gould 3 (“Act 5”; pp. 172-207)
Gould 3 (207-239)

Week 13  
11/13 Read  Gould 4
Gould 5
Gonick and Wheelis, “The Spiral Staircase,” (R9)
11/15 Read  Hazen & Trefil 15, 16
Watson 1-5
Watson 6-14

Week 14  
11/27 Read  Watson 15-21
Watson 22-29
11/29 Read  Crick 8
Crick 9
Crick 10

Week 15  
12/4 Read  Crick 11
Crick 12

**Essay #3 Due 12/11**

12/6 Read  Kevles, “Big Science and Big Politics,” (R11)

End of Semester Wrapup & Course Evaluation

Week 16  
**Essay #3 Due 12/11**

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:  MW 9-10am, W 2:30-3:30pm, and 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
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 5 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. Essays. Three times in the course of the semester, you will write an essay based on our shared reading and discussions. These essays will not be cumulative. Prompts will be distributed in class a week before the essays are due. Each essay 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.

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. Please take careful note of the following attendance policies:

For every class that you miss that is marked “Lecture:” your final grade will be lowered a full letter grade (that is, an A- becomes a B-).

Excessive absences from sessions not marked “Lecture” will also have a negative impact on your final grade. Your final grade will be lowered a full letter grade for every three absences of this type.

Makeup assignments will be provided when absences arise due to legitimate documented emergencies.
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 crossed box ( ).

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