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. An outline of the topics for the semester follows.

Reading assignments are indicated as follows:
- C1 = Read Crick, Chap. 1.  J4 = Read Jones, Chap. 4. R3 = Read item 3 in the course reader.
- Refer to the list of assigned reading on page 3 for a complete key.
- Do the Reading Before Class on the Day Indicated.

Schedule of Topics and Reading Assignments

Jun 6  Introductions, Course Themes

Jun 7  New Discoveries: Radioactivity and Atoms
       Read: HT1-2, R1-2, J22.

Jun 8  Atomic Theory and Early Quantum Theory
       Read: HT3-4, R6, J8.

Jun 9  Modern Quantum Theory
       Read: HT5, J9, J11, M2-3.

Jun 13 Special Relativity
       Read: HT12, R7, J1-2

Jun 14 General Relativity
       Read: CP2, J3-4

Jun 15 The Evolutionary Synthesis
       Read: HT17-18, R8, M6-8

Jun 16 The Evolutionary Synthesis
       Read: M9, M11
       EXAM I
Jun 20  Molecular Biology
    Read: HT15-16, R9, P2-3, C1-7

Jun 21  Molecular Biology
    Read: P4-6, C8-13

Jun 22  Nuclear Physics
    Read: HT8, J16, G1-4

Jun 23  Particle Physics
    Read: HT9, J18, G7-9

Jun 27  Astrophysics
    Read: HT10-11, CP7, G10-12

Jun 28  Cosmology
    Read: J6, CP5, G13-15

Jun 29  Big Science
    Read: R10, R11

Jun 30  Big Science
    Read: R12
         EXAM II

Jul  4  Independence Day – No Class Meeting

Jul  5  Oral Reports

Jul  6  Oral Reports

Jul  7  Oral Reports
         Closing Remarks and Course Evaluation

**Required Texts:**


R  Reader, available at Little Professor Books.
Assessment:
Each student’s performance will be assessed in four distinct ways:

§ 1. Examinations. These will occur on June 16 and June 30. Each exam will include an identification section, a short answer section, and an essay section. Each exam will account for 20% of your final grade.

§ 2. Discussion Questions. In the middle three weeks of the semester, you will be responsible for sending me, by email, questions about the readings that will serve as the foundation for our discussions. We will set the schedule for these submissions in class on June 9. Your email submissions will make up 20% of your final grade.

§ 3. Class Participation. Your contribution to the learning community includes discussion of assigned reading and active engagement during your classmates’ presentations. Active participation in all facets of the course will make up 20% of your final grade.

§ 4. Oral Presentation. A detailed description of this assignment will be distributed and discussed in class on June 9. You will be responsible for presenting the key ideas in an article about recent work in science to your classmates. All work related to the presentation will make up 20% of your final grade.

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

Performance Weighted Grading Option:
Recognizing that each student brings a different set of skills and talents into the classroom, I will allow each student to shift the relative weights of their grades as follows:

Your strongest grade in §§ 1–3 will account for 25% of your final grade.

and

Your weakest grade in §§ 1–3 will account for 15% of your final grade.

You may not exercise this option if:

- You accumulate more than two hours of unexcused absences in the course of the semester.
- You accumulate more than four hours of absences in the course of the semester.
- You do not take both exams in § 1.
- You miss more than one fourth of the assignments in § 2.

Absenseeism:
The purpose of this course is to expose you to a variety of perspectives and issues in contemporary science. Excessive absenteeism will be disruptive to your ability to integrate the material presented. The class participation portion of your final grade will suffer dramatically if you miss more than two hours of class time without a legitimate and documented excuse.

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: EC 626
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/SResources.htm
## Readings

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<tr>
<th></th>
<th>Author(s)</th>
<th>Title</th>
<th>Source/Details</th>
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<tbody>
<tr>
<td>R1</td>
<td>Craig McConnell</td>
<td>“A Brief Overview of Science Studies.”</td>
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