

Foundations of Teaching and Learning Science

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Office hours: Wednesdays 2:30–3:45 pm
Course website: <http://webct.ucsd.edu>

Course description:

The aim of this course is to strengthen students' ability to teach science subject-matter by deepening their understanding of the nature of science, the process of scientific inquiry, and fundamental science concepts. This course will model an instructional method known as problem-based learning; therefore, the main in-class activity directed toward course goals will be problem-solving. A wide variety of problems will be posed during class; students, working in groups, will evaluate and analyze the problem tasks, and then formulate and present consensus solutions and explanations. Participants in the course will be challenged to apply their cumulative scientific knowledge to basic problems and questions in science. Problems may involve concepts from chemistry, physics, biology, and Earth science; many will be interdisciplinary. Pedagogical issues and insights will arise as participants work on problems. Students will extend and solidify their knowledge through research and reflection outside of class; the regular group work and class presentations during the course will be important opportunities for teaching practice.

Course materials:

1. A simple scientific calculator (may be needed in class)
2. Science textbooks of your choosing (for reference outside of class)
3. On-line resources, e.g.: <http://libraries.ucsd.edu/locations/se/> ▶ Research Tools
4. Access to WebCT (to post homework, etc.)
5. A notebook
6. Additional materials and readings will be provided by the instructor.

Evaluation: Students will be evaluated on the basis of in-class presentations and reports, homework assignments, and an end-of-quarter in-class presentation. Regular attendance and participation is essential for success in the course; absence and late arrival/early departure from class will affect the student's grade. The final project/presentation will be scheduled for each student and cannot be missed; details about the project will be described in a separate handout. The weighting of the bases for evaluation is as follows:

In-class work: 30%
Homework: 30%
Final project: 20%
Final exam: 20%

Homework: It is expected that some questions will remain unanswered after problem tasks have been worked on during the class period. Individual students may also differ on some points with the consensus report developed in class. The regular homework will be a follow-up report to assess and complete the consensus explanation offered for the prior class's problem task(s). Typically only general references such as textbooks and on-line encyclopedias need be consulted, but all sources used must be referenced properly. Students will work independently on homework, and post their homework assignments to WebCT.

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Academic integrity is the foundation of a university. A core guideline of academic integrity for students is summed up in the following statement: *No student shall engage in any activity that involves attempting to receive a grade by means other than honest effort.* For details on the responsibilities of students with regard to academic integrity, and the manner in which cases of dishonesty may be handled, please review the UCSD Policy on Integrity of Scholarship at this web page:

<http://www-senate.ucsd.edu/manual/appendices/app2.htm>

- In this course, all assignments, and the final exam, are to be a student's individual work, unless otherwise specified by the instructor.
- Copying or paraphrasing the words or ideas of others without acknowledgment of the source and proper citation is plagiarism, and is therefore a violation of the standards of academic integrity.
- University guidelines require that an instructor report any suspected violation of academic integrity, such as unauthorized collaboration with other students on an assignment, or cheating on an exam.
- Any student found guilty of cheating or plagiarism on any assignment or exam in this course will receive a grade of F for the course.

Approximate course schedule:

Week	Wednesday	Friday
1	Introduction to the course Problem in physics/chemistry	Library resources Problems in nature of science/physics
2	Problems in nature of nature of science/physics	Problems in nature of science/physics
3	Problems in physics	Problems in physics/chemistry
4	Problems in chemistry	Problems in chemistry
5	Problems in biology	Problems in biology
6	Problems in biology	Problems in biology
7	Problems in Earth science/physics	Problems in Earth science/chemistry
8	Problems in Earth science	Problems in Earth science
9	Student projects/presentations	Student projects/presentations
10	Student projects/presentations	Student projects/presentations