

**In a 1-3 page essay, discuss how your introductory course(s) serve your students, your department, and your institution. What features of your course(s) are targeted at serving those different audiences and needs, and how do you know those features are working?**

**GEOL 370 California Water:** new (Fall 2014) upper-division, general education course

**1. Rationale for the new course**

Water is vital for the survival of individuals, societies, and ecosystems. Water has played a central role in the development of modern California, and will continue to be the focus of scientific inquiry and political debate for many decades to come. Where does our water come from? How is water allocated between urban users, agriculture and ecosystem needs? Why do we experience floods and droughts? Why do some people in California not have reliable access to safe drinking water? How will climate change affect California's water supply? GEOL 370 California Water is an upper-division, general education (GE) course about the science and politics of water in California that will challenge students from across the University to grapple with these questions. Human interaction with the hydrologic system provides an excellent setting to explore how science is used to solve practical problems, and how scientific understanding is mediated by politics, law, economics and other social factors in managing our most vital resource.

**2. How will the course serve students, my department, and institution?**

The overall course design will use a case-study approach to help students better explore the issues surrounding water in California and to a lesser extent in other part of the U.S. and abroad. Each week a new case study or local water issue will be highlighted and explored. Through lecture material, in-class discussion and small group activities, and outside reading and writing assignments, student will better understand the natural, scientific processes that shape the current water-resource problems and challenges across San Francisco and California. Students will examine and better understand the science that supports (or doesn't support) current water policy and management decisions, which will help make them a more informed citizen and engaged voter. Students will better appreciate the history and scope of water resources problems and challenges in California and how California is a global leader is solving a number of these challenges. Students will gain a better appreciation for how water touches nearly all aspects of modern life, and will better appreciate the breadth of water-related professions in California and beyond.

The University has recently established new upper-division general education science requirements. The new course will serve students by providing a large enrollment science course to

help meet the new GE science requirements, which simultaneously benefits our relatively small department by helping increase FTES and recruitment of majors.

The new course also serves our students and institution by addressing the following five student learning outcomes. (1) Apply scientific methods of inquiry and analysis (including hypothesis testing, systematic and reproducible observations, and the analysis of measurable data) to the physical universe, including either living or nonliving systems. (2) Articulate how scientific theories and practices come to be accepted, contested, changed, or abandoned by the scientific community. (3) Evaluate the quality of scientific information and claims on the basis of their source and the methods used to generate the information or claims. (4) Construct coherent and sound arguments with support from multiple sources, including library resources and proper citations, to support or contest a scientific theory. (5) Show how scientific knowledge can be applied to their own lives and to ways in which they could contribute purposefully to the well-being of their local communities, their nations, and the people of the world; to social justice; and/or to the sustainability of the natural environment. The new course also covers several topical perspectives and overlays, including environmental interconnection, ethical reasoning and action, life in San Francisco Bay Area and/or California, and environmental sustainability.

**3. What features of your course(s) are targeted at serving those different audiences and needs, and how do you know those features are working?**

The following is an example of course features and assessment methods. Through the following assignments and activities students will demonstrate that they have acquired the information and developed the necessary skills to SLO #4. Students will acquire knowledge of how hydrologists communicate the results of their research to the colleagues and society, and how these results are validated and disseminated to the scientific and public communities. To demonstrate that students can construct coherent and sound arguments with support from multiple sources (SLO #4), students will complete at least 2 major writing assignments where students will illustrate the knowledge, analytical skills, and ability to synthesize hydrologic data and information from multiple library, internet, textbook, and other resources. As described below, instructors will provide examples of proper citation for all types of resources.

The writing assignments will be on topics that they can choose from an instructor-generated list of current water topics and issues in California. One example topic is the San Joaquin River Restoration Program (SJRRP), which is a fairly controversial program that includes stakeholders from all perspectives in California. Students will read newspaper articles and find other sources from the library about the SJRRP, which they will use as proper citation in their papers. Students will be tasked with writing the

paper from the perspective of one of the many different stakeholders, which includes farmers, environmentalists, fishery advocates, reservoir engineers, local residents, etc. In the paper, students must critically evaluate the science (i.e., referring back to what they learned from SLO #3) that was used to help develop the SJRRP and identify how the implementation of the SJRRP is currently benefiting their own interests and how the SJRRP could be modified to improve their own interests.

Prior to writing assignment, the instructors will provide a brief lecture and handouts that cover proper referencing and handout an explicitly designed set of reference format guidance handouts. The instructors will clearly articulate that the paper grade is partially based upon proper format and style and the citations. The grading rubric will be discussed in class and includes point deductions in two areas related to proper referencing.

After the writing assignment is complete, students will have a mock stakeholder meeting where groups of students will act the part of different stakeholder groups to propose improvement for the SJRRP. A separate group of students (with the help of the instructors) will act as the hydrologists and engineers to keep the stakeholder discussion within the realm of the scientific and engineering limitations. Through the mock stakeholder discussion, the instructor will highlight the need for coherent and sound arguments in order to make compelling cases to the scientific and public communities. The instructors will illustrate that criteria for these sound arguments are inherent in the citations that students used in writing their papers. The criteria are thus generated from the students researching their topic and citing appropriate references in their paper and in their oral arguments.

To help evaluate student learning, we will develop a survey for the students to complete after the mock stakeholder meeting. The survey will help assess their own areas of competence and deficiencies about the science driving the stakeholder perspectives and discussions.