Water Resources Management
Civil & Environmental Engineering 206
Spring 2018
Course information

Context. Achieving a water-secure future requires strategic research to build the knowledge base for better water-resources management. Unprecedented climate change, population growth and changing landcover are radically altering the water cycle, with dramatic impacts on human and environmental uses of water. The main focus will be on California and the Western United States, with comparative analysis for other regions.

Format. Each weekly meeting is planned to include lecture, discussion and workshop components. Lecture materials will be posted before or after each class. Students are expected to ask questions, volunteer discussion, and comment on assigned reading. Students are also encouraged to bring additional ideas from other sources, which are relevant to the topic under study, to the class.

Course goal. This course will provide students a framework to address contemporary water resources problems, and to achieve water security for local areas and broader regions.

Course learning outcomes. Upon completion of this course, students will: i) be aware of critical water-resources issues at local, national and global scale, ii) have some depth of knowledge of water-resources issues facing California, and iii) be able to formulate solutions for water-resources problems .

Reading. Please read the papers and reports noted on the syllabus before class, and be prepared to discuss during class.

Homework. Assignments are due one week after being posted. Some longer assignments will be due 2 weeks after being assigned. See syllabus for sequencing of homework.

Object oriented programming. Some homework assignments will use object-oriented programming. We will also use this some during class. The open-source platform for this is Insightmaker. You can also use Stella; one can download a trial version, or purchase a student educational version at a discounted price.

Individual project. Each student will do a project paper and discussion on one topic of interest that they would like to pursue in more depth. A one-page proposal is due mid-way through the class, as noted on the syllabus. A final paper is due at the end of the class. Each student should also do a 10-minute presentation of the main points from the paper to the class.

Grading. Homework 40%; Project 40%; Participation 15%, Presentation 5%. All components are essential. The grading scale is determined by the students' performances (with A representing "excellent" work).

Academic integrity. Each student in this course is expected to abide by the University's Academic Honesty Policy. Any work submitted by a student in this course for academic credit will be the student's own work. You are encouraged to study together and to discuss information and concepts with other students. You can give "consulting" help to or receive "consulting" help from such students. However, this permissible cooperation should never

involve one student having possession of a copy of all or part of work done by someone else, in the form of an e mail, an e mail attachment file, a diskette, or a hard copy. Should copying occur, both the student who copied work from another student and the student who gave material to be copied will both automatically receive a zero for the assignment. Penalty for violation of this Policy can also be extended to include failure of the course and University disciplinary action.

Accommodations for students with disabilities**.** The University of California is committed to ensuring equal academic opportunities and inclusion for students with disabilities based on the principles of independent living, accessible universal design and diversity. I am available to discuss appropriate academic accommodations that may be required for student with disabilities. Requests for academic accommodations are to be made during the first three weeks of the semester, except for unusual circumstances. Students are encouraged to register with Disability Services Center to verify their eligibility for appropriate accommodations.

Possible project topics. Pick something you are interested in. It should be narrow enough that you can treat the subject in depth. Following are some examples of topics that could make a good individual project. Feel free to go outside the list for your topic.

- Sustainability and carbon footprint of storage options to offset loss of Sierra snowpack
- Transformative power of California's Sustainable Groundwater Management Act
- Origins and solutions for a recent drought, e.g. South Africa
- Elements of long-term sustainable drought management in California
- Role of water footprinting in water resources management
- Australia's water-resources information system & lessons for California
- Elements of successful groundwater governance in semi-arid regions
- Potential for and constraints limiting water conservation in California agriculture
- Inter-annual water-storage potential in San Joaquin Valley, i.e. potential for development of water banks in selected river/groundwater basins
- Need and potential for natural-capital investments in California
- Robustness of infrastructure in the Sacramento-San Joaquin Delta
- Impact of forest thinning on water yield – water rights and institutional issues
- How data science can improve current water management of California

Format of project proposal. Write a one-half to one page project abstract or proposal, describing the topic and main questions that you propose, plus possible sources of information that will serve as a starting point for your project. Identify if you propose to use Stella for simulations or scenarios.

Format of project paper. The paper should include a brief introduction to the issue, topics and context, plus a clear statement of the questions posed. It should then develop the appropriate context needed to understand the topic, e.g. geographic, historical, climatic and socio-economic. It should analyze the problem or challenge and possible solutions. Consider infrastructure, institutions and also informational or other constraints to informed decision making. Length should be around 10 pages (1.5 line spacing), plus figures and at least 5

references from the peer-reviewed literature. Additional references can be from the grey literature. Please consult with instructor early in the process if you have questions.

Format of in-class presentation. Each student will give a 10-min presentation of their project. Use of slides to guide the audience and emphasize the main points is encouraged. Other students will be required to make anonymous written critique of presentation.