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Water Resource Systems and Management (Spring 2017) - University of Colorado Boulder

Joseph Kasprzyk

University of Colorado Boulder, joseph.kasprzyk@colorado.edu

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CVEN 5393: Water Resource Systems and Management

Syllabus: Spring 2017



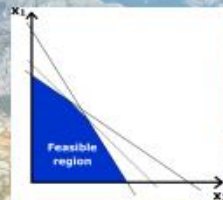
Prof. Joseph Kasprzyk

Office: SEEC C244
 E-mail: joseph.kasprzyk@colorado.edu
 Personal Website: josephkasprzyk.wordpress.com
 Twitter: @josephrkasprzyk

Course Overview



Learn how to analyze water reservoir systems under multiple objectives, using simulation modeling



Master techniques of classical and evolutionary-algorithm based optimization modeling.



Consider uncertainties such as socioeconomic factors and climate change in water systems planning.



Use RiverWare, R, and Python programming to solve water resources problems.

Directions and transportation information for the SEEC building: <http://www.colorado.edu/even/about-us/map-and-directions/research-park>

Course and Office Hours Time/Location

Monday	Tuesday	Wednesday	Thursday	Friday
	Class (SEEC N128) 9:15-10:30 am	Office Hours (Engineering Center, ECES 103D) 9-11 am	Class (SEEC N128) 9:15-10:30 am	
	Office Hour (SEEC C244) 10:30-11:30			

Prerequisites: There are no formal prerequisites for this course, but I assume that you have familiarity with matrix algebra, calculus, probability, statistics, and basic computer skills (including the ability to apply or learn Python and R programming). Some knowledge of fluid mechanics and hydrology is also assumed. However, students that come from different disciplinary backgrounds should be able to learn enough about water resources to do well in the course.

Required Textbook: Loucks, DP and E van Beek (2005) Water Resources Systems Planning and Management: An Introduction to Methods, Models, and Applications. United Nations Educational, Scientific, and Cultural Organization. Available free online at: <http://ecommons.library.cornell.edu/handle/1813/2804>. A full version of the book is available in a single pdf at: <http://unesdoc.unesco.org/images/0014/001434/143430e.pdf>.

Course Objectives: At the end of the course, students will be able to:

1. Formulate and solve classical optimization-based problem formulations for decision support in water and other civil engineering problems.
2. Formulate and solve simulation-optimization decision support approaches using multiobjective evolutionary algorithms, and other multiobjective decision analysis techniques, for water and other civil engineering problems.
3. Understand the strengths and limitations of systems analysis approaches applied to water and civil engineering problems.
4. Understand the current research in the field and where research gaps exist.
5. Identify important water resources challenges related to uncertainty and environmental change.
6. Carry out an independent research project using the techniques above on a problem of their choosing.



Assignments (30%): These will be assigned via D2L and will be turned in either on paper or on D2L (see instructions on each specific assignment). No late assignments will be accepted. **The lowest assignment grade will be dropped.** Although you are allowed to discuss homework with your peers, **everyone must turn in their own assignment that is in their own words** and represents individual effort. We reserve the right to take off points for neatness or lack of clarity. I am **very strict** on making sure that you **cite and document all sources** used within your work in this class. I suggest using the Harvard citation style (<http://guides.is.uwa.edu.au/harvard>) and a citation management software such as LaTeX or Zotero (<http://www.zotero.org/>); let me know if you have more questions on this.

Quizzes (30%): In-class quizzes are used to test your understanding of course material. The dates for these quizzes will be announced in advance. There will not be long-form exams or a final exam in this course (see below).

Project (30%): You will perform a group project over the course of the semester. I will summarize the details of the project in a separate document. **The final exam period will be used for project presentations.**

Accommodation for Disabilities

If you qualify for accommodations because of a disability, please submit to your professor a letter from Disability Services in a timely manner (for exam accommodations provide your letter at least one week prior to the exam) so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities. Contact Disability Services at 303-492-8671 or by email at dsinfo@colorado.edu. If you have a temporary medical condition or injury, see [Temporary Injuries guidelines](#) under the Quick Links at the [Disability Services website](#) and discuss your needs with your professor.

Religious Holidays

Campus policy regarding religious observances requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. In this class, contact me with any potential conflicts **before** the date that the conflict will occur. See the [campus policy regarding religious observances](#) for full details.

Classroom Behavior

Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, color, culture, religion, creed, politics, veteran's status, sexual orientation, gender, gender identity and gender expression, age, disability, and nationalities. Class rosters are provided to the instructor with the student's legal name. I will gladly honor your request to address you by an alternate name or gender pronoun. Please advise me of this preference early in the semester so that I may make appropriate changes to my records. For more information, see the policies on classroom behavior and the campus [Classroom and Course-Related Behavior policy](#)

Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation

The University of Colorado Boulder (CU Boulder) is committed to maintaining a positive learning, working, and living environment. CU Boulder will not tolerate acts of sexual misconduct, discrimination, harassment or related retaliation against or by any employee or student. CU's Sexual Misconduct Policy prohibits sexual assault, sexual exploitation, sexual harassment, intimate partner abuse (dating or domestic violence), stalking or related retaliation. CU Boulder's Discrimination and Harassment Policy prohibits discrimination, harassment or related retaliation based on race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation or political philosophy. Individuals who believe they have been subject to misconduct under either policy should contact the Office of Institutional Equity and Compliance (OIEC) at 303-492-2127. Information about the OIEC, the above referenced policies, and the campus resources available to assist individuals regarding sexual misconduct, discrimination, harassment or related retaliation can be found at the [OIEC website](#).

Honor Code

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the [academic integrity policy](#) of the institution. Violations of the policy may include: plagiarism, cheating, fabrication, lying, bribery, threat, unauthorized access, clicker fraud, resubmission, and aiding academic dishonesty. All incidents of academic misconduct will be reported to the Honor Code Council (honor@colorado.edu; 303-735-2273). Students who are found responsible for violating the academic integrity policy will be subject to nonacademic sanctions from the Honor Code Council as well as academic sanctions from the faculty member. Additional information regarding the academic integrity policy can be found at <http://honorcode.colorado.edu>.

Civil, Environmental and Architectural Engineering Department Policy on Academic Integrity

The Department of Civil, Environmental, & Architectural Engineering (CEAE) requires all students to adhere to a strict policy of academic integrity. These expectations are in accordance with the University of Colorado Boulder Honor Code, but this policy is intended to provide more specific guidelines for all undergraduate and graduate students in CEAE. Ethical behavior in college sets the stage for a lifetime of professional and ethical behavior that is expected of all engineering professionals. This policy describes the academic sanctions that will be imposed by CEAE faculty members. Faculty retain the right to set academic sanctions, and if they choose individual courses can deviate from the expectations stated below; these changes will be noted in the course syllabus. All incidents of academic misconduct will be reported to the Honor Code Council. Non-academic sanctions are the purview of the Honor Code Council.

Any activity that could give you an unfair advantage over other students may be cheating. Specific examples of actions that are considered to be cheating and therefore violations of academic integrity:

- Plagiarizing a homework, lab report, or problem set. On assignments that require you to use supplemental materials, you must properly document the sources of information that you used. If you are uncertain about allowable reference materials or how to document your sources, ask your instructor in advance. Specific examples of plagiarism include:
- Copying from any source, including but not limited to: a solution manual, Internet sites, previous semester's homework set or lab report, copying answers directly from classmates, or reporting on data or computer code that you yourself did not write.
- Plagiarizing content in a paper, report, thesis, or dissertation, by copying material from a published sources or the internet, without appropriate citation format and attribution
- Using unapproved information during a closed-book test or quiz (such as a reference sheet, information stored in a calculator, iPhone, information written on your skin)
- Copying from another student during a quiz, exam, or test
- Working in groups on web based quizzes, exams, or tests
- Working in groups on take-home quizzes, exams, or tests
- Asking another student about questions on an exam that you have not yet taken
- Changing the answer on your test/homework after it was graded and then telling the instructor that there was a grading mistake
- Allowing another student to copy your homework, lab report, or allowing another student to look at your answers during a quiz or exam

The list above is not exhaustive; other violations are possible. Any violation will be reported to the Honor Code Council. Any first violation of academic integrity on graded course activities (i.e. homework, lab reports, exams) will result in a minimum sanction of a zero score and an entry in your department file. Instructors can increase these penalties to assigning a failing grade (F) for the entire course. The department will retain a list of all instances of academic integrity violations. Additional sanctions will be imposed for subsequent violations.