

CE 191: Civil and Environmental Engineering Systems Analysis

Syllabus

Lectures: TuTh, 9:30 - 10:30am, 406 Davis Hall

Lab Sections: Th 2-5pm (GSI Jacob Shaw) or Th 5-8pm (GSI Andrea Mengual), 345 Davis Hall

Website: (<http://bcourses.berkeley.edu>) Used for course announcements, materials, grades

Instructors

Professor Scott Moura
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GSI Jacob Shaw
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@ 504 Davis Hall

GSI Andrea Mengual
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Catalog Description

This course is organized around five real-world large-scale CEE systems problems. The problems provide the *motivation for the study of quantitative tools* that are used for planning or managing these systems. The problems include design of a public transportation system for an urban area, resource allocation for the maintenance of a water supply system, development of repair and replacement policies for reinforced concrete bridge decks, traffic signal control for an arterial street, scheduling in a large-scale construction project. **Prerequisites:** CE 93 AND E7

Objectives

1. To encourage the development of a “systems perspective” necessary for intelligent planning and management of large-scale civil and environmental engineering systems.
2. To provide students with a set of quantitative tools for systematic decision-making in civil and environmental engineering problems.
3. To strengthen students’ skills in the use of programming techniques for implementing optimization algorithms and analysis.

Contents

This course provides optimization tools for decision-making in civil engineering systems. The lab assignments facilitate motivation and application of these tools.

1. Water supply networks
2. Planning California’s future energy supply mix
3. Scheduling a Memorial Stadium construction project
4. Berkeley WiFi Tower Location
5. Big Game Week Special: Cal Band Pregame

Textbooks

No textbooks are required. Course notes and slides will be distributed throughout the semester via bCourses. Nevertheless, the following textbooks are officially recommended for additional background:

- ¹Civil and Environmental Systems Engineering; C. Revelle, E. Whitlatch, R. Wright; Pearson Prentice Hall, 2004.
- ²Design and Operation of Civil and Environmental Engineering Systems; C. Revelle, A. E. McGarity; John Wiley & Sons, 1997.

The following textbooks are also useful resources:

- ¹Convex Optimization; S. Boyd and L. Vandenberghe; Cambridge University Press, 2004.
- ²Principles of Optimal Design; P. Papalambros and D. Wilde; Cambridge University Press, 2000.

¹These textbooks have been placed on **2 hr. reserve** in the library. ²These textbooks are available to peruse during Prof. Moura's office hours.

Software

The numerical computing software MATLAB must be used for lab assignments. MATLAB is available on the computers in the lab, or you may purchase your own copy if you wish to work on your personal computer. A student version of the software can be purchased from the university at a discounted price.

Computer Access: A CEE Computer Lab Account is required to use the computers in 345 Davis. Use the link below to request an account. http://www.ce.berkeley.edu/resources/computing/create_lab_account

Grading

- Labs: 50pts - 5 lab assignments, 10pts each
- Midterm: 20pts - Tues Oct 16, 9:30-10:30am, in-class
- Final: 30pts - Exam Group 7: Tues Dec 16, 2014 3-6pm

A total of 100pts are possible. Graded lab assignments will be submitted and returned via bCourses.

Late Submissions: One point is subtracted for each 24 hours submitted late (rounded up to nearest integer). Two free late days are allowed on any lab of your choice. Late submissions are not accepted after the Tuesday following a Friday due date.

Regrade Policy: If you feel a problem was graded incorrectly, you may submit a regrade request to the GSI. This request **MUST** be submitted within one week of receiving the graded assignment, with a short paragraph justifying the regrade. Any regrade request is subject to a full regrade, i.e. points may be lost. Our grading philosophy is to achieve *consistency* and *transparency*.

Extra Credit: Students who find errors and supply corrections to the notes will receive 0.1 pts extra credit. You receive 0.1 pts for each new error and correction that you supply, subject to instructor approval. First come-first reward. Students must report the corrections by e-mail, to leave a paper-trail. Each student can receive a maximum of two points, i.e. for twenty corrections. Keep in mind that the notes are continuously updated on bCourses, so make sure the correction is applicable to the most up-to-date version.

Planned Absences: You may request to submit assignments early or late. E-mail me your request two weeks prior to the assignment due date. Requests due to extended holidays will not be granted. Requests due to emergencies will be handled case-by-case.

E-mail Correspondence

Use [CE 191] in your message subject. We typically respond within one day, however our ability to help declines as e-mail volume increases. Please be considerate and concise. Do not wait until the due-date to ask questions, otherwise they may not be answered.

Code of Conduct

Students must abide the Code of Conduct. For further reference, see the Berkeley Campus Code of Student Conduct at <http://sa.berkeley.edu/code-of-conduct>.