
Syllabus**CSU, Sacramento****CE 280C: Advanced Soil Mechanics Laboratory****Spring 2016**

Listed time: Mondays 7:30 – 8:20 AM, Wednesdays and Fridays 7:30 – 8:50 AM

Typical time: Mondays and Wednesdays 7:30 – 8:40 AM

Location: 1014 ARC

Course website: <http://sacct.csus.edu>

Instructor:

Richard Armstrong, Ph.D., P.E.

Office: 4046 Riverside Hall

Office hours: Mondays and Wednesdays 1:00 – 2:30 PM

E-mail: Richard.Armstrong@csus.edu

Website: <http://www.csus.edu/faculty/A/richard.armstrong/>

Textbooks:

Geotechnical Modelling by David Muir Wood. Additional supporting course notes will be provided electronically to all students.

Computer Software:

- Numerical modeling software: FLAC by Itasca (<http://www.itascacg.com/software/flag>)

Prerequisite: CE 171A**Course Description:**

Catalog Description (Advanced Soil Mechanics Laboratory): Lectures and experimental studies dealing with the more advanced aspects of soil properties and their applications in design. Consolidation, strength of soils in triaxial compression testing with measurements of volume changes and pore-water pressures, dynamic soil tests, in-situ measurement techniques of soil properties such as Dutch cone, pressuremeters, and vane shear methods, advanced instrumentations, R-value and CBR tests for pavement designs and student projects.

Updated Description (Geotechnical Modeling): Application of physical and numerical modeling in geotechnical engineering. Details are provided for conducting various physical element models and small-scale tests, as well as for interpreting the measured results. Numerical-analysis principles are outlined and actual numerical analysis software is used to model element-scale, small-scale, and full-scale geotechnical problems where soil yielding, water flow, and dynamic response are important. The connection between physical and numerical modeling is explored, as well as the applicability of each in engineering practice.

Grading:

The grading is weighted as follows:

Term Project	35%
Midterm	25%
Final Exam	40%

Grades will be based upon the standard percentages. Currently, the course is 2 units, but a 1-unit undergraduate or graduate independent study (CE 199 or CE 299) is also available to bring the equivalent course load to 3 units. The same final grade (details later) for CE 280C and CE 199/299 will be given. Students not enrolled in CE 199/299 will not be required to complete the term project, and their grades will be based solely on the midterm and final-exam grades.

Tentative Schedule:

Topic		Approx. Dates⁽¹⁾
A.1	Introduction to geotechnical modeling	1/25, 1/27
A.2	Monotonic soil behavior	2/1
A.3	Cyclic soil behavior	2/3, 2/8
A.4	FLAC formulation	2/10
A.5	FISH language	2/15
A.6	Constitutive modeling	2/17
	FLAC hands-on tutorial	2/22
A.6	Constitutive modeling (continued)	2/24, 2/29, 3/2
	FLAC hands-on tutorial	3/7, 3/9
B.1	Mechanical static equilibrium	3/14
B.2	Steady-state fluid flow	3/16
	FLAC hands-on tutorial	3/28
Midterm		3/30
	FLAC hands-on tutorial	4/4
B.3	Coupled soil-water response	4/6, 4/11
B.4	Mechanical-fluid formulation used in FLAC	4/13
	FLAC hands-on tutorial	4/18
B.5	Dynamic formulation in FLAC	4/20
	FLAC hands-on tutorial	4/25
B.6	Site response	4/27
B.7	Ground motions and boundary conditions	5/2
	FLAC hands-on tutorial	5/4
Presentation of prediction results		5/9
Review		5/11
Final Exam		5/16

Notes: (1) Assuming no Friday classes and 70-minute lectures on Mondays and Wednesdays.

Course Policies:

Course Preparation – Students are expected to complete the readings of assigned materials prior to each lecture.

Academic Dishonesty – Any instance of academic dishonesty will result in a grade of “F” for the course and all other sanctions as applicable by the current University policy. Academic dishonesty includes, but is not limited to, copying another student’s work.

Add/Drop – The add/drop policies are the same as those outlined for the Spring 2016 schedule.

Class Disturbance – Professional behavior is required of all class participants during all aspects of the course. Coming to class late is a form of class disturbance. Chitchatting disturbs the class, too. It is unprofessional to eat food in class.

Use of Electronics – Cell phones should be avoided unless under extreme circumstances. Using cell phone to take pictures of white-board or chalk-board notes during lecture is unacceptable. No laptop, tablet, cell phone, camera, or any other electronic device besides a CE department-approved calculator is allowed during the quiz or exam periods.

Disability Access – If you have a disability and require accommodations, please provide disability documentation to SSWD, 1008 Lassen Hall, (916) 278-6955. Please discuss your accommodation needs with me during the first week of the semester.

Preparing Problem Sets:

The practices formed as an engineering student will follow you in the future. For this reason, strive to develop a practice of producing neat, legible, and accurate calculations. Future associates and clients will review your calculations and notes, forming an impression of your qualifications based on the work presented. Always make your work complete by using clear sketches. Use a straightedge, compass, Excel, or other engineering tools to plot. Keep sketches as close to true scale as practically possible. Place plenty of information on sketches, as it will prove useful. Use engineering paper and only one side of the paper. Finally, record final results using an appropriate number of significant figures.