CVEN 5768:  
Introduction to Rock Mechanics  
and Rock Engineering  

Spring 2015

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Office Hours: by appointment

Lectures: Tu and Th, 11:00-12:15, Room ECCR 135

Readings: Students are responsible for all the required readings. These readings aim to set the context for the class, allow students to engage lecturers, to generate questions for discussions, and to deepen students’ knowledge of topics.  
- Introduction to Rock Mechanics, by R. E. Goodman, 1989  
- Readings are also available on-line from the course website

Web Site: [https://mcedc.colorado.edu/education/non-edc-courses/cven-5768-introduction-rock-mechanics](https://mcedc.colorado.edu/education/non-edc-courses/cven-5768-introduction-rock-mechanics). This website will be frequently updated with assignments, lecture notes, readings for class, useful links, and resource materials. Make sure you visit the web site frequently.

Note: Classes start and finish on time. Attendance to classes is mandatory. Late assignments are not accepted. No exceptions. Work will often be done in established study groups. Study groups will remain the same throughout the semester.

Course Description

This 3-credit hour course explores the nature of rocks and rock masses as construction, foundation or engineering materials. Topics covered include: Physical properties of intact rocks; stresses and strains; thermal, hydraulic and mechanical properties of rocks and rock masses; applications of theory of elasticity in rock mechanics; viscoelasticity; rock discontinuities; hemispherical projection methods; in situ stresses and stress measurements; rock slope engineering and underground excavations in rock.

Specific topics to be covered during the semester:

- Introduction
- Geological engineering review
- Physical properties of rocks
- Natural hazards
- Geophysical methods in rock engineering
- Stresses and strains (review)
- Thermal and hydraulic properties of rocks and rock masses
- Deformability properties of rocks and rock masses
- Applications of theory of elasticity in rock mechanics
- Visco-elasticity and rocks
- Strength properties of rocks and rock masses
- Rock discontinuities
- Hemispherical projection methods
- In situ stresses
- Rock slope engineering
- Underground excavation in rock

**Grading**

Grading will be based on the following factors:

- 30% Homework assignments and quizzes
- 30% Mid-term (take home)
- 30% Final project (20% written report, 10% presentation)
- 10% Participation in class discussions and demonstrating understanding of required reading

**Term Projects**

- Select a major article (or a series of articles) that provides an interesting case study and clearly emphasizes the applied aspect of rock mechanics in an engineering (civil, mining, petroleum) context. Note that actual case studies on which you have worked in design projects or on internships are good as well as some in-house company publications. Ongoing projects in the Denver/Boulder area can also be reported. Your instructor must approve the case study by **Tuesday February 17**. This can be an individual project or a group project (no more than 2 people per group).

- Prepare a report (one per group) to be given as an oral presentation with illustrations for the class. Each of your colleagues in class should receive a one-page summary handout highlighting the main features of your case studies including the major references. The written report should be typed and should not exceed 10 pages (single space, 12 font) including illustrations (figures, tables, diagrams, sketches, etc.) The written reports are due by **Thursday April 23**.

- Each oral presentation should not exceed 20 minutes including 5 minutes for Q&A. The oral presentations will take place during the final exam period. All presentations must be given using Power Point.
This assignment will give you the opportunity to explore a real engineering case study, understand it in depth, and present it to your peers. It will count for 30% of your final grade (20% written report and 10% oral presentation).

Important Policies on Campus

Disability and Medical Conditions

1) If you qualify for accommodations because of a disability, please submit to me a letter from Disability Services in a timely manner so that your needs be addressed. Disability Services determines accommodations based on documented disabilities. Contact: 303-492-8671, Willard 322, and http://www.Colorado.EDU/disabilityservices.

2) If you have a temporary medical condition or injury, see guidelines at http://www.colorado.edu/disabilityservices/go.cgi?select=temporary.html

3) Disability Services' letters for students with disabilities indicate legally mandated reasonable accommodations. The syllabus statements and answers to Frequently Asked Questions can be found at http://www.colorado.edu/disabilityservices

Religious Observances

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. See full details at http://www.colorado.edu/policies/fac_relig.html.

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, culture, religion, politics, sexual orientation, gender, gender variance, 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. See policies at http://www.colorado.edu/policies/classbehavior.html and at http://www.colorado.edu/studentaffairs/judicialaffairs/code.html#student_code

Discrimination and Harassment

The University of Colorado at Boulder policy on Discrimination and Harassment, the University of Colorado policy on Sexual Harassment and the University of Colorado policy on Amorous Relationships apply to all students, staff and faculty. Any student, staff or faculty member who believes s/he has been the subject of sexual harassment or discrimination or harassment based upon race, color, national origin, sex, age, disability, creed, religion, sexual orientation, or veteran status should contact the Office of Discrimination and Harassment (ODH) at 303-492-
2127 or the Office of Judicial Affairs at 303-492-5550. Information about the ODH, the above referenced policies and the campus resources available to assist individuals regarding discrimination or harassment can be obtained at http://www.colorado.edu/odh

Honor Code

All students of the University of Colorado at Boulder are responsible for knowing and adhering to the academic integrity policy of this institution. Violations of this policy may include: cheating, plagiarism, aid of academic dishonesty, fabrication, lying, bribery, and threatening behavior. All incidents of academic misconduct shall be reported to the Honor Code Council (honor@colorado.edu; 303-735-2273). Students who are found to be in violation of the academic integrity policy will be subject to both academic sanctions from the faculty member and non-academic sanctions (including but not limited to university probation, suspension, or expulsion). Other information on the Honor Code can be found at http://www.colorado.edu/policies/honor.html and at http://www.colorado.edu/academics/honorcode/