

# CVEN 5768

## Introduction to Rock Mechanics

### Spring 2019

- Instructor:** Bernard Amadei, ECOT 546, Tel: 303-929-8167  
Email: [amadei@colorado.edu](mailto:amadei@colorado.edu)  
Office Hours: by appointment
- Lectures:** Monday and Wednesday, 11:00-12:15, Room ECCE 1B47
- 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 or 2010.  
- *Practical Rock Engineering*, by E. Hoek, 2007. Can be downloaded from <https://www.rocscience.com/learning/hoek-corner>  
- Readings are also available on-line from the course website
- Web Site:** <https://www.colorado.edu/faculty/amadei/courses/cven-5768-rock-mechanics>  
This website will frequently be 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.

### 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. On-going projects in the Denver/Boulder area can also be reported. Your instructor must approve the case study by **Monday February 18**.
- Prepare a report 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 **Wednesday April 24**.
- 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

### *Accommodations for Disability*

If you qualify for accommodations because of a disability, please submit your accommodation letter from Disability Services to your faculty member in a timely manner so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities in the academic environment. Information on requesting accommodations is located on the [Disability Services website](#). Contact Disability Services at 303-492-8671 or [dsinfo@colorado.edu](mailto:dsinfo@colorado.edu) for further assistance. If you have a temporary medical condition or

injury, see [Temporary Medical Conditions](#) under the Students tab on the Disability Services website.

### *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, (insert your procedures here). See the [campus policy regarding religious observances](#) for full details. For more information on the religious holidays most commonly observed by CU Boulder students consult the [online interfaith calendar](#).

### *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 race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation or political philosophy. 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 [Student Code of Conduct](#).

### *Sexual Misconduct, Discrimination, Harassment and/or Related Retaliation*

The University of Colorado Boulder (CU Boulder) is committed to fostering a positive and welcoming learning, working, and living environment. CU Boulder will not tolerate acts of sexual misconduct (including sexual assault, exploitation, harassment, dating or domestic violence, and stalking), discrimination, and harassment by members of our community. Individuals who believe they have been subject to misconduct or retaliatory actions for reporting a concern should contact the Office of Institutional Equity and Compliance (OIEC) at 303-492-2127 or [cureport@colorado.edu](mailto:cureport@colorado.edu). Information about the OIEC, university policies, [anonymous reporting](#), and the campus resources can be found on the [OIEC website](#). Please know that faculty and instructors have a responsibility to inform OIEC when made aware of incidents of sexual misconduct, discrimination, harassment and/or related retaliation, to ensure that individuals impacted receive information about options for reporting and support resources.

### *Honor Code*

All students enrolled in a University of Colorado Boulder course are responsible for knowing and adhering to the Honor Code. Violations of the policy may include: plagiarism, cheating, fabrication, lying, bribery, threat, unauthorized access to academic materials, clicker fraud, submitting the same or similar work in more than one course without permission from all course instructors involved, and aiding academic dishonesty. All incidents of academic misconduct will be reported to the Honor Code ([honor@colorado.edu](mailto:honor@colorado.edu); 303-492-5550). Students who are found responsible for violating the academic integrity policy will be subject to nonacademic sanctions from the Honor Code as well as academic sanctions from the faculty member. Additional information regarding the Honor Code academic integrity policy can be found at the [Honor Code Office website](#).

