

Fall 2022 – Course Announcement

Advanced Soil Mechanics—CEEN 410/510

3 Hours Credit, Room: TBA, Time: TBA

Instructor: D.V. Griffiths

Coolbaugh Hall: CO252, Tel: 273 3669, d.v.griffiths@Mines.EDU

Web: www.mines.edu/~vgriffit

Advanced soil mechanics concepts and theories as applied to analysis and design in geotechnical engineering. The course has an emphasis on numerical and analytical methods.

Course Outline:

- a Seepage:** Review; Principle of effective stress; Confined flow; Flow nets; Method of Fragments; Introduction to finite difference and finite element solutions to steady seepage problems.
- b Settlement and Consolidation:** Review; Amount and rate of settlement; Boundary/initial conditions; Finite difference and finite element solutions; Sand drains.
- c Slope Stability Analysis:** Review of shear strength; Analytical Methods; Charts; Methods of Slices; Finite element slope stability software.
- d Introduction to Limit Analysis:** Review of limit theorems; Upper and lower bound solutions; Finite Element Limit Analysis (FELA).
- e Failure Criteria for Soil:** A discussion of 3D stress states, principal stress space and stress invariants. Several failure criteria for soil are introduced including Tresca, Mohr-Coulomb and Drucker-Prager type models.

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Prerequisite: A first course in Soil Mechanics.

Additional reading:

“Advanced Soil Mechanics”, B.M. Das, Second Edition, Taylor and Francis, 1997

“An Introduction to Geotechnical Engineering”, R.D. Holtz, W.D. Kovacs and T.C. Sheahan, Second Edition, Prentice Hall, 2011

“Soil Mechanics (SI Edition)”, by T.W. Lambe and R.V. Whitman, Wiley, 1969

Assessment:

Exam 1	0.35
Exam 2	0.35
Coursework	0.3

Grading:

A	B	C	D	F
≥ 90%	≥ 80%	≥ 70%	≥ 60%	< 60%

Exam dates:

Mid-semester	TBA
End-semester	TBA

Students enrolled at the 500-level will receive one additional homework assignment.

Practice questions will be handed out throughout the course but will not be graded.