Advanced Soil Mechanics–CEEN 410/510

Instructor: D.V. Griffiths
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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:


Assessment:

| Exam 1 | 0.35 |
| Exam 2 | 0.35 |
| Coursework | 0.3 |

Grading:

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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.