



# GEOTECHNICAL ENGINEERING-II

## PROF. DEVENDRA NARAIN SINGH

Department of Civil Engineering  
IIT Bombay

**PRE-REQUISITES :** Geotechnical Engineering-I (which I have been offering since last 2/3 years and is in a great demand)

**INTENDED AUDIENCE :** Civil Engineers

**INDUSTRY SUPPORT :** All companies and organization that deal with the Civil infrastructure development and research.

### COURSE OUTLINE :

Geotechnical Engineering-II, a follow up course of GE-I and broadly designed to help students getting a better picture of practice of geotechnical Engineering to solve the real-life problem. Also this course is highly recommended for practicing consultants and engineers.

### ABOUT INSTRUCTOR :

Prof. Devendra Narain Singh is 'D. L. Shah Chair Professor for Innovation' in Department of Civil Engineering at Indian Institute of Technology Bombay. He has obtained his bachelors, masters and doctorate degrees from Indian Institute of Technology Kanpur. His research majorly focuses on geomaterial characterization, contaminant- geomaterial interaction, sensors for soil moisture measurement, modelling of heat migration through soils, utilization of industrial by-products, municipal solid waste management, CCUS and other fields associated with Environmental Geotechnics since 1994. He has guided 40 Ph.D.s and 35 Master students and several are in the process. He is also the editor-in-chief for the Journal of Environmental Geotechnics, ICE (UK).

### COURSE PLAN :

**Week 1:** Introduction; Shear Strength of soils

**Week 2:** Direct Shear Box Test; Interpretation of Direct Shear Test Results; Kf line

**Week 3:** Selection of Parameter (SS); Shear Strength of Cohesive Soils

**Week 4:** Triaxial Test; Interpretation of Triaxial test Results

**Week 5:** Interpretation of Triaxial test Results(contd.); Pore Pressure Parameters

**Week 6:** Stress Paths; Plastic Equilibrium in Soils; Mechanisms of Development of Plastic Equilibrium in Soils

**Week 7:** Earth Pressure Analysis (Trial Wedge) Analysis of Completely Submerged Retaining wall

**Week 8:** Gravity Walls Supporting Cohesive Soil Mass (Backfill); Sloping Backfill; Earth Pressure Analysis

**Week 9:** Sheet Pile Wall Introduction; Analysis of Sheet Piles

**Week 10:** Anchored Bulkheads; Cantilever Sheet Piles; Lateral Earth Pressure Braced Sheet Pile Walls

**Week 11:** slope stability; Slope Instability

**Week 12:** Analysis of Finite Slopes; Finite Slopes Friction Circle Method; Slip Circle Method