

# Geotechnical Measurements & Explorations - Video course

## COURSE OUTLINE

The course prepares the student (graduate level) to be able to make effective learning of soil exploration, in-situ tests and interpretation of test results in design of foundation and soil structure interaction problems. The first module is on index property tests, consolidation test, direct shear tests etc and is a general overview. The remaining modules, dealing with triaxial (static and cyclic) and simple shear testing under stress- and strain-control with pore pressure measurements, subsurface exploration, planning, drilling and sampling techniques and in situ field tests, relevant theoretical concepts and data interpretations for determination of engineering properties of soils, and their application to geotechnical design are presented in such a manner that readers who are unfamiliar with the subject will not face any serious problems in understanding. The basic concepts are presented in the earlier sections. A number of example problem are given in each chapter as well as a fairly large number of representative problem at the end of each module.

**Contents:** Subsurface exploration, planning, drilling and sampling techniques. In-situ field testing and laboratory investigation of soil, including advanced equipments, instrumentation, data acquisition, and measurement techniques. Field tests: SPT, CPT, DCPT, Pressuremeter, Dilatometer, Permeability, etc. Lab tests: Index property tests, Consolidation test, direct shear, triaxial (static and cyclic) and simple shear testing under stress- and strain-control with pore pressure measurements. Relevant theoretical concepts and data interpretations for determination of engineering properties of soils, and their application to geotechnical design. Preparation of site-investigation reports.

## COURSE DETAIL

Sl. No	Topic	No. of Hours
1	<b>Introduction to Soil Mechanics</b> Index properties, 1-d consolidation theory , direct shear tests: Theory and application	6
2	<b>Triaxial tests</b> Triaxial (static and cyclic) and simple shear testing under stress- and strain-control with pore pressure measurements.	6
3	<b>Engineering properties of soil</b> Relevant theoretical concepts for determination of engineering properties of soils	6
4	<b>Subsurface exploration</b> Subsurface exploration, planning, drilling and sampling techniques	6
5	<b>In-situ field tests</b> In-situ field testing and laboratory investigation of soil, including	



NP-TEL

NPTEL

<http://nptel.iitm.ac.in>

## Civil Engineering

### Pre-requisites:

Soil Mechanics  
(Geotechnical  
Engineering I)

### Coordinators:

**Dr. Nihar Ranjan Patra**  
Department of Civil  
Engineering IIT Kanpur

	advanced equipments, instrumentation, data acquisition, and measurement techniques: SPT, CPT, DCPT, Pressuremeter, Dilatometer, Permeability, etc	10
6	<b>Data Interpretation</b> Data interpretations for determination of engineering properties of soils, and their application to geotechnical design. Preparation of site-investigation reports.	6
	<b>Total</b>	<b>40</b>

**References:**

1. Das B. M.: Advanced Soil Mechanics, (2nd Edition), Taylor and Francis, Washington, DC. (1997)
2. Lambe and Whitman: Soil mechanics. John Wiley and Sons. New York. (1969)
3. American Society of Civil Engineers: Soil sampling (1999)
4. Bowles, B: Engineering Properties of Soil and Their Measurements, McGraw-Hill Companies, (1992)
5. Clayton et al., Matthews and Simons: Site Investigation, Blackwell Science, (2005)
6. Head, K.H., Manual of Soil Laboratory Testing, Whittles Publishing, (2006)