



# SOIL MECHANICS / GEOTECHNICAL ENGINEERING I

**PROF. DILIP KUMAR BAIDYA**  
Department of Civil Engineering IIT Kharagpur

**TYPE OF COURSE** : Rerun | Core | UG  
**COURSE DURATION** : 12 weeks (20 Jul' 20 - 9 Oct' 20)  
**EXAM DATE** : 18 Oct 2020

**PRE-REQUISITES** : Engineering Mechanics, Solid Mechanics

**INTENDED AUDIENCE** : Civil Engineering

**INDUSTRIES APPLICABLE TO** : Most of the Civil Engineering companies

## **COURSE OUTLINE :**

Broadly Geotechnical Engineering encompasses two distinct segments: Soil Mechanics and Foundation Engineering. Soil Mechanics deals with study of physical properties of soils, and the relevance of these properties as they affect soil strength, stability, and drainage. Foundation engineering deals with (i) selection of foundation type based on building site conditions and site constraints, (ii) determining size and reinforcement of the foundation and (iii) finally construction of foundation element. This course will focus on the first, soil mechanics. Soil Mechanics is the basis for all geotechnical applications.. One has to learn basic principle of geotechnical engineering through soil mechanics and it is a core course for civil engineering in every college/university across the globe. Every aspect of soil mechanics starting from origin of soil to stability of soil slopes will be covered with great detail under this course.

## **ABOUT INSTRUCTOR :**

Prof. Dilip Kumar Baidya is presently a Professor in Civil Engineering at IIT Kharagpur, graduated in Civil Engineering in 1987 from Bengal Engineering College Sibpur and obtained ME and Ph D from IISc Bangalore in the year 1989 and 93, respectively. Have 25 years of experience in teaching and research and guided more than 25 M Tech dissertations and 7 Ph D theses on Geotechnical Engineering. Visited different countries for presenting papers in the international conferences and served 2 years as Faculty members in the University of West Indies, Trinidad and Tobago.

## **COURSE PLAN :**

- Week 1:** Origin of soil and its Classification
- Week 2:** Three-phase diagram & Weight volume relationship
- Week 3:** Index properties
- Week 4:** Soil Compaction
- Week 5:** Seepage and Permeability
- Week 6:** Effective stress concept
- Week 7:** Boussinesq's theory and Vertical Stress distribution
- Week 8:** Shear strength of soil I
- Week 9:** Shear strength of soil II
- Week 10:** Compressibility of soil
- Week 11:** Consolidation settlement and time rate of settlement
- Week 12:** Introduction to Stability of slopes