



# GEOTECHNICAL ENGINEERING II

## FOUNDATION ENGINEERING

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**PRE-REQUISITES** : Soil Mechanics/Geotechnical Engineering II

**INTENDED AUDIENCE** : Civil Engineering

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

**COURSE OUTLINE** : Broadly Geotechnical Engineering encompasses two distinct segments: Geotechnical engineering I (Soil Mechanics) and Geotechnical Engineering II (Foundation Engineering). Geotechnical Engineering I/Soil Mechanics deals with study of physical properties of soils, and the relevance of these properties as they affect soil strength, stability, and drainage. Geotechnical Engineering II/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 second, Geotechnical Engineering II/Foundation Engineering. One week will be spent for quickly reviewing the soil mechanics and subsequently various topics of foundations will be covered. Although the objective is to select a safe and economical design, there is no unique design or method in foundation engineering. Therefore an attempt is made to connect the theoretical concepts with the practical aspects of foundation engineering. Every civil engineer has to learn basic principle of geotechnical engineering and its application through foundation engineering and both are core courses for civil engineering in every college/university across the globe. Every aspect of foundation as per GATE, Engineering Service and other important competitive Examination will be covered with great detail under this course.

**ABOUT INSTRUCTOR** : Prof. Dilip Kumar Baidya Presently 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. Published more than 100 papers in National/international journals and conferences out of which 3 papers received best paper award. 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. Besides teaching and research, provided consultancy services to various industrial problems. Held several administrative positions at IIT Kharagpur which includes responsible position like Vice Chairman/Chairman JEE for IIT Kharagpur zone, Prof In-charge Examination etc. Fellow of Indian Geotechnical Society and member of International Society for Soil Mechanics and Geotechnical Engineering, Elected member of Executive committee of IGS for 2017-18.

### **COURSE PLAN :**

**Week 1:** Introduction and quick review of Soil Mechanics

**Week 2:** Shallow Foundation and Bearing Capacity

**Week 3:** Bearing Capacity theories and its application

**Week 4:** Settlement of Footing

**Week 5:** Soil Exploration and Geotechnical Investigation

**Week 6:** Earth Pressure Theories

**Week 7:** Stability Analysis of Retaining wall

**Week 8:** Deep Foundations type, selection and load transfer mechanism

**Week 9:** Pile capacity, pile load test and settlement

**Week 10:** Sheet pile wall

**Week 11:** Deep Excavation

**Week 12:** Introduction to Machine foundation