



# FOUNDATION ENGINEERING

## **PROF. KOUSIK DEB**

Department of Civil Engineering  
IIT Kharagpur

**INTENDED AUDIENCE :** Civil Engineering

**PRE-REQUISITES :** Soil Mechanics

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

## **COURSE OUTLINE :**

This course is an undergraduate core course. The course will focus on the design of shallow foundation and axially loaded pile foundation. The field and laboratory soil testing methods will be discussed to determine the required design parameters. Lateral earth pressures theories and design of various retaining structures will be covered. Design of sheet piles and bracing system will also be discussed. It will also focus on soil arching and its application to design the underground conduits. The selection of proper foundation or characteristics of foundations for different soils will be discussed. The course is suitable for undergraduate students who are preparing for competitive examination like GATE, IES and for university or college examinations. Field Engineers can also be benefited from this course.

## **ABOUT INSTRUCTOR :**

Prof. Kousik Deb is presently working as Associate Professor in Civil Engineering at IIT Kharagpur. Dr. Deb has more than 11 years of research experience and working in the areas of Geosynthetic- Reinforced Earth, Numerical Modeling, and Embankment stability. He has published/accepted 100 research articles including about 60 papers in referred journals. He has developed number of numerical and analytical models to study the behavior of improved grounds, embankment stability and underground structures. Under Dr. Deb's guidance, 5 Ph.D. are awarded and 5 more are in progress. He has also supervised 13 M.Tech dissertations. Dr. Deb has completed 2 sponsored research projects funded by DST. He has successfully completed more than 12 consultancy projects. As a visiting research fellow at RWTH, Aachen, Germany under DAAD Fellowship; He is the recipient of IIT Roorkee Shamsheer Prakash Research Award for outstanding research contribution in Geotechnical Engineering by Young Indian Researcher. He also received IEI Young Engineers Award; Excellent Paper Award to Junior Individuals-2008 given by International Association for Computer Methods and Advances in Geomechanics (IACMAG), USA. Dr. Deb also selected for Endeavour Research Fellowship to undertake a Postdoctoral Research programme in Australia. Dr. Deb has gained expertise in the cutting edge technologies on ground improvement such as applications of geosynthetics in roadways. Dr. Deb has offered course on Foundation Engineering under NPTEL Online Certification Programme.

## **COURSE PLAN :**

- Week 01 :** Introduction, Soil Exploration
- Week 02 :** Penetration Tests, Geophysical Exploration
- Week 03 :** Bearing capacity of shallow foundation
- Week 04 :** Settlement of shallow foundations
- Week 05 :** Design of shallow foundation
- Week 06 :** Deep foundation, load transfer mechanism in piles, pile capacity, Pile load test
- Week 07 :** Pile group capacity, settlement of pile, Design of Pile Foundation
- Week 08 :** Lateral Earth Pressures-I
- Week 09 :** Lateral Earth Pressures-II
- Week 10 :** Earth retaining structures
- Week 11 :** Sheet Piles and Braced Excavation
- Week 12 :** Soil Arching, Underground Conduits