



SOIL STRUCTURE INTERACTION

PROF. KOUSIK DEB

Department of Civil Engineering
IIT Kharagpur

TYPE OF COURSE : Rerun | Elective | UG/PG

COURSE DURATION : 12 weeks (24 Jan' 22 - 15 Apr' 22)

EXAM DATE : 23 Apr 2022

PRE-REQUISITES : Soil Mechanics and Foundation Engineering

INTENDED AUDIENCE : Civil Engineering, Geotechnical engineering, Environmental Engineering,
Geoenvironmental Engineering Students

INDUSTRIES APPLICABLE TO : Most of the Civil Engineering companies

COURSE OUTLINE :

The course will focus on the different soil-structure interaction models for shallow foundation under various loading conditions and subgrade characteristics. Piles under uplift and lateral loading conditions will also be discussed. Beams and plates on elastic foundation problems & different foundation models and their solution with the help of Finite Difference Method (FDM) will be discussed. The application of foundation models in real life problems will also be discussed.

ABOUT INSTRUCTOR : Prof. Kousik Deb is presently working as Associate Professor in Civil Engineering at IIT Kharagpur. Prof. 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.

COURSE PLAN :

- Week 1** : Introduction, critical study of conventional methods of shallow foundation design
- Week 2** : Critical study of conventional methods of shallow foundation design (continued),
- Week 3** : Determination of subgrade modulus and parameters influencing subgrade modulus(continued)
- Week 4** : Time-dependent response, Beams on Elastic Foundation, infinite beam.
- Week 5** : Infinite beam (continued),
- Week 6** : Semi-infinite beam (continued)
- Week 7** : Beams with finite length and various end conditions
- Week 8** : Continuity among the foundation soil layers
- Week 9** : Plates on Elastic Foundation (rectangular and circular)
- Week 10** : Use of Finite Difference Method (FDM) for soil structure interaction problems
- Week 11** : Group action of pile, Elastic Analysis, settlement of pile group under compressive load by Interaction Factor Approach, negative skin friction.
- Week 12** : Laterally loaded piles, Reese and Matlock's generalized solution, displacement of pile group under lateral load by Interaction Factor Approach, Uplift capacity of piles and anchors.