Course Type	Course Code	Name of Course	L	T	P	Credit
DC	NCEC538	Advanced Foundation Engineering	3	1	0	4

Course Objective
The course aims at the development of deeper understanding of foundation analyses, choice of design parameters, advanced topics of foundation design and analyses.
Learning Outcomes
Upon successful completion of this course, the students should be able to: ● Identify a suitable foundation system for various structures ● Be capable of analyzing and designing the foundation system for various structures

Unit No.	Topics to be Covered	Contact Hours	Learning Outcome
1	**Subsurface Exploration** Boring, Sampling, SPT, CPT, Geophysical methods, Bore log and soil report.	4L+2T	To understand different methods of geotechnical exploration and preparation of exploration report
2	**Shallow Foundations** Bearing capacity theories Bearing capacity of foundation on slopes, layered soils, eccentric and inclined loads; Bearing capacity based on in-situ test data. Settlement analysis.	9L+3T	To know about bearing capacity and settlement estimation of shallow foundations and their Geotechnical design.
3	**Rigid and Elastic Analyses of Foundation** Design of combined footings and rafts. Elastic analysis, Winkler foundation model, Analysis of beams on elastic foundations;	9L+3T	Understand the beam on the elastic foundation concept, the Winkler model, and how to analyze beam deflection under loading.
4	**Deep Foundations** Pile foundations, Load transfer mechanism, Pile capacity in various soil types, Negative skin friction, Group action, Settlements, Laterally loaded vertical piles, load test on piles, Codal provisions. Micro-pile, Anchor pile.	12L+4T	Estimation of load carrying capacity isolated and group of piles using analytical and field methods. Introduction to well foundation and their bearing capacity
5	**Introduction to machine foundations**: Permissible amplitudes of vibrations, Factors affecting the resonant frequency and amplitudes of vibrations; Foundations under Reciprocating Machine: Resonant frequency of the block foundations.	8L+2T	Introduction to analysis of machine foundations
	Total Contact Hours	**42L + 14T**	

Text Books:

1. Das, B.M. (2011). Principle of Foundation Engineering, 7th Edition, Cengage Learning, USA
2. Murthy, V.N.S. (2010). Advanced Foundation Engineering, CBS Publisher.

Reference Books:

1. Bowles, J.E. (1996). Foundation Analysis and Design, McGraw Hill Education, New Delhi, India.
2. Kurian N. P. (2005). Design of Foundation Systems: Principles and Practices. Alpha.
3. Katzenbach, R., Leppla, S. and Choudhury, D. (2017). Foundation Systems for High-Rise Structures, CRC Press, New York.