Course Type	Course Code	Nameof the Course	L	T	P	Credits
DC	CEC302	**Foundation Engineering**	3	0	0	9

Course Objective

To develop an understanding of concepts regarding the stability and settlement analysis of Geotechnical problems.

Learning Outcomes

After studying this course, students should be able to:

- To understand the buckling behaviour of column
- Determination elastic properties of given models
- Evaluation of mix proportions for given strength of concrete
- To know different NDT tests on concrete

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Stability problems in Geotechnical engineering: Method of analysis, Limit equilibrium method	2	Analysis of stability problem in geotechnical engineering
1	**Stability of slopes:** Stability analysis of infinite slopes, Stability analysis of finite slopes, Swedish circle method, Friction circle method, Bishop's method, stability analysis of earth dam slopes for different conditions.	6	Slope stability analysis as per limit equilibrium method
2	**Earth pressures:** Earth pressure theories of lateral earth pressure, Active and passive earth pressures in cohesion less and cohesive soils, Rankine's and Coulomb's earth pressure theories Types of retaining structures, Stability considerations of gravity and cantilever retaining walls. Stipulations as per Indian and other standards.	8	Lateral earth pressure and design of earth retaining structures
3	**Bearing Capacity:** Terzaghi's bearing capacity theory, Bearing capacity of Square, Rectangular, Circular and Continuous footings, Meyerhof's theory, Vesic Method, Skempton's method, Effect of ground water table on bearing capacity. Determination of Bearing capacity as per BIS	6	Limit equilibrium analysis and determination of bearing capacity of shallow foundation
4	**Foundations:** Types of foundations, Design of shallow foundations from laboratory and field test data, Settlement analysis of footings	6	Geotechnical design and settlement evaluation of shallow foundations
5	**Pile Foundation:** Classification of piles, Load carrying capacity of piles, Types and methods of construction, estimation of pile capacity from static and dynamic formulae, Negative skin friction. Group action of piles, capacity and settlement of group of piles, Pile load tests.	10	Introduction to pile foundation and determination of its load carrying capacity .
6	Design examples of foundation and retaining structures as per relevant Indian standards	4	Design of geotechnical structures as per standard guidelines

Text Books

1. Das, B.M. (2011). Principle of Foundation Engineering, 7th Edition, Cengage Learning, USA.
2. 3. Murthy, V.N.S. (2006). Geotechnical Engineering, Marcel Dekker Inc, New York, USA.

Reference Books:

1. Budhu, M. (2010). Soil Mechanics and Foundations, John Wiley & Sons.
2. Ranjan, G. and Rao, A.S.R. (2016). Basic and Applied Soil Mechanics, 3rd Edition, New Age International Publishers, India.
3. IS 6403: Determination of Bearing capacity of shallow Foundation, BIS New Delhi
4. IS: 2911: Design and Construction of piles, BIS New Delhi