NIRMA UNIVERSITY

Institute of Technology

School of Engineering

Bachelor of Technology - Civil Engineering

Semester- V

L	T	P	C
3	0	2	4

Course Code	2CL503
Course Name	Foundation Engineering

Course Outcomes:

At the end of the course, students will be able to –

1. evaluate the engineering properties of soils
2. analyze and design shallow foundation
3. analyze and design deep foundation
4. assess stability of retaining structure & slopes and select appropriate ground improvement technique.

Syllabus: Teaching hours: 45

Unit 1: Soil Investigations **Hours: 06**

Methods, stages, planning, sampling, field tests, report.

Unit 2: Lateral Earth Pressures **Hours: 07**

Introduction, earth pressure analysis: submerged soil, level and inclined backfill, pressure calculations for retaining walls, stability analysis, base pressure.

Unit 3: Shallow Foundations **Hours: 12**

Types of foundation; Bearing capacity analysis: analytical methods, using penetration tests, factors affecting; Settlement: causes, analysis, factors affecting, control; Foundation: selection and design of shallow foundation.

Unit 4: Consolidation of Soils **Hours: 04**

One-dimensional theory, settlement analysis and experimental evaluation

Unit 5: Deep Foundation **Hours: 07**

Introduction to deep foundations, pile foundation: classification, load carrying capacity; Pile groups: efficiency and settlement, Pile load test.

Unit 6: Stability of Slopes **Hours: 05**

Slope Stability analysis: cohesive and non-cohesive soils, factor affecting stability and remedial measures, reinforced earth.

Unit 7: Ground Improvement Techniques **Hours: 04**

Introduction, need, methods: drainage, chemical and mechanical stabilization of soils. Liquefaction: phenomenon and remedial measures.

Self-Study:

The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents.

Laboratory Work:

Laboratory work will be based on above syllabus with minimum 10 experiments to be incorporated.

Suggested Readings:

1. Das, B. M. *Principles of Foundation Engineering*, C.B.S Publishers
2. Gulhati, S. and Datta, M. Geotechnical Engineering, Tata McGraw Hill.
3. Bowles, J.E. *Foundation Analysis and Design*, McGraw Hill.
4. Coduto, D.P., Kitch, W.A. & Yeung, M.R. *Foundation Design: Principles and Practices*, Pearson
5. Terzaghi, K.V., Peck, R.B. & Mesri, G. *Soil Mechanics in Engineering Practice*, John Wiley
6. Arora, K.R. *Soil Mechanics and Foundation Engineering*, Standard Publication

L= Lecture, T= Tutorial, P= Practical, C= Credit

w.e.f. academic year 2020-21 and onwards