

III Year II Semester
Code: 17CE601

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GEOTECHNICAL ENGINEERING II

Course Objectives:

1. To impart to the student knowledge of types of shallow foundations and theories required for the determination of their bearing capacity.
2. To enable the student to compute immediate and consolidation settlements of shallow foundations.
3. To impart the principles of important field tests such as SPT and Plate bearing test.
4. To enable the student to imbibe the concepts of pile foundations and determine their load carrying capacity.

Course Outcomes:

1. The student must be able to understand about earth slopes and can do stability analysis
2. The student must be able to understand the various types of shallow foundations and decide on their location based on soil characteristics.
3. The student must be able to compute the magnitude of foundation settlement to decide the size of the foundation.
4. The student must be able to use the field test data and arrive at the bearing capacity.
5. The student must be able to design Piles based on the principles of bearing capacity.
6. The student must be able to explore different types of soil.

SYLLABUS

UNIT – I

Stability of Slopes: Infinite and finite earth slopes in sand and clay – types of failures – factor of safety of infinite slopes – stability analysis by Swedish arc method, standard method of slices – Taylor’s Stability Number-Stability of slopes of dams and embankments - different conditions.

UNIT – II

Earth Retaining Structures: Rankine’s& Coulomb’s theory of earth pressure – Culmann’s graphical method - earth pressures in layered soils.

UNIT-III

Shallow Foundations – Bearing Capacity Criteria: Types of foundations and factors to be considered in their location - Bearing capacity – criteria for determination of bearing capacity – factors influencing bearing capacity – analytical methods to determine bearing capacity – Terzaghi’s theory - IS Methods. Settlement Criteria: Safe bearing pressure based on N- value – allowable bearing pressure; safe bearing capacity and settlement from plate load test – Types of foundation settlements and their determination – allowable settlements of structures.

UNIT –IV Pile Foundations: Types of piles – Load carrying capacity of piles based on static pile formulae – Dynamic pile formulae– Pile load tests - Load carrying capacity of pile groups in sands and clays.

UNIT-V

Well Foundations: Types – Different shapes of well – Components of well –functions – forces acting on well foundations - Design Criteria – Determination of steining thickness and plug - construction and Sinking of wells – Tilt and shift.

UNIT – VI

Soil Exploration: Need – Methods of soil exploration – Boring and Sampling methods – Field tests – Penetration Tests – Pressure meter – planning of Programme and preparation of soil investigation report.

Text Books:

1. Principles of Foundation Engineering, Das, B.M., (2011), 6th edition Cengage learning.
2. Basic and Applied Soil Mechanics, GopalRanjan& A.S.R. Rao, New Age International Pvt. Ltd, (2004).

References:

1. Foundation Analysis and Design, Bowles, J.E., (1988), 4th Edition, McGraw-Hill Publishing Company, Newyork.
2. Analysis and Design of Substructures by Swami Saran, SaritaPrakashan, Meerut.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	1	3	3	3	1	1	2	1	1	3	3	3	3
CO2	3	3	3	3	3	3	1	1	2	1	1	3	3	3	3
CO3	3	3	3	3	3	3	1	1	2	1	2	3	3	3	2
CO4	3	3	3	3	3	3	1	1	1	1	1	3	3	3	3
CO5	3	3	3	3	3	3	1	1	1	1	2	3	3	3	3
CO6	3	3	3	3	2	3	1	1	3	1	2	3	3	3	3