

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. SEMESTER: VI

Civil Engineering

Subject Name: **Geo Technical Engineering – II**
 Subject Code: **160606**

Teaching Scheme				Evaluation Scheme		
Theory	Tutorial	Practical	Total	University Exam (Theory) (E)	Mid Sem Exam (Theory) (M)	Practical (I)
4	0	2	6	70	30	50

Module - I:

Sr. No	Course Content
1.	Stability of Slopes: Infinite and finite slopes, factor of safety, type of slope failure, stability of infinite slopes, finite slopes forms of slip surfaces, limit equilibrium method and critical stage instability analysis, effects of tension crack and submergence, C-analysis-method of slices, Taylor's stability no., use of Bishop's method.

Module II:

Sr. No	Course Content
1.	Earth Pressure: Types of lateral earth pressure, Rankine's and Coulomb's earth pressure, theory and their application for determination of lateral earth pressure under different conditions, Rebhann's and Culmann's Graphical methods of determination of lateral earth pressures.

Module III :

Sr. No	Course Content
1.	Stress Distribution of Soils: Causes of stress in soil, geostatic stress, Boussinesque's equation, stress distribution diagrams, Newmark's influence chart Westergard's equation, contact pressure, stresses due to triangular and other loadings.
2.	Basics of foundation: Types of foundation, Factors affecting the selection of type of foundations, steps in choosing types of foundation.
3.	Subsurface Investigation: Objectives of exploration, planning of exploration program, soil samples and soil samplers, field penetration tests: SPT, SCPT, DCPT. Introduction to geophysical methods, Bore log and report writing.

Module IV :

Sr. No	Course Content
1.	Bearing Capacity of Shallow Foundation : Introduction, significant depth, design criteria, modes of shear failures. Detail study of bearing capacity theories (Prandtl, Rankine, Terzaghi, Skempton), bearing capacity determination using IS Code, Presumptive bearing capacity. Settlement, components of settlement & its estimation, permissible settlement, Proportioning of footing for equal settlement, allowable bearing pressure. Bearing capacity by use of penetration test data and by plate load test. Bearing capacity of raft. Factors affecting bearing capacity including Water-Table. Contact pressure under rigid and flexible footings. Floating foundation. Types of pavements & its design.

Module V :

Sr. No	Course Content
1.	Pile foundations : Introduction, load transfer mechanism, types of piles according to their composition, their method of installation and their load carrying characteristics, piles subjected to vertical loads- pile load carrying capacity from static formula, dynamic formulae (ENR and Hiley), penetration test data & Pile load test. Pile group: carrying capacity, efficiency and settlement. Negative skin friction. Under-reamed pile foundation-its concept, design & field installation.

Note: Each module carries equal weight age and teaching hours.

Term Work:

Term work shall consist of laboratory work (Minimum 10 Experiments from listed below) and tutorials (minimum 25 problems) based on above course. Practical examinations shall consists of oral based on term work and above course.

IS Codes:

1. Code of practice for determination of bearing capacity of shallow foundation IS:6403
2. Code of practice for design and construction of pile foundation- IS:2911 (Part I to IV)
3. Method for standard penetration test for soil- IS:2131
4. Code of practice for subsurface investigation for foundation- IS:1892
5. Code of practice for structural safety of buildings: Shallow Foundations- IS:1904
6. Code of practice for calculation of settlement of foundations- IS:8009

Geotechnical Engineering-LAB II

1. Auger boring/sampling
2. Standard/dynamic cone penetration test
3. Static cone penetration test
4. In site permeability test
5. Free swell and swell potential
6. Swelling pressure test
7. Model test on pile driving.
8. Model pile load test.
9. Panning site investigations for a real life problem- project mode tests.

Text Books:

1. B.C. Punamia; Soil Mechanics & Foundation Engineering; Laxmi Pub. Pvt. Ltd., Delhi
2. Arora K.R.; Soil Mechanics & Foundation Engineering; Standard Pub., Delhi

Reference Books:

1. P.Purushothama Raj; Soil Mechanics and Foundation Engineering; Pearson Education.
2. Alamsingh; Soil Mechanics & Foundation Engineering; CBS Publishers & Distributors, Delhi
3. Taylor D.W.; Fundamentals of Soil Mechanics; Asia Publishing House, Mumbai
4. V. N. S. Murthy; Soil Mechanics & Foundation Engineering; CRS Press, Taylor & Francis Group, New York
5. Gopal Ranjan, Rao A.S.R.; Basic and applied soil mechanics; New age int. (p) ltd.
6. Das Braja M; Principles of Geotechnical Engineering; Thomson Asia Pvt. Ltd.