

3/4 B.Tech. SIXTH SEMESTER

CE6T6

GEOTECHNICAL ENGINEERING – II

Credits: 4

Lecture: 4 periods/week

Internal assessment: 30 marks

Tutorial: 1 period /week

Semester end examination: 70 marks

Objectives:

- To know the soil exploration, field tests involved in assessing the quality of soils
- To calculate the earth pressures and check the stability of slopes and retaining walls.
- To calculate the Safe Bearing Capacity (SBC) of soils and to understand about the importance and suitability of pile and well foundations.

Learning outcomes:

A student learn and able to find out

- The Soil Profile in a given location.
- A student able to select suitable foundation for a given structure and site.
- Expertise in the calculation of load carrying capacity of selected foundation.

Gain experience in solving field geotechnical engineering problems such as slope stability and earth retaining structures

UNIT – I

SOIL EXPLORATION:

Need – Methods of soil exploration – Boring and Sampling methods – Field tests – Penetration Tests – Plate load test – Pressure meter – planning of Programme and preparation of soil investigation report.

UNIT – II

EARTH SLOPE STABILITY:

Infinite and finite earth slopes – types of failures – factor of safety of infinite slopes – stability analysis by Swedish arc method, standard method of slices, Bishop's Simplified method – Taylor's Stability Number- Stability of slopes of earth dams under different conditions.

UNIT – III

EARTH PRESSURE THEORIES:

Rankine's theory of earth pressure – earth pressures in layered soils – Coulomb's earth pressure theory – Culmann's graphical method

UNIT-IV

RETAINING WALLS:

Types of retaining walls – stability of retaining walls.

UNIT – V

SHALLOW FOUNDATIONS:

Types - choice of foundation – Location of depth – Safe Bearing Capacity – Terzaghi, Meyerhof, Skempton and IS Methods

UNIT-VI

SAFE BEARING CAPACITY:

Safe bearing pressure based on N- value – allowable bearing pressure; safe bearing capacity and settlement from plate load test – allowable settlements of structures - Settlement Analysis

UNIT -VII**PILE FOUNDATION:**

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 – Settlement of pile groups.

UNIT-VIII**WELL FOUNDATIONS:**

Types – Different shapes of wells – Components of wells – functions and Design Design Criteria – Sinking of wells – Tilts and shifts.

Learning resources**Text books:**

1. Basic and Applied Soil Mechanics by Gopal Ranjan and Rao A.S.R., New Age International Pvt. Ltd, 2004.
2. Foundation Engineering by Varghese P.C., Prentice Hall of India., New Delhi, 2008.
3. Soil Mechanics and Foundations, (16th edition) Punmia, B.C., Ashok Kumar Jain and Arun Kumar Jain, Laxmi Publications Pvt. Ltd. New Delhi, 2005.

Reference books:

1. Principles of Foundation Engineering, (6th edition) Das B.M., Indian edition, Thomson Engineering, 1999.
2. Foundation Analysis and Design (4th Edition) Bowles J.E., McGraw-Hill, Newyork, 1988.
3. Analysis and Design of Substructures by Swami Saran, Oxford and IBH Publishing Company Pvt Ltd., 1998.
4. Geotechnical Engineering by Gulhati S. K. and Manoj Datta, Tata McGraw-Hill, New Delhi. 2005.

Web Reference books: NPTEL