GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - Civil Engineering

SEMESTER: V

Subject Name: **Foundation Engineering**
Subject Code: **X50603**

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

Sr. No	Course Content
1.	**Introduction:** Types of foundation, Factors affecting the selection of type of foundations, steps in choosing types of foundation.
2.	**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.
3.	**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.
4.	**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.
5.	**Foundations on problematic soil:** Significant characteristics of expansive soil, footing on such soils, Problems and preventive measures. Under-reamed pile foundation-its concept,design & field installation. Significant characteristics of silt and loess, problems & remedial measures,

	footing on such soils.
6.	**Introduction to GeoSynthetics:** Types and uses.

Term Work:

Term work shall consist of laboratory work and tutorials (mini.30 problems) based on above course. Practical examination shall consist of oral based on term work.

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

Reference Books:

1. Arora K.R.; *Soil Mechanics & Foundation Engineering*
2. Murthy V.N.S.; *Soil Mechanics & Foundation Engg Vol.I*
3. Peck Ralph B., Thornburn Thomas H., Hanson Walter E.; *Foundation Engineering*
4. Das Braja M; *Principles of Foundation Engineering*