BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, PILANI
INSTRUCTION DIVISION

First Semester 2015-2016

Course Handout (Part II)

Date: 16.05.2016

In addition to part-I (General Handout for all courses appended to the time table) this portion gives further details regarding the course.

Course No. : **CE G620**

Course Title : **Advanced Foundation Engineering**

Instructor-in-charge : **Dr. Anasua GuhaRay**

1. Course Description:

Types of foundations, capacity and settlement of foundations, soil properties, design considerations, discrete method for analysis, design of shallow and deep foundations, failure in foundations, remedial measures, case studies of foundations.

2. Scope and Objective of the Course:

All engineered construction resting on the earth must be carried by some kind of interfacing element called a foundation. This course is aimed understand different types of foundation, estimation of bearing capacity of underlying soil, settlement behaviour, design of various types of foundation and case studies in foundation. Complete design of foundation systems considering geotechnical as well structural (R.C.C.) design of foundation systems (spread footing, combined footing, raft foundation, ring foundation, pile foundations, pile cap, caissons, well foundations, machine foundations, basements walls, retaining structures etc.) Emphasis will be given on complete coverage of Indian code of practice for various type of foundation.

3. Text Book:

T1	Bowles, J. E. (1988). Foundation analysis and design.
T2	Murthy, V. N. S. (2002). Geotechnical engineering: principles and practices of soil mechanics and foundation engineering. CRC Press.

4. Reference Books:

R1	Varghese, P.C. (2009) "Design of reinforced concrete foundations" Prentice-Hall of India
R2	Tomlinson, M. (1994). Pile design and construction practice. 4th edition, CRC Press.
R3	Prakash, S., & Sharma, H. D. (1990). Pile foundations in engineering practice. John Wiley & Sons.
R4	Relevant IS codes

5. Course Plan

Learning Objective	Topics to be covered	No of Lec.	Ref. to Ch.
Types of Foundation	Introduction to foundation engineering, different types of foundation, Requirements of good foundation	1	1, T1
Soil exploration technique	Immediate settlement, consolidation settlement, total settlement, settlement from field tests	2-3	3T1
Bearing capacity of shallow foundations	Failure mechanism, generalized bearing capacity eqn, bearing capacity from field tests	4-6	4 T1: 12, T2, R4
Foundations subjected to eccentric and inclined loads	Effect of load eccentricity and inclination, pressure distribution, bearing capacity, tilt and settlement	7-9	4 T1: 12 T2
Foundations on layered soils, slopes	Design of foundations on slopes, foundations on layered soils, rocks	10-12	5 T1: 12 T2
Foundation Settlement calculation	Settlement problems, Stress in soil mass, Immediate settlement calculation, field plate load tests	13-15	5 T1: 13 T2
Design of shallow foundations	Geotechnical and structural design of isolated footings, strip, rectangular and trapezoidal combined footings – strap – balanced footings	16-18	8 T1: 22 R1
Design of raft foundations	Design of flat slab Raft foundation, Design of beam and slab Raft foundation – Approximate flexible method of raft design - Compensated foundations.	19-21	10, T1
Pile Foundations	Types of Piles and their applications, Single Pile and Pile group - Load capacity – Settlements, Pile load test, Pile Dynamic analysis	22-25	16, 17 T1: 15 T2: 2 R2, R3, R4
Laterally loaded Pile Foundations and seismic design	Different methods for estimating Lateral load capacity of piles	26-29	16 T1: 15 T2: 2 R2
Design of pile foundation	Structural design of piles, pile cap, under-ream piles, detailing.	30-33	7 R2
Machine Foundation	Types - General requirements and design criteria - General analysis of machine-foundations-soil system - Stiffness and damping parameters - Tests for design parameters -	34-36	18 T1:15 T2

Drilled Piers And Sheet piles	Introduction, capacity analysis of drilled piers, Settlement, analysis of sheet piles	37-40	20 T2
	Total	40	

6. Evaluation Scheme:

Component	Duration	Weightage	Date & Time	Remarks
Test – I	1 hr	15%		OB
Test-II	1 hr	15%		CB
Projects/ Open Book/Assignments /Research oriented activities	-	40%	Continuous	-
Comprehensive	3 hrs	30%		CB

7. Chamber Consultation Hour: To be announced in the class
8. Reading assignments will be given whenever necessary.
9. Notice: Notices will be displayed on Civil Engg. Group Notice Board only.

Instructor-in-charge