## Lesson Plan

School : Engineering Department: Civil Engineering Instructor: Dr. U.K.Das Email: ukrdas@tezu.ernet.in

### Course Code: CE323 Name: Geotechnical Engineering II 3 - 0 - 0 : 3 Credits

## **Course outline and suggested reading:**

Soil exploration & site investigation: Planning of subsurface exploration, methods, sampling, samplers, in-situ tests, bore log.

Shallow foundations: Classifications, shallow & deep foundations, bearing capacity theory, Terzaghi,

Meyerhoff, IS code method for determination of bearing capacity, effect of depth of water table,

eccentric & inclined loads. Bearing capacity from in-situ tests, immediate & consolidation settlements, corrections, settlement from field tests.

Deep Foundations: Classifications of piles, load carrying capacity of piles, group action, settlement, negative skin friction, lateral load capacity, pile load tests.

Cassion foundations: Types & selections, forces & moments, depth determination.

Ground improvement techniques: Improvement of soil using admixtures, grouting, vertical drains, stone columns.

Introduction to soil dynamics & machine foundation.

Stability of slopes: causes of slope failures, introduction to different methods of slope stability analysis.

## **Text Books:**

1. Braja M Das, Principles of Foundation Engineering, Thomson Learning

 Gopal Ranjan & A.S.R. Rao, Basic and Applied Soil Mechanics, New Age International, 2000.

#### **Reference Books:**

- S.R. Kaniraj, "Design Aids in Soil Mechanics & Foundation Engineering", Tata McGrawHill, 1988.
- 2. J.E. Bowles, "Foundation Analysis and Design", McGraw Hill, 1996.
- 3. V.N.S. Murthy, Soil Mechanics & Foundation Engineering, Dhanpat Rai & Sons.

## Course Plan

Module No.	Main Topic	Details	Hours			
Module 1	Soil exploration & site investigation	Planning of subsurface exploration, methods, sampling, samplers,	2			
	(5 hrs)	In-situ tests. (SPT, Plate Load Test)	3			
		Classifications, shallow & deep foundations	1			
		Bearing capacity theory : Terzaghi,	3			
	Shallow foundations	Bearing capacity theory : Meyerhof	2			
Madula 2		IS code method for determination of bearing capacity	2			
Wiodule 2	(15 hrs)	Effect of depth of water table	1			
		Eccentric & inclined loads,	2			
		Bearing capacity from in-situ tests,	2			
		Immediate & consolidation settlements, corrections, settlement from field tests.	2			
		Classification of piles	1			
		Load carrying capacity of piles,	3			
	Deep Foundations	Pile group action,	2			
Module 3		Settlement of piles	2			
	(12 hrs)	Negative skin friction,	1			
		Lateral load capacity,	1			
		Pile load tests.	2			
	Ground improvement	Improvement of soil using admixtures, grouting	1			
Module 4	teenniques	Vertical drains, stone columns,	1			
Module 4	(8 hrs.)	Introduction to soil dynamics & machine foundation.	2			
		Stability of slopes: causes and prevention, introduction to different methods of analysis.	4			
Total No of Classes						

# **Evaluation Plan**

SI.	Mode of assessment	Туре	Marks	Duration	Syllabus
1	Test 1	Written	25	45 minutes	From beginning
2	Test 2 Mid Term	Written	40	120 minutes	From beginning
3	Test 3	Written type (including objective type), assignment, Quiz, Seminar, Field visit etc	25	45 minutes	
4	Test 4 End Term	Written	60	180 minutes	From Test-II till Test IV (may include some units of the syllabus covered under Test-I and Test-II)
Gra	ind total			150 marks	

**<u>Pedagogy:</u>** Lecture and Discussion; Problem solving; Assignment; Quiz.

## Course outcome:

CO1	Apply the knowledge of geotechnical engineering in various types of sampling operations and to carry out the different field tests on soils.
CO2	Demonstrate the knowledge of geotechnical engineering in providing solutions for various ground improvement and slope stabilization.
CO3	Identify, formulate and differentiate between the various theories and assumptions on shallow and deep foundations.
C04	Identify and analyse the problems related to different foundation types in static and dynamic conditions.

## Articulation Matrix

СО		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2	PSO3
CO1		2	1	-	3	-	-	-	-	-	-	-	-	1	3	2
CO2		3	2	1	-	-	1	-	-	-	-	-	-	2	3	1
CO3		2	3	-	-	1	-	-	-	-	-	-	-	3	2	1
C04		2	3	-	-	1	-	-	-	-	-	-	-	3	2	1
CE32	23	2.25	2.25	1	3	1	1	1	-	-	-	-	-	2.25	2.50	1.25