Kadi Sarva Vishwavidyalaya's
LDRP Institute of Technology & Research
Gandhinagar-382 015

M.E. (Civil) (Infrastructural Engineering), Semester: II
Subject Name: Soil Improvement Techniques
Subject Name: MECV203

A. Learning objectives:

The objective of this course is

- To understand the soil behaviors before and after application of loads
- To be able to design various foundations.
- To be aware of various reinforced techniques to enhance Soil Bearing Capacity of
- poor soils

B. Teaching scheme (credits and hours):

Teaching Scheme				Credit Scheme			Evaluation Scheme				
Lect Hrs	Tut Hrs	Pract. Hrs	Total	Theory	Pract/TW	Total	UE	IE	CIA	PRAC/VIVA	Total
04	02	00	06	04	01	05	70	30	20	30	150

C. Detailed Syllabus :

- **Formation and development of ground** – Formation of rock,soil and soil profile , soil distribution in India , alternation of ground after formation , reclaimed soils, ground improvement potential
- **Compaction**- Introduction ,compaction mechanics, field procedure,surface compaction, selection of field compaction procedures, compaction quality control
- **Drainage Methods-** Introduction seepage, filter requirements, ground water, ground water and seepage control, methods of dewatering systems, design steps for dewatering systems, drains
- **Precompression and vertical drains-** Introduction compressibility of soils and consolidation, preloading and surcharge fills, monitoring of compression, vertical drains, dynamic consolidation, consolidation by electro-osmosis
- **Vibration methods-** Introduction, vibro-compaction, vibro-displacement compaction.
- **Grouting and Injection-** Introduction, Aspect of grouting, grouting procedure, Application
- **Mechanical ,cementing and chemical stabilization-** Introduction, requirements of soil stabilization , mechanical stabilization , Portland cement (cementing) stabilization , Bituminous stabilization ,chemical stabilization, construction methods
- **Geosynthetics-** Introduction, geosynthetic types, properties of geosynthetics,application of geosynthetics.

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D. Lesson Planning:

Unit No	Topics	Lectures (Hours)	Weightage
1	Formation and development of ground	7	10
2	Compaction	8	12
3	Drainage Methods	8	12
4	Pre compression and vertical drains	6	12
5	Vibration methods	8	12
6	Grouting and Injection-	7	14
7	Mechanical ,cementing and chemical stabilization	8	14
8	Geosynthetics	8	14
	Total	**60**	**100**

E. List of Tutorials

Sr no	Tutorial Content
1	Site visits and its report presentation and or seminar presentations
2	Assignments for the topics covered in theory classes

H. Instructional Method and Pedagogy (Continuous Internal Assessment (CIA) Scheme)

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
- Lectures will be conducted with the aid of multi-media projector, black board, OHP etc.
- Attendance is compulsory in lectures and laboratory which carries 10 Marks Weightage.
- One internal exam will be conducted
- Assignment/Surprise tests/Quizzes/Seminar will be conducted which carries 5 Marks as a part of internal theory evaluation
- The course includes a assignments, where students have an opportunity to build an appreciation for the concepts being taught in lectures

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I. Students Learning Outcomes:

On successfully completion of term

- Students will learn planning and execution of soil improvement techniques.
- Student will able to work out field soil bearing capacity with appropriate methods and improvement tools.
- The students will gain an experience in the solving the problems for footing on typical soil whose bearing capacity is very less using engineering concepts.

J. Recommended Study Materials

(A) Reference Books:

1. Koerner R M, "Construction and Geotechnical Methods in Foundation Engineering", McGraw Hill Publishing Co. Ltd., 1984
2. Hausmann M.R. 'Engineering Principles of Ground Modification' McGraw Hill Publishing Company, New York - 1990.
3. Zeevart L, "Foundation Engineering for Difficult Subsoil Conditions"
4. Bell F G, "Foundation Engineering in Difficult Ground", Butterworth, 1978.
5. Harr M E, "Ground Water & Seepage"
6. Van Impe W.F, "Soil Improvement technique and their evaluation"
7. Rao V.V S, "Ground Improvement techniques"

(B) Web Materials:

1. http://edudel.nic.in
2. http://bis.org.in/other/quake.htm
3. http://www.vastu-design.com/india_homes.htm
4. http://www.thepeninsulaneighborhood.com/ThePlan.html
5. http://www.historytution.com/indus_valley_civilization/town_planning.html