Marwadi University

Syllabus for Master of Technology

Geotechnical Engineering

Advanced Foundation Engineering
01GT1103 (PCC)

Objective of the Course: Objectives of introducing this subject at first year level in Masters of civil engineering are:

- To Impart the knowledge of the sub surface investigation and bore log report interpretation
- To developed the knowledge and skills for evaluating the bearing capacity of the soil
- To Analyze and evaluate the load carrying capacity of the various types of foundation

Credits Earned: 4

Students learning outcomes:

After the successful completion of the course it is expected that student would be able to….

1. Conduct the site investigation for a proposed structure and prepare the report
2. Apply the knowledge of the bearing capacity theories and test to evaluate the Safe bearing capacity of the soil for a given site
3. Analyze the foundation for its load carrying capacity and estimate the settlement
4. Select appropriate foundation for given structure/machine and soil conditions

Teaching and Examination Scheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	CSE (M)	Internal (I)	Viva (V)	Term Work (TW)	
3	1	0	4	50	20	30	25	25	150

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Detailed Syllabus

Sr No.	Title of the unit	Number of hours
1	**Sub Soil Exploration**	8
	Site investigation objectives & techniques, CPT SPT SCPT & PLT tests Geophysical methods Preparation of Bore log & its Interpretation. Typical value-ranges for different soil conditions and Report writing	
2	**Shallow Foundation**	12
	Bearing capacity of soil, Terzaghi 's, Meyerhoff, Hansens bearing capacity theories, based on SPT layered soils Eccentric and inclined loads. Bearing capacity on slopes, Settlement of Foundations	
3	**Design of Combined and Raft Foundations:**	6
	Design of combined footings by Conventional method elastic line methods. Rectangular, Trapezoidal and strap footings	
4	**Pile foundation**	10
	Load carrying capacity of piles, Pile group, Group efficiency Lateral resistance of piles settlement of piles Negative skin friction & its consideration in design, introduction to Piled Raft foundation	
5	**Machine Foundation**	6
	Types of machine & suitable foundations General criteria for design of machine foundation Resonance & frequency ratioSoil dynamic parameters, Block type machine foundation Principles of Design of Foundations for reciprocating and impact machines as per IS code.	

Suggested Theory Distribution

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
5%	20%	15%	30%	20%	10%

Instructional Method and Pedagogy:

1. Use of Learning Management system like canvas
2. Demonstration through ppt and videos and lectures
3. Brainstorming and group discussion sessions
4. Collaborative learning

Recommended Study Material:

Reference Book:

1. Joseph Bowles, "Foundation Analysis and Design", McGraw-Hill Book Company.
2. Braja M. Das, "Principles of Foundation engineering", PWS Publishing Company.
3. Braja M. Das, Principles of Soils Dynamics, McGraw Hill, 1992.
4. Shamsher Prakash et al, Analysis, Design of foundations and Retaining Structures Sarita Prakashan.
5. Kaniraj, Design Aids in Soil Mech. and Found. Engg., Tata McGraw, 1995.
6. Tomlinson, Found. Design and Const., 6th Edition, Longman Pub., 1995.
7. Swami Saran, Soil Dynamics and Machine Foundation, Galgotia publications Pvt. Ltd., New Delhi 1999.
8. Barkon, D.D., Dynamics of Basis of Foundation, McGraw Hill, 1974.
9. Vaidyanathan, C.V., and Srinivasalu, P., Handbook of Machine Foundations, McGraw Hill, 1995.
10. Poulos, H.G., Davis, E.H., Pile foundation analysis and design, John Wiley and Sons, New York, 1980.
11. V.N.S. Murthy, "Advanced Foundation Engineering", CBS Publishers and Distributors

Web Resources

Advanced Foundation engineering NPTEL course:
http://nptel.ac.in/courses/nptel_download.php?subjectid=105105039

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