

GOPALAN COLLEGE OF ENGINEERING AND MANAGEMENT

Department of civil Engineering

Academic Year: **2016-17**

Semester: **EVEN**

COURSE PLAN

Semester: **IV**

Subject Code& Name: **15CV45 & BASIC GEOTECHNICAL ENGINEERING**

Name of Subject Teacher: **ASIF**

Name of Subject Expert (Reviewer): **Mrs. Kalyani Dongarkar**

For the Period: From: 6-02-17 to 02-06-17

Details of Book to be referred:

<p>Text Books</p>	<p>T1. Gopal Ranjan and Rao A.S.R., Basic and Applied Soil Mechanics- (2000), New Age International (P) Ltd., Newe Delhi. T2. Punmia B C, Soil Mechanics and Foundation Engineering- (2012), Laxmi Pulications. T3. Murthy V.N.S., Principles of Soil Mechanics and Foundation Engineering- (1996), 4th Edition, UBS Publishers and Distributors, New Delhi. T4. Braja, M. Das, Geotechnical Engineering; (2002), Fifth Edition, Thomson Business Information India (P) Ltd., India</p>
<p>Reference Books</p>	<p>R1. T.W. Lambe and R.V. Whitman, Soil Mechanics, John Wiley & Sons, 1969. R2. Donold P Coduto, Geotechnical Engineering- Phi Learning Private Limited, New Delhi R3. Shashi K. Gulathi & Manoj Datta, Geotechnical Engineering-. (2009), “Tata Mc Graw Hill. R4. Narasimha Rao A. V. & Venkatrahmaiah C, Numerical Problems, Examples and objective questions in Geotechnical Engineering-. (2000), Universities Press. Hyderabad. R5. Muni Budhu ,Soil Mechanics and Foundation Engg.- (2010), 3rd Edition, John Wiely & Sons</p>

Lecture NO	Topic Planned	Practical Applications & Brief objectives	Book referred with Pg No.	Planned Date	Executed Date	Deviation Reasons thereof	How Made Good / Reciprocate arrangement	Remarks by HOD
1.	Introduction to the subject			06-02-2017				
MODULE 1 : INTRODUCTION								
2.	Introduction, origin and formation of soil	<p>Objectives: To appreciate basic concepts of soil mechanics as an integral part in the knowledge of Civil engineering.</p> <p>Applications: Origin and formation of Soil Classification</p>	T3:pg 7-9	08-02-2017				
3.	Phase Diagram, phase relationships		T2:pg 9-16	08-02-2017				
4.	Definitions and their inter relationships.		T2:pg 17-21	09-02-2017				
5.	Problems on phase relationships and phase diagram		T2:pg 27-36	09-02-2017				
6.	Problems on phase relationships and phase diagram		T2:pg 27-36	10-02-2017				
7.	Determination of Index properties-Specific gravity,		T2:pg 37-43	13-02-2017				
8.	Water content, in-situ density		T2:pg 37-41 &73-76	15-02-2017				
9.	particle size analysis -sieve and		T3:pg33-35	15-02-2017				
10.	sedimentation analysis		T2: pg52-57	16-02-2017				
11.	Atterberg's Limits, consistency indices,		T2: pg59-73	16-02-2017				
12.	Atterberg's Limits, consistency indices,		T2: pg59-73	17-02-2017				
13.	relative density, activity of clay, Plasticity chart, and problems		T4:pg 64-66&T2:76-80 T2: pg59-73	20-02-2017				
14.	unified and BIS soil classification		T2: pg115-132	22-02-2017				
15.	Unit Test			22-02-2017				

MODULE 2 : SOIL STRUCTURE AND CLAY MINERALOGY

16.	Single grained, honey combed, flocculent	<p>Objectives: To study clay minerology for the different minerals</p> <p>Applications: Microscopic observations of clay structure</p>	T2: pg140-142	23-02-2017				
17.	Dispersed structures, Valence bonds		T2: pg134-137	23-02-2017				
18.	Soil-Water system, Electrical diffuse double layer		T2: pg137-140	27-02-2017				
19.	Adsorbed water, base-exchange capacity,		T2: pg149-152	01-03-2017				
20.	Isomorphous substitution			01-03-2017				
21.	Common clay minerals in soil and their structures- Kaolinite		T2: pg142-144	02-03-2017				
22.	Illite and Montmorillonite and their application in Engineering		T2: pg142-144	02-03-2017				
23.	Compaction of Soils: Definition, Principle of compaction,	<p>Objectives: To determine the improvement in mechanical behaviour by densification of soil deposits</p> <p>Applications: Using compaction. Field compaction control</p>	T2: pg407-414	03-03-2017				
24.	Standard proctor's compaction tests,		T2: pg407-414	04-03-2017				
25.	Modified proctor's compaction tests, factors affecting compaction		T2: pg407-414 & 414-416	06-03-2017				
26.	effect of compaction on soil properties, Field compaction control		T2: pg417-419	08-03-2017				
27.	compactive effort & method of compaction, lift thickness and number of passes, Proctor's needle,		T2: pg413-414	13-03-2017				
28.	Compacting equipments and their suitability.		T4: pg 132-136	15-03-2017				
29.	Problems on compaction of soil		T2: pg419-421	15-03-2017				
30.	Unit Test			16-03-2017				

MODULE 3 : FLOW THROUGH SOILS

31.	Darcy's law- assumption and validity, coefficient of permeability and its determination	<p>Objectives: To become familiar broadly with geotechnical engineering problems such as, foundation engineering, flow of water through soil medium and terminologies associated with geotechnical engineering</p> <p>Applications: Seepage analysis for various hydraulic structure, Flow through dams Stress analysis</p>	T2: pg177-183	16-03-2017				
32.	coefficient of permeability and its determination (laboratory and field),		T2: pg186-190	17-03-2017				
33.	factors affecting permeability, permeability of stratified soils, Seepage velocity,		T2: pg183-185 &195-197	20-03-2017				
34.	superficial velocity and coefficient of percolation, Capillary Phenomena			22-03-2017				
35.	Seepage Analysis: Laplace equation, assumptions, limitations and its derivation.		T2: pg223-232	22-03-2017				
36.	Flow nets- characteristics and applications.		T2: pg232-238	23-03-2017				
37.	problems.		T2: pg244-248	23-03-2017				
38.	Unconfined flow, phreatic line (Casagrande's method –with and without toe filter),		T2: pg238-244	27-03-2017				
39.	flow through dams, design of dam filters.		T2: pg238-244	30-03-2017				
40.	Effective Stress Analysis: Geostatic stresses, Effective stress concept- total stress,			30-03-2017				
41.	Effective stress and Neutral stress			31-03-2017				
42.	impact of the effective stress in construction of			01-04-2017				

	structures,							
43.	quick sand phenomena			03-04-2017				
44.	Unit Test			05-04-2017				
MODULE 4 : CONSOLIDATION OF SOIL								
45.	Definition, Mass-spring analogy,	<p>Objectives: To know how the properties of soils that can be measured in the lab</p> <p>Applications: Foundation settlement analysis, Finding out coefficient of consolidation</p>		05-04-2017				
46.	Terzaghi's one dimensional consolidation theory - assumption and limitations.			06-04-2017				
47.	Derivation of Governing differential Equation			06-04-2017				
48.	Pre-consolidation pressure			07-04-2017				
49.	Determination by Casagrande's method			10-04-2017				
50.	Over consolidation ratio, normally consolidated, under consolidated and over consolidated soils.			12-04-2017				
51.	Consolidation characteristics of soil (C_c , a_v , m_v and C_v).			12-04-2017				
52.	Laboratory one dimensional consolidation test,			13-04-2017				
53.	characteristics of e - $\log(\sigma')$ curve,			13-04-2017				
54.	Determination of consolidation characteristics of soils compression index			20-04-2017				
55.	Coefficient of consolidation		20-04-2017					
56.	square root of time fitting method, logarithmic time fitting method		21-04-2017					

57.	Primary and secondary consolidation.			24-04-2017				
58.	Unit Test			26-04-2017				
MODULE 5 : SHEAR STRENGTH OF SOIL								
59.	Concept of shear strength,	<p>Objectives: To know the basic engineering properties and the mechanical behaviour of different types of soil. This includes strength-deformation characteristics under shearing stresses</p> <p>Applications: Measurement of strength parameters of soil by various tests</p>		26-04-2017				
60.	Mohr–Coulomb Failure Criterion,			27-04-2017				
61.	Modified Mohr–Coulomb Criterion			27-04-2017				
62.	Problems on Mohr-Coulomb theory			28-04-2017				
63.	Concept of pore pressure,			03-05-2017				
64.	Total and effective shear strength parameters			03-05-2017				
65.	factors affecting shear strength of soils.			04-05-2017				
66.	Thixotropy and sensitivity,			04-05-2017				
67.	Measurement of shear strength parameters			05-05-2017				
68.	Direct shear test,			06-05-2017				
69.	unconfined compression test,			08-05-2017				
70.	triaxial compression test and field Vane shear test,			15-05-2017				
71.	Test under different drainage conditions.			17-05-2017				
72.	Total and effective stress paths.			17-05-2017				
73.	Revision / Unit Test			18-05-2017				
74.	Revision			19-05-2017				

Prepared By: _____
(Faculty)
Date & Sign _____

Reviewed by: _____
(Sub. expert)
Date & Sign _____

Approved by: _____
(HOD)
Date & Sign _____

Approved by: _____
(Principal/ Acad. Co)
Date & Sign _____