

RGPV (DIPLOMA WING) BHOPAL		OBE CURRICULUM FOR THE COURSE		FORMAT-3		Sheet No. 1/3	
Branch		Civil Engineering		Semester		4 th	
Course Code		Course Name				Soil Mechanics	
Course Outcome 1		Define the soil and interpret its properties related to construction to classify types of soil.		Teach Hrs		Marks	
Learning Outcome 1		Explain the scope of soil mechanics and soil as three phase system and establish relationship between properties of soil		12		15	
Contents		<p>Definition of soil, Importance of Soil Studies in Civil Engineering, Geological origin of soils with special reference to soil profiles in India: residual and transported soil, alluvial deposits, lake deposits, local soil found in MP, black cotton soils.</p> <p>Constituents of soil and representation by a phase diagram</p> <p>Definitions of void ratio, porosity, degree of saturation, water content, specific gravity, unit weight, bulk density/bulk unit weight, dry unit weight, saturated unit weight and submerged unit weight of soil grains and correlation between them</p> <p>Simple numerical problems with the help of phase diagrams</p>					
Method of Assessment		External : End semester Examination-Pen Paper Test					
Learning Outcome 2		Classify and identify various types of soil and determine properties of soil by standard test procedures.		8		10	
Contents		<p>Consistency of soil, Atterberg limits of consistency: Liquid limit, plastic limit and shrinkage limit. Plasticity index.</p> <p>Particle size distribution test and plotting of curve, Determination of effective diameter of soil, well graded and uniformly graded soils, BIS classification of soil.</p>					
Method of Assessment		Internal: Mid Semester Exam I - Pen paper test/Assignment					
Learning Outcome 3		Determine water content , grain size distribution , Liquid & Plastic limit of given sample.		12			
Contents		<ol style="list-style-type: none"> 1. Determination of water content of given soil sample by oven drying method as per IS Code. 2. Determination of specific gravity by Pycnometer 3. Determination of grain size distribution of given soil sample by mechanical sieve 4. Determination of Liquid limit & Plastic limit of given soil sample as per IS Code. 					
Method of Assessment		Lab Experiment					

Course Outcome 2	Describe the concept of permeability & Stress and determine permeability of given soil.		
Learning Outcome 1	Understand signification of permeability and seepage and compute those	10	15
Contents	Concept of permeability and its importance, Darcy's law, coefficient of permeability, factors affecting permeability. Permeability of stratified soil deposits, Methods of measurement of permeability Seepage through earthen structure, seepage velocity, seepage pressure, phreatic line, flow line and equipotential line, flow net and its application, Comparison of permeability of different soils as per Indian Standards, Simple numerical problems		
Method of Assessment	External : End semester Examination-Pen Paper Test		
Learning Outcome 2	Determine permeability by constant head and falling head test using Darcy's Law.	6	
Contents	<ol style="list-style-type: none"> 1. Determination of coefficient of permeability by constant head test 2. Determination of coefficient of permeability by falling head test . 		
Method of Assessment	Lab Experiment		
Course Outcome 3	Describe requirement and mechanism of compaction and explain concept of consolidation.		
Learning Outcome 1	Explain compaction and consolidation of soil and methods of compaction.	8	15
Contents	Compaction - Definition and necessity of compaction Laboratory compaction test: standard and modified proctor test as per IS code, optimum water content, maximum dry density, Factors affecting Compaction, Field methods of compaction – rolling, ramming & vibration, Suitability of various compaction Equipments-smooth wheel roller, sheep foot roller, pneumatic tyred roller, Rammer and Vibrator. Determination of field density of soil, Simple Numerical problems. Consolidation, Difference between compaction and consolidation.		
Method of Assessment	External : End semester Examination-Pen Paper Test		
Learning Outcome 2	Determine Bulk unit weight dry unit weight of in field and MDD & OMC of given soil.	9	
Contents	<ol style="list-style-type: none"> 1. Determination of bulk unit weight & dry unit weight of soil in field by core cutter method as per IS Code. 2. Determination of bulk unit weight & dry unit weight of soil in field by Sand replacement method as per IS Code. 3. Determination of MDD & OMC by standard proctor test on given soil sample as per IS Code. 		
Method of Assessment	Lab Experiment		

Course Outcome 4	Calculate shear strength of soil ,Bearing capacity of soil and Earth Pressure.		
Learning Outcome 1	Determine the shear strength of soil as per coulomb's law.	8	10
Contents	Shear Strength of Soil - Concept and Significance of shear strength, Factors contributing to shear strength of cohesive and cohesion less soils , Coulomb's law, Determination of shearing strength by Direct shear test, Tri axial test, Unconfined compression test and Vane shear test. Drainage conditions of test and their significance , Numerical problems		
Method of Assessment	External : End semester Examination-Pen Paper Test		
Learning Outcome 2	Calculate Bearing Capacity of Soil.	8	10
Contents	Concept of bearing capacity, ultimate bearing capacity, safe bearing capacity and allowable bearing pressure. Introduction to Terzaghi's analysis and assumptions, effect of water table on bearing capacity. Field methods for determination of bearing capacity – Plate load and Standard Penetration Test. Test procedures as per IS:1888 & IS:2131. Total and differential Settlement, Permissible values of settlement.		
Method of Assessment	Internal: Mid Semester Exam II - Pen paper test/Assignment		
Learning Outcome 3	Explain and calculate Earth Pressure.	6	10
Contents	Definition of Active earth pressure, Passive earth pressure, Earth pressure at rest. coefficient of earth pressure, Rankine's theory and assumptions Use of Rankine's formula for the following cases (cohesion-less soil only) (i) Backfill with no surcharge, (ii) backfill with uniform surcharge Simple Numerical Problems		
Method of Assessment	External : End semester Examination-Pen Paper Test		
Learning Outcome 4	Determine shear strength of soil using various test .	6	
Contents	<ol style="list-style-type: none"> 1. Determination of shear strength of soil using direct shear test. 2. Determination of shear strength of soil using Laboratory Vane shear test 		
Method of Assessment	Lab Experiment		
Course Outcome 5	Explain the methods of soil exploration and soil stabilization.		
Learning Outcome 1	Understand the necessity of soil exploration and method to take sampling of soil.	6	10
Contents	Necessity of site investigation & sub-soil exploration. Types of exploration – general, detailed. Method of site exploration open excavation & boring(auger, wash, rotary, percussion) . Criteria for deciding the location and number of test pits and bores. Sampling and Types of samplers. Disturbed & undisturbed soil samples		

Method of Assessment	Internal: Assignments/Presentation/Seminar		
Learning Outcome 2	Explain the methods of soil stabilization and suitability of each.	6	05
Contents	Concept of soil stabilization, necessity of soil stabilization, Different methods of soil stabilization – Mechanical soil stabilization, lime stabilization, cement stabilization, bitumen stabilization, fly-ash stabilization		
Method of Assessment	External : End semester Examination-Pen Paper Test		

Suggested Learning Resources :-

S.No	Title	Author	Edition
1	Soil Mechanics & Foundation Engineering	Dr. B. C. Punmia	Standard Book house, New Delh
2	Soil Mechanics & Foundation Engineering	V.N.S. Murthi	Tata McGraw Hill , New Delhi
3	Soil Mechanics	B. J. Kasmalkar	Pune Vidhyarti Griha, Pune
4	Geo-technical Engineering	Gulhati & Dutta	Tata McGraw Hill , New Delhi