

Semester: 4 th Subject: Soil Mechanics (PC/CE/7-T)			
Week	Lec. Day	Topics	Remarks
1 st	1.	Soil Formation and Composition: Introduction, soil and rock, Soil Mechanics and Foundation Engineering, origin of soils, weathering, soil formation,	
	2.	major soil deposits of India, particle size, particle shape, inter particle forces, soil structure, principal clay minerals.	
	3.	Basic Soil Properties: Introduction, three phase system, weight-volume relationships,	
2 nd	4.	soil grain properties, soil aggregate properties, grain size analysis	
	5.	sieve analysis, sedimentation analysis, grain size distribution curves	
	6.	consistency of soils, consistency limits and their determination, activity of clays, relative density of sands.	
3 rd	7.	Classification of soils: Purpose of classification, classification on the basis of grain size, classification on the basis of plasticity,	
	8.	plasticity chart, Indian Standard Classification System	
	9.	Permeability of Soils: Introduction, Darcy's law and its validity, discharge velocity and seepage velocity	
4 th	10.	factors affecting permeability, laboratory determination of coefficient of permeability,	
	11.	determination of field permeability, permeability of stratified deposits	
	12.	Effective Stress Concept: Principle of effective stress, effective stress under hydrostatic conditions,	
5 th	13.	capillary rise in soils, effective stress in the zone of capillary rise,	
	14.	effective stress under steady state hydro-dynamic conditions,	
	15.	seepage force, quick condition, critical hydraulic gradient, two-dimensional flow,	
6 th	16.	Laplace's equation, properties and utilities of flow net,	
	17.	graphical method of construction of flow nets, piping, protective filter	
	18.	Compaction: Introduction, role of moisture and compactive effect in compaction	
7 th	MINOR TEST I		
8 th	19.	laboratory determination of optimum moisture content, moisture density relationship,	
	20.	compaction in field, compaction of cohesionless soils, moderately cohesive soils and clays, field control of compaction.	
	21.	Compressibility and Consolidation: Introduction, components of total settlement,	
9 th	22.	consolidation process, one-dimensional consolidation test,	
	23.	typical void ratio-pressure relationships for sands and clays, normally consolidated and over consolidated clays,	
	24.	Casagrande's graphical method of estimating pre-consolidation pressure,	
10 th	25.	Terzaghi's theory of one-dimensional primary consolidation,	
	26.	determination of coefficients of consolidation, consolidation settlement,	
	27.	Construction period settlement, secondary consolidation	
11 th	28.	Shear Strength: Introduction, Mohr stress circle,	
	29.	Mohr-Coulomb failure-criterion, relationship between principal stresses at failure,	
	30.	shear tests, direct shear test,	
12 th	31.	unconfined compression test, triaxial compression tests	
	32.	drainage conditions and strength parameters,	
	33.	Vane shear test, shear strength characteristics of sands	
13 th	34.	shear strength characteristics of normally consolidated clays, over-consolidated clays and partially saturated soils	
	35.	sensitivity and thixotropy.	
	36.	Earth Pressure Introduction, earth pressure at rest, Rankine's active & passive states of plastic equilibrium	
14 th	MINOR TEST II		
15 th	37.	Rankine's earth pressure theory	
	38.	Coulomb's earth pressure theory,	
	39.	Culmann's graphical construction, Rebhann's construction.	