

GOVERNMENT POLYTECHNIC, BALANGIR

DEPARTMENT OF CIVIL ENGINEERING

LESSION PLAN

SESSION 2023-24

SUBJECT: GEOTECHNICAL ENGINEERING	BRANCH: CIVIL ENGINEERING
NAME OF THE FACULTY: ABINASH BISWAL	SEMESTER: 5 TH

SL NO.	CHAPTER	HOURS	LECTURE NO.	TOPIC TO BE COVERED
1	CHAPTER 01	02		Introduction
			1	Soil and Soil Engineering, Scope of Soil mechanics
			2	Original and formation of soil
2	CHAPTER 02	06		Preliminary Definition and Relationship
			1	Soil as a three Phase system
			2	Water content, Density, Specific gravity
			3	Void ratio, Porosity, Percentage of Air voids, Air content
			4	Degree of Saturation, Density Index
			5	Bulk/Saturated/submerged density, interrelationship of various parameters
			6	interrelationship of various parameters
3	CHAPTER 03	04		Index Properties of soil
			1	Water Content, Specific Gravity
			2	Particle size distribution: sieve analysis, wet analysis
			3	Particle size distribution curve and its use
			4	Consistency of soils, Atterberg limits, Plasticity Index, Liquidity index
4	CHAPTER 04	06		Classification of Soil
			1	General
			2	Indian standard Classification
			3	Indian standard Classification
			4	Indian standard Classification

			5	Plasticity Chart
			6	Plasticity Chart
5	CHAPTER 05	07		Permeability and Seepage
			1	Concept of Permeability, Darcy's Law
			2	Co-efficient of Permeability and Factors affecting Permeability
			3	Constant head permeability test
			4	Falling head permeability test
			5	Seepage pressure
			6	Effective stress
			7	Phenomenon of quick sand
6	CHAPTER 06	08		Compaction and Consolidation
			1	Compaction, Light Compaction test
			2	Heavy compaction test, Optimum moisture content of soil
			3	Maximum dry density, zero air void line, Factor affecting Compaction
			4	Field Compaction method and their Suitability
			5	Consolidation
			6	Distinction between compaction and Consolidation
			7	Terzaghi's model analogy of compression
			8	Spring showing the process of consolidation -Field impletions
7	CHAPTER 07	06		Shear Strength
			1	Concept of shear strength
			2	Mohr- Coulomb failure theory, Cohesion
			3	Angle of internal friction, strength envelope for different type of soi
			4	Measurement of shear strength; - Direct shear test, triaxial shear test,
			5	Measurement of shear strength; - Direct shear test, triaxial shear test,
			6	unconfined compression test and vane-shear test

8	CHAPTER 08	07		Earth Pressure on Retaining Structures
			1	Active earth pressure
			2	Passive earth pressure,
			3	Earth pressure at rest
			4	Use of Rankine's formula for the following cases (cohesion-less soil only)
			5	(i) Backfill with no surcharge
			6	(ii) backfill with uniform surcharge
			7	i) Backfill with no surcharge (ii) backfill with uniform surcharge
9	CHAPTER 09	14		Foundation Engineering
			1	Functions of foundations
			2	shallow and deep foundation
			3	different type of shallow and deep foundations with sketches.
			4	different type of shallow and deep foundations with sketches.
			5	Types of failure (General shear, Local shear & punching shear)
			6	Bearing capacity of soil,
			7	bearing capacity of soils using Terzaghi's formulae & IS Code formulae for strip
			8	bearing capacity of soils using Terzaghi's formulae & IS Code formulae for strip
			9	Circular and square footings
			10	Circular and square footings
			11	Effect water table on bearing capacity of soil
			12	Effect water table on bearing capacity of soil
			13	Plate load test and standard penetration test
			14	Plate load test and standard penetration test