MEHRAN UNIVERSITY OF ENGINEERING AND TECHNOLOGY JAMSHORO

Department of Civil Engineering

LESSON PLAN

COURSE TITLE: **Geotechnical Engineering**	COURSE CODE: **CE411**	CREDIT HOURS: **03**	MINIMUM CONTACT HOURS: **48**
COURSE INSTRUCTER: **Prof. Dr. Aneel Kumar(A) / Prof. Dr. Zaheer Almani (B+C)**			
Batch: **21CE**	Semester: **7th**	Semester Starting Date: **09-12-2024**	Semester Suspension Date: **18-04-2024**

COURSE LEARNING OUTCOMES:

CLO No.	Description	Taxonomy level	Associated PLO
1	EXPLAIN various soil improvement techniques, their applications and equipment	C2	5
2	ANALYSES the range of soil related problems especially those involving external stresses, shear strengths, earth retaining structures and slope stability	C4	4

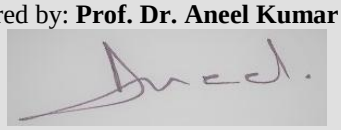
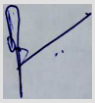
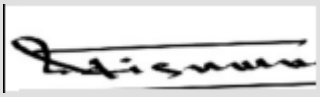
LESSON CONTENTS AND ASSOCIATED CLO(s)

Contents	CLO No.	Marks Assigned	Delivery Methods	Assessment Methods (Marks)
• **COMPACTION:** - Compaction and its Fundamentals - Moisture-Density relationship - Factors Affecting Compaction - Standard and Modified Proctor Tests - Compaction in the Field - Compaction Equipment & Machinery - Field Control and Measurements of In-Situ Density - Problems on the Compaction **Total Classes: 09**	**1**	**20**	• Class Lecture • Discussion • Problem Solving	• Class Test -I (05) • Mid Semester Exam (15)
• **SOIL IMPROVEMENT** - Introduction to Various Soil Improvement Techniques - Basic Principles and Objectives - Removal and Replacement of soil - Mechanical and Chemical Stabilization of Soil - In-situ Densification, Grouting - Pre-Loading and Vertical Drains - Soil Reinforcement - Applications of various Soil Improvement Techniques **Total Classes: 07**	**1**	**15**	• Class Lecture • Discussion • Problem Solving	• Mid Semester Exam (15)
• **SHEAR STRENGTH** - Concepts, Shear Strength Parameters - Shear Strength of Cohesive and Cohesion Less Soils - Mohr Columb's Failure Criterion - Determination of Shear Strength Parameters in Laboratory - Direct Shear Box Test, Unconfined Compression Test - Vane Shear Test, Tri-axial Shear Test. - Merits and Demerits of Different Tests - Problems on Shear Strength of Soil **Total Classes: 10**	**2**	**20**	• Class Lecture • Discussion • Problem Solving	• Class Test -II (05) • Final Exam (15)

• **EARTH PRESSURE** - Earth Retaining Structures - Forces Acting on Earth Retaining Structure - Earth Pressure at Rest, Active and Passive Earth Pressures - Theories of Earth pressures for Non- Cohesive Soils - Theories of Earth pressures for Cohesive Soils - Earth Pressure Distribution Diagrams - Problems on Earth Pressure **Total Classes: 09**	**2**	**19**	• Class Lecture • Discussion • Problem Solving	• Class Test-III (05) Assignment-I (04) • Final Exam (10)
• **STRESSES IN SOIL MASS** - Principal Problems due to External Stresses in Soil Mass - Boussinesq's Theory and Its Assumptions - Boussinesq's Equations for Computing Vertical Stresses Caused by Point Load, Line Load, Uniformly Loaded Strip & Rectangular Areas and Circular Areas - Stresses at a Point Outside the Loaded Area - Stress Isobar, Pressure distribution Diagrams on Horizontal and Vertical Planes - Equivalent Point Load Method, Newmark Influence Chart for Vertical Pressure, 2:1 Approximate Method - Problems on Stress Distribution **Total Classes: 07**	**2**	**14**	• Class Lecture • Discussion • Problem Solving	• Assignment -II (04) • Final Exam (10)
• **STABILITY OF SLOPES** - Types of Slopes, Slope Failures and Factor of Safety - Factors Affecting Stability and Remedial Measures - Stability of Infinite slopes, Stability Number - Stability Analysis of Finite Slopes: Taylor's Chart, Friction Circle, Method of Slices. - Problems on Slope Stability **Total Classes: 06**	**2**	**12**	• Class Lecture • Discussion • Problem Solving	• Assignment-III (07) Final Exam (05)

ASSESSMENT DETAILS

S. No.	Assessment Activities	Marks	Activities		CLO(s) to be assessed
1	Class Test/Assignment	**30**	Assignment(s)	3	1, 2
			Class test(s)	3	1, 2
2	Mid Semester Exam	**30**	1		1
3	Final Semester Exam	**40**	1		2

Prepared by: **Prof. Dr. Aneel Kumar**  Signature: Dated: 09-12-2024	Reviewed by: **Curriculum Review Committee**  Signature: Dated: 20-12-2024	Approved by: **Chairman, CED**  Signature: Dated: 20-12-2024