



MEHRAN UNIVERSITY OF ENGINEERING AND TECHNOLOGY JAMSHORO

Department of Civil Engineering

LESSON PLAN

COURSE TITLE: Soil Mechanics	COURSE CODE: CE326	CREDIT HOURS: 03	MINIMUM CONTACT HOURS: 48
COURSE INSTRUCTOR: Prof. Dr. Aneel Kumar/Engr. Ali Raza Lashari (A+C)/ Engr. Samar Hussain Rizvi (B+D)			
Batch: 20CE	Semester: 6th	Semester Starting Date: 03-07-2023	Semester Suspension Date: 20-10-2023

COURSE LEARNING OUTCOMES:

CLO No.	Description	Taxonomy level	Associated PLO
1	DEMONSTRATE index properties of soils and carry out classification of soils	C3	4
2	ANALYZE the range of soil related problems especially those involving in-situ stresses, flow of water through soils and consolidation settlement of soils.	C4	4

LESSON CONTENTS AND ASSOCIATED CLO(s)

Contents	CLO No.	Marks Assigned	Delivery Methods	Assessment Methods (Marks)
• INTRODUCTION: - Importance of mechanics of soils in civil engineering - Difficulties in predicting the behavior of soils as a construction and load bearing material. - Formation and type of soils - No. of lectures: 02	1	02	• Lectures • Discussions	• Assignment-I (02)
• INDEX PROPERTIES OF SOIL - Phase diagrams of soil, - Phase relations of soil: water content, void ratio, porosity, degree of saturation, air content, percentage air voids, unit weights and specific gravity - Weight-volume relationships and their derivations - Determination of phase relations of soil - Problems related to phase relations of soil. - Consistency of soils and its states - Atterberg's limits - Determination of Atterberg's limits - Consistency indices - Problems related to consistency of soils. - Grain size distribution of soils: - Particle size distribution curves - Sieve analysis - Stoke's law - Hydrometer analysis - Problems related to grain size distribution of soil. No. of lectures: 18	1	38	• Lectures • Discussions • Problem Solving	• Assignment -II (02) • Class Tes- I (02) • Class Test- II (02) • Mid Semester Exam (20) • Final Semester Exam (12)

<ul style="list-style-type: none"> • SOIL CLASSIFICATION - Particle size classification systems - AASHTO classification system - Unified soil classification system - Identification and classification of expansive soils - Collapsible and dispersion soils No. of lectures: 04	1	08	<ul style="list-style-type: none"> • Lectures • Discussions • Problem Solving 	<ul style="list-style-type: none"> • Assignment - III (02) • Final Exam (06)
<ul style="list-style-type: none"> • SOIL WATER - Modes of occurrence of water in soil - Absorbed / adsorbed water - Capillary water No. of lectures: 01	2	02	<ul style="list-style-type: none"> • Lectures • Discussions 	<ul style="list-style-type: none"> • Assign-IV (02)
<ul style="list-style-type: none"> • IN-SITU STRESSES - Stress condition in soil - Effective and neutral stresses - Stresses in saturated soils with upward and downward seepages - Problems related to in-situ stresses No. of lectures: 06	2	14	<ul style="list-style-type: none"> • Lectures • Discussions • Problem Solving 	<ul style="list-style-type: none"> • Class Test – III (02) • Final Exam (12)
<ul style="list-style-type: none"> • PERMEABILITY OF SOIL - Permeability - Darcy's law - Factors affecting permeability - Permeability of stratified soils - Laboratory and field determination of permeability - Problems related to permeability of soils No. of lectures: 05	2	14	<ul style="list-style-type: none"> • Lectures • Discussions • Problem Solving 	<ul style="list-style-type: none"> • Class Test- IV (02) • Final Exam (12)
<ul style="list-style-type: none"> • SEEPAGE IN SOILS - Seepage, hydraulic potential, hydraulic gradient, and seepage pressure - Quicksand condition and critical hydraulic gradients - Introduction to flow nets: flow lines, equipotential lines - seepage calculation from a flow net - Liquefaction, Piping No. of lectures: 02	2	02	<ul style="list-style-type: none"> • Lectures • Discussions • Problem Solving 	<ul style="list-style-type: none"> • Assig-V (02)
<ul style="list-style-type: none"> • CONSOLIDATION - Settlement and its types - Consolidation and its importance - Mechanics of consolidation - Spring water analogy, - Theory of one-dimensional consolidation: assumptions and validity - Laboratory consolidation tests and graphical representation of data - Calculation of voids ratio - Primary and secondary consolidation - Time factor and degree of consolidation - Coefficient of consolidation - Normally and pre-consolidated clays - Determination of pre-consolidation pressure and over consolidation ratio - Problems related to consolidation settlement. No. of lectures: 10	2	20	<ul style="list-style-type: none"> • Lectures • Discussions • Problem Solving 	<ul style="list-style-type: none"> • Assignment - VI (02) • Final Exam (18)

ASSESSMENT DETAILS

S. No.	Assessment Activities	Marks	Activities		CLO(s) to be assessed
1	Sessional	20	Class Test/ Quiz/Assignment	10	1, 2
2	Mid Semester Exam	20	1		1
3	Final Semester Exam	60	1		1, 2

Prepared by: **Prof. Dr. Aneel Kumar**



Signature:

Dated: 14-04-2023

Reviewed by: **Curriculum Review Committee**



Signature:

Dated: 18-04-2023

Approved by: **Chairman CED**



Signature:

Dated: 18-04-2023