

## MEHRAN UNIVERSITY OF ENGINEERING AND TECHNOLOGY JAMSHORO Department of Civil Engineering

## LESSON PLAN

COURSE TITLE: Foundation Engineering COU			COUR	SE COE	DE: CE426	CREDIT HOURS: 03	MINIMUM CONTACT HOURS: 48	
E INSTRUC	CTER: Dr. Zahe	er Ahme	d Alman	i (A+D)	/ Dr. Rehan	Hakro (B+C)	)	
Batch: 20CE Semester: 8 <sup>th</sup> Semester Starting Date: 15-07-2024 Semester S			Semester Su	uspension Date: 06-11-2024				
SE LEARNI	NG OUTCOM	ES:						
Description					Taxonomy level	Associated PLO		
<b>C</b> 1						C2	5	
2 DESIGN shallow and pile foundations; and discuss earthen dam components and design parameters.				omponents	C6	3		
N CONTEN	NTS AND ASSO	OCIATEI	O CLO(s	)				
Contents		CLO No.	Marks Assigned	Delivery Methods N		Assessment Methods (Marks)		
<ul> <li>Importance of soil exploration and planning of soil exploration program,</li> <li>-Soil exploration methods: probing, test pits, auger boring, wash percussion and rotary drilling and geophysical methods</li> <li>Soil samplers: disturbed and undisturbed sampling.</li> <li>In situ tests: standard penetration test, cone penetration test, and field vane shear test.</li> <li>Coring of rocks, core recovery and RQD.</li> <li>Borehole logs and sub soil exploration report.</li> </ul>		1	22	Class Lecture Discussion Problems	Mid Exam (20) Assignment I (2)			
<ul> <li>Selection of foundation type</li> <li>Types of bearing capacities of foundation</li> <li>-Gross and net pressures on footing.</li> <li>-Failure modes in foundations and their characteristics and criterion.</li> </ul>		dation. I their	2	06	Class Lecture Discussion Problems	Fin	al Exam (06)	
	E INSTRUC OCE <b>BE LEARNI</b> DISCUSS DESIGN s and design <b>N CONTEN</b> <b>IL EXPLOF</b> Importance planning of -Soil exp pits, auge rotary dril Soil samp sampling. In situ tess penetratic Coring of Borehole report. <b>of lectures re</b> <b>NDATIONS</b> Purpose Selection Types of I -Gross an -Failure r characteri General	E INSTRUCTER: Dr. Zahe OCE Semester: 8 <sup>th</sup> <b>SE LEARNING OUTCOM</b> DISCUSS soil investigation DESIGN shallow and pile and design parameters. N CONTENTS AND ASSO Contents IL EXPLORATION Importance of soil exploration -Soil exploration methods pits, auger boring, wash rotary drilling and geophy Soil samplers: disturbed sampling. In situ tests: standard pene penetration test, and field Coring of rocks, core reco Borehole logs and sub s report. of lectures required: 11 NDATIONS Purpose and types of Selection of foundation ty Types of bearing capacitie -Gross and net pressures of -Failure modes in foundation ty Types of bearing capacitie -Gross and net pressures of -Failure modes in foundation ty Types of bearing capacitie -Gross and net pressures of -Failure modes in foundation ty Types of bearing capacitie -Gross and net pressures of -Failure modes in foundation ty Types of bearing capacitie -Gross and net pressures of -Failure modes in foundation ty Types of bearing capacitie -Gross and net pressures of -Failure modes in foundation ty Types of bearing capacitie -Gross and net pressures of -Failure modes in foundation ty Types of bearing capacities -Gross and net pressures of -Failure modes in foundation ty Types of bearing capacities -Gross and net pressures of -Failure modes in foundation ty Types of bearing capacities -Gross and net pressures of -Failure modes in foundation ty -Failure modes in foundation ty -	E INSTRUCTER: Dr. Zaheer Ahmee OCE Semester: 8 <sup>th</sup> Semeste SE LEARNING OUTCOMES: De DISCUSS soil investigation techniq DESIGN shallow and pile foundation and design parameters. 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General requirements for foundation       2       06	E 111LE: Foundation Engineering       COURSE CODE:       CE426       HOURS: 03         E INSTRUCTER: Dr. Zaheer Ahmed Almani (A+D) / Dr. Rehan Hakro (B+C)         OCE       Semester: 8 <sup>th</sup> Semester Starting Date: 15-07-2024       Semester Starting Date: 15-07-2024         OCE       Semester: 8 <sup>th</sup> Semester Starting Date: 15-07-2024       Semester Starting Date: 15-07-2024       Semester Starting Date: 15-07-2024         SE LEARNING OUTCOMES:       Description       DISCUSS soil investigation techniques, in situ tests and equipment.       DESIGN shallow and pile foundations; and discuss earthen dam components and design parameters.         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C6         N CONTENTS AND ASSOCIATED CLO(s)       CLO       Marks Assigned         Importance of soil exploration and planning of soil exploration program, -Soil exploration methods: probing, test pits, auger boring, wash percussion and rotary drilling and geophysical methods Soil samplers: disturbed and undisturbed sampling.       1       22         In situ tests: standard penetration test, cone penetration test, and field vane shear test. Coring of rocks, core recovery and RQD. Borehole logs and sub soil exploration report.       1       22       06         Purpose and types of foundations. Selection of foundation type       Types of bearing capacities of foundationGross and net pressures on footingFailure modes in foundations and their characteristics and criterion.       2       06       Class Lecture Discussion Problems

<ul> <li>SHALLOW FOUNDATIONS <ul> <li>Techniques to obtain bearing capacity of shallow Foundations</li> <li>Development of bearing capacity theory.</li> <li>Terzaghi's theories to calculate bearing capacity.</li> <li>Effects of water table.</li> <li>Design of strip, isolated, combined and raft footings.</li> <li>Bearing capacity theories of Meyerhof's, Hansen's, Vesic's and skempton.</li> <li>Elastic settlement of shallow foundations based on theory of Elasticity.</li> <li>Elastic and consolidation settlement of shallow foundations on saturated clays.</li> <li>Settlement of sandy soil. Presumptive values.</li> <li>Plate load test.</li> <li>Problems on geotechnical design of shallow foundations</li> </ul> </li> </ul>	2	32	Class Lecture Discussion Problems	Class Test-I (05) Final Exam (24) Assignment -II (03)
<ul> <li>No. of lectures required: 15</li> <li>PILE FOUNDATIONS <ul> <li>Introduction to deep foundations. Types of deep foundations.</li> <li>Reasons to use piles. Classification of piles. Methods of Installation.</li> <li>Load transfer mechanism of piles, Load carrying capacity of piles in different soils. Negative skin friction.</li> <li>Empirical relationships.</li> <li>Settlement of Piles.</li> <li>Pull out resistance of piles.</li> <li>Pile driven formulas. Pile load test.</li> <li>Group piles: Group efficiency</li> <li>Elastic and consolidation settlement of group piles</li> <li>Up lift capacity of group piles.</li> <li>Problems on geotechnical design of pile foundations</li> </ul> </li> <li>No. of lectures required: 15</li> </ul>	2	32	Class Lecture Discussion Problems	Assignment-III (3) Class Test-II (05) Final Exam (24)

<ul> <li>FOUNDATIONS ON DIFFICULT SOILS</li> <li>Foundation on collapsible soils</li> <li>Foundations on expansive soils</li> <li>No. of lectures required: 03</li> </ul>	2	06	Class Lecture Discussion Problems	Final exam (06)
<ul> <li>EARTHEN DAMS</li> <li>Types of earthen dams, components and their functions.</li> <li>General design considerations and typical cross-section</li> <li>No. of lectures required: 01</li> </ul>	2	02	Class Lecture Discussion Problems	Assignment-IV (02)

S. No.	Assessment Activities	Marks	Activities		CLO(s) to be assessed
1	Class Test/Assignment/Project Design/ Presentation/Quiz/Field Report	20	Assignment(s)	4	1 and 2
		20	Class Test	2	2
2	Mid Semester Exam	20	1		1
3	Final Semester Exam	60	1		2

Prenared by: Ur Zaneer Anmed Almani	Reviewed by: Curriculum Review Committee	Approved by: Chairman, CED
		Signature:
Signature: Dated: 25-05-2023	Dated: 30-05-2024	Dated: 30-05-2024
Dated: 23-03-2025		