

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Soil Mechanics-1		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	CIV014		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	UGIII	Semester of Delivery	
Administering Department	CV101	College	College of Engineering/Civil dept.
Module Leader	Dr. Khalid Rassim Mahmood	e-mail	Kr_aljanabi@uoanabr.edu.iq
Module Leader's Acad. Title	Asst. Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Maher Zuhair Al-Rawi	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Strength of materials I&II	Semester	3&4
	Fluid Mechanics		4
	Engineering Geology		3
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Aims أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> 1. To develop an appreciation soil as a vital construction material, and of soil mechanics in the engineering of civil infrastructure; 2. To develop an understanding of the relationships between physical characteristics and mechanical properties of soils; 3. To understand the concepts governing the mechanical and fluid transport properties of soils 4. To understand and be able to apply the modeling and analysis techniques used in soil mechanics: (a) Darcy's Law and flow-nets for seepage; (b) consolidation models for load-time-deformation responses of soils; 5. (c) Mohr-Coulomb models for shear strength behavior of soils. 6. To provide the knowledge on the use of experimental results pertaining to foundation problems
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1. understand the origin, formation, parameters and basic fundamental behavior of soils and have the knowledge of soil classification and be able to classify the soil using Unified Soil Classification System 2. understand soil permeability and seepage theory and be able to analyze a seepage problem by flow net 3. understand the effective stress concept and be able to calculate effective stress in non-seepage and seepage problems and be able to calculate the vertical stress in soils caused by various types of loading 4. apply one-dimensional consolidation theory to calculate settlement and pore pressure as a function of time during consolidation 5. apply the principles of shear strength of soils to various laboratory tests 6. do the experiments and determine the Engineering and index properties of soils applied in field problems
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Chapter 2 Introduction, Soils and Rocks, Types of Rocks, Soil – Rock Cycle, Basic Soil Types, Soil-Particle Size or Grain Sizes, Structure of Clay Minerals, Types of Clay Minerals, how is water absorbed on the surface of a clay particle? Gradation of Particle Size [2Hrs]</p> <p>Chapter 3 Weight-Volume Relationships, Important variables-(Water or Moisture Content-Unit Weight or Mass-Void ratio-Specific Gravity.....etc., Relative Density, Particle Size and Shape, Grain Size Tests Sieve Tests (Coarse-Grained Soils), Hydrometer Tests (Fine-Grained Soils), Plasticity and the Atterberg Tests [6Hrs]</p> <p>Chapter 3 Introduction, Textural classification, Unified Soil Classification System (USCS) [2Hrs]</p> <p>Chapter 5 PERMEABILITY Overview of Underground Water Flow, Permeability, Theory, Laboratory and Field Tests, Empirical Correlations, Equivalent Permeability in Stratified Soil [5Hrs]</p> <p>SEEPAGE Laplace's Equation of Continuity, Continuity Equation for Solution of Simple Flow Problems, Flow Nets, Seepage Calculation, Seepage pressure and Uplift Pressure [5Hrs]</p> <p>Chapter 6 Effective Stress Concept, Effective Stress in Saturated Soil with no Seepage, Effective Stress</p>

	<p>in Saturated Soil with Seepage, Seepage Force, Filter Requirements and Selection of Filter Material, Capillary Rise in Soil, Effective Stress in Capillary Zone [8Hrs]</p> <p>Chapter 6 Stress distribution in soils, Stress Caused by a Point Load, Vertical Stress Caused by a Line Load, Vertical Stress Caused by a Strip Load, Vertical Stress Due to Embankment Loading, Vertical Stress below the Center of a uniformly Loaded Circular Area, Vertical Stress at any Point below a uniformly Loaded Circular Area, Vertical Stress Caused by a Rectangularly Loaded Area, Approximate methods [5Hrs]</p> <p>Chapter 7 Introduction, Consolidation Settlement (Primary Consolidation), Secondary Compression (Secondary consolidation) Settlement, Time Rate of Consolidation, Calculation of Consolidation Settlement under a Foundation [12Hrs]</p> <p>Chapter 8 Introduction, Mohr-Coulomb Failure Criterion, Inclination of the plane of failure due to shear, Laboratory Tests for Determination of Shear Strength Parameters [12Hrs]</p>
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	<p>Problem-based learning by solving assignment</p> <p>Experiential learning is based on experiments in the lab.</p> <p>Visualization includes Using of visual aids like photos, videos, Diagrams, charts</p>

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	unspecified	-	unspecified	unspecified
	Assignments	8	10% (10)	3,4,5,6,8,11,13,15	LO# 1,2,3,4, and 5
	Projects / Lab.	10	10% (10)	2,3,4,5,6,7,8,9,10	LO #6
	Report	unspecified	-	unspecified	unspecified
Summative assessment	Midterm Exam	2 hr	20% (20)	7	LO # 1-3
	Final Exam	3hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	ORIGIN OF SOIL AND GRAIN SIZE
Week 2	WEIGHT-VOLUME RELATIONSHIPS, PLASTICITY, AND STRUCTURE OF SOIL
Week 3	WEIGHT-VOLUME RELATIONSHIPS, PLASTICITY, AND STRUCTURE OF SOIL
Week 4	ENGINEERING CLASSIFICATION OF SOIL
Week 5	PERMEABILITY
Week 6	SEEPAGE
Week 7	EFFECTIVE STRESS CONCEPT
Week 8	EFFECTIVE STRESS CONCEPT
Week 9	Med term exam
Week 10	STRESSES IN SOIL MASS
Week 11	STRESSES IN SOIL MASS
Week 12	CONSOLIDATION OF SOIL
Week 13	CONSOLIDATION OF SOIL
Week 14	SHEAR STRENGTH OF SOIL
Week 15	SHEAR STRENGTH OF SOIL
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	General and safety instruction, how to prepare a report and its format
Week 2	1. Water content determination (Oven drying method).
Week 3	2. Grain size distribution – Sieve analysis.
Week 4	3. Grain size distribution – hydrometer analysis.
Week 5	4. Determination of Specific gravity by Pycnometer and density bottle method.
Week 6	5. Determination of Liquid and Plastic limit (Casagrande method).
Week 7	6. Determination of Shrinkage limit of soil
Week 8	7. Determination of Permeability by Constant and Variable head method.
Week 9	Med. Term exam
Week 10	8. Consolidation Test
Week 11	9. Unconfined compression test for fine grained soils
Week 12	10. Triaxial Compression Test
Week 13	10. Triaxial Compression Test
Week 14	11. Direct shear test.
Week 15	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	<ol style="list-style-type: none"> 1. Braja M. Das, Fundamentals of Geotechnical Engineering, Cengage Learning, 3rd ed., 2008 2. Braja M. Das, Soil mechanics laboratory manual, Oxford University press, 6th ed., 2002 	An electronic copy is provided to each student
Recommended Texts	<ol style="list-style-type: none"> 1. Principles of geotechnical engineering, Braja M. Das, 8th edition 2. Soil mechanics, R.F. Craig, 8th ed. 3. Solving problems in soil mechanics, B.H.C. Sutton, 2nd ed. 	An electronic copy is provided to each student
Websites	https://www.uoanbar.edu.iq/Bank-Section.php	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.