



**Course Syllabus**  
**According to JORDAN National Qualification**  
**Framework (JNQF)**

**Course Name: GEOTECHNICAL Engineering**

**Course Number: 4033151**

### General Course Information:

Course title	Geotechnical Engineering
Course number	4033151
Credit hours	3Hrs Theory
Education type	[Online (Synchronous, Asynchronous)], [Hybrid (Face-to-Face, Online (Synchronous, Asynchronous)), OR [Face-to-Face]
Prerequisites/corequisites	
Academic Program	Civil Engineering
Program code	40
Faculty	Engineering
Department	Civil Engineering
Level of course	Third Year
Academic year /semester	1 <sup>st</sup> Semester 2022-2023
Awarded qualification	B.Sc
Other department(s) involved in teaching the course	-
Language of instruction	English
Date of production/revision	-

### Course Coordinator:

Coordinator's name	Prof. Dr. Saad Alabdullah
Office No	3411
Office Phone extension number	2452
Office Hours	
Email	<a href="mailto:saad.alabdullah@iu.edu.jo">saad.alabdullah@iu.edu.jo</a>

### Other Instructors:

Instructor name	Prof. Dr. Saad Alabdullah
Office No	3411
Office Phone extension number	2452
Office Hours	
Email	saad.alabdullah@iu.edu.jo

### Course Description (English/Arabic):

<b>English</b>	<p>Origin and main characteristics of soil, soil in engineering, soil classification, concepts of soil compaction, seepage of water through a soil and its permeability, types of stresses transmitted to soil, types of settlements in the soil (a focus on consolidation), shear strength of soil and its applications.</p> <p>soil and rock support and affect the performance of structures built on or</p>
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	below the earth's surface.
Arabic	الأصل والخصائص الرئيسية للتربة ، التربة في الهندسة ، تصنيف التربة ، مفاهيم انضغاط التربة ، تسرب المياه من خلال التربة ونفاذية التربة ، أنواع الضغوط المنقولة إلى التربة ، أنواع المستوطنات في التربة (التركيز على التوحيد) ، القص قوة التربة وتطبيقاتها.

**Textbook: Author(s), Title, Publisher, Edition, Year, Book website.**

**1. Principles of Geotechnical Engineering, 9th Edition, B. Das, 2020.**

Supplemental lecture material (e.g copies of lecture power points, study guides, handouts) will be available. Recommended reading assignments from the course textbook are indicated on the lectures schedule. It is best to read the assignment in advance of the lecture so that you are prepared with questions.

**References: Author(s), Title, Publisher, Edition, Year, Book website.**

1. Geotechnical Engineering, 1st edition, T. Ramamurthy, 2011.
2. Modern geotechnical engineering, S. Alam, 2009.
3. Soil Mechanics and Geotechnical Engineering, S. Dhananjay, 2003.
4. Basic glossary of geological terms (in English):  
<http://www.geotech.org/survey/geotech/dictiona.html>

**Course Educational Objectives (CEOs):**

1.	Introduce students to the methods of applying the principles of soil mechanics.
2.	Be able to identify the types of soil and rocks, their physical and engineering properties..
3.	Provide an introductory understanding of soil mechanics analyses and design techniques
4.	Develop skills in solving several classical and major problems in geotechnical engineering
5.	Be able to identify the soil, its physical and Engineering properties.
6.	Be able to identified the stiffness of soil
7.	Conduct simple soil improvement

### Intended Learning Outcomes (ILO's):

	Subject Intended learning outcomes (ILOs) describe what students are expected to know and be able to do at the end of the course. These outcomes are related to the knowledge, skill and competence that students acquire:	Relationship to CEOs	Contribution to PLOs	Bloom Taxonomy Levels*	Descriptors**
A	Knowledge and Understanding:				
1. A1	Demonstrate an understanding of the terms, concepts and principles of Geotechnical engineering	1	1	1	K
2. A2	Demonstrate an understanding of the physical and mechanical properties of Soil	2	1	1	K
B	Intellectual skills:				
3. B1	Review stress in soil and effected criteria's	3	2	2	KS
4. B2	Use the techniques, skills and modern engineering tools for recognize all consolidation theory	3	2	2	KSC
5. B3	Develop professional skills in stiffness of soil	4	2	2	KSC
C	Subject specific skills:				
6. C1	Develop understanding of soil types and engineering classifications of soils and rocks	5	2	2	SC
7. C2	Be aware of the role of geotechnical engineering in civil engineering design, construction .	6	6	2	SC
D	Transferable skills:				
8. D1	Solve the geotechnical engineering problems	7	6	3	KSC

**\*Bloom Taxonomy Levels**

Level #	1	2	3	4	5	6
Level Name	Knowledge	Comprehension	Application	Analysis	Evaluation	Synthesis

**\*\* Descriptor (National Qualification Framework Descriptors): K : Knowledge, S: Skill, C: Competency.**

**Program Learning Outcome (PLOs):**

Program Learning Outcomes describe what students are expected to know and be able to do by the time of graduation. These relate to the knowledge, skills, and behaviours that students acquire as they progress through the program. A graduate of the ( _____ ) program will demonstrate:		Descriptors**		
		K	S	C
1.	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	K	S	C
2.	An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	K	S	C
3.	An ability to communicate effectively with a range of audiences			
4.	An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts			
5.	An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives			
6.	An ability to develop and conduct appropriate experimentation, analyse and interpret data, and use engineering judgment to draw conclusions	K	S	C
7.	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies			

**\*\* Descriptors according to the national qualifications framework (K: knowledge, S: skill, C: Competency)**

**Weekly Schedule** (please choose the type of teaching)

✓ Face to Face

Week	First Lecture (S 11.00-12.00)	Second Lecture (T 11.00-12.00)	Third Lecture (TH 11.00-12.00)	Ach. ILOs	Ac h. PL Os	Descriptors **
1	<b>Introduction</b>	<b>Physical properties</b>	<b>Know basic properties of soil</b>	<b>A1</b>	1	K
2	<b>Atterberg limits</b>	<b>Consistency limits</b>	<b>Understand soil consistency</b>	<b>A2</b>	1	K
3	<b>classification</b>	<b>classification</b>	<b>Types and classification of soil</b>	<b>B1</b>	1	KS
4	<b>USCS</b>	<b>USCS</b>	<b>Understand the rock cycle, (igneous, sedimentary and metamorphic).</b>	<b>B2</b>	1	KSC
5	<b>TYPE OF STRESSES</b>	<b>EFFECTIVE STRESS</b>	<b>Effect of geostatic and external stresses on behavior of soil</b>	<b>C1</b>	2	KSC
6	<b>Hydraulic Conductivity</b>	<b>Hydraulic Conductivity</b>	<b>Understand the coefficient of permeability on flow of water in soil</b>	<b>C2</b>	2	KSC
7	<b>Rocks</b>	<b>Rocks</b>	<b>Dips and Strike in Rocks</b>	<b>C3</b>	2	KSC
8	<b>Consolidation theory</b>	<b>Consolidation theory</b>	<b>Solving problems in compressibility</b>	<b>A1 &amp; C1</b>	1 & 2	KSC
9	<b>Differential settlement in soil</b>	<b>Differential settlement in soil</b>	<b>Understand Differential settlement and consolidation theory</b>	<b>B1 &amp; D1</b>	2 & 6	SC
10	<b>Consolidation with time</b>	<b>Consolidation with time</b>	<b>Behaviour of soil under loading</b>	<b>B2 &amp; C3</b>	2	SC
11	<b>Consolidation with time</b>	<b>Consolidation properties</b>	<b>Evaluating of settlement</b>	<b>C1</b>	2	KSC
12	<b>Introduction in shear strength</b>	<b>Shear strength evaluation</b>	<b>Triaxial tests and its types</b>	<b>C1</b>	2	KSC
13	<b>Soil stiffness</b>	<b>Soil stiffness</b>	<b>problems in Soil stiffness</b>	<b>C2</b>	6	KSC
14	<b>UUT,CUT &amp; CDT</b>	<b>Shear in site</b>	<b>Soil improvement</b>	<b>D1</b>	6	KSC
15	<b>Review</b>	<b>Review</b>	<b>Final exam</b>	<b>D1</b>	6	KSC

\* **K: Knowledge, S: Skills, C: Competency**

### Teaching Methods and Assignments:

Development of ILOs is promoted through the following teaching and learning methods:

- ✓ Interactive videos
- Practice Labs
- ✓ Discussion Forums
- ✓ Quizzes
- ✓ Other Interactive online activities
- ✓ Reports

### Course Policies:

A- Attendance policies:

The maximum allowed absences is 15% of the lectures.

B- Absences from exams and handing in assignments on time:

Midterm exam can be retaken based on approval of excuse by the instructor's discretion.

Not handing assignment on time will incur penalties.

C- Academic Health and safety procedures

D- Honesty policy regarding cheating, plagiarism, and misbehaviour:

Cheating, plagiarism, misbehaviour will result in zero grade and further disciplinary actions may be taken.

E- Grading policy:

- All homework is to be posted online through the e-learning system.
- Exams will be marked within 72 hours and the marked exam papers will be handed to the students.
- Online Activities (Course Videos, Practice labs, Discussion Forums, Quizzes) **\_20%**
- Midterm **30%**
- Final Exam **50%**

F- Available university services that support achievement in the course: **E-Learning Platform, Labs, Library.**

### Required equipment:

- **PC / Laptop with webcam and mic**
- **Internet Connection**
- **Access to the IU E-Learning Platform at: <https://elearn.iu.edu.jo/>**
- **E-learning plan**
- Satisfaction questionnaires for online and face-to-face learning
- Software for e-learning
- Training

### Assessment Tools implemented in the course:

- ✓ Final Exam
- ✓ Midterm Exam

- ✓ Quizzes
- ✓ Homework
- Practice Labs
- ✓ Discussion Forums
- ✓ Periodic reports for learning assessment
- ✓ Improvement plans for online or face-to-face teaching
- Others:.....

### Responsible Persons and their Signatures:

<b>Course Coordinator</b>	<b>Prof. Dr. Saad Alabdullah</b>	<b>Completed Date</b>	/ /
		<b>Signature</b>	
<b>Received by</b> (Department Head)		<b>Received Date</b>	/ /
		<b>Signature</b>	