



Course Syllabus
According to JORDAN National Qualification
Framework (JNQF)

Course Name: FOUNDATION Engineering

Course Number: 04034151

General Course Information:

Course title	Foundation Engineering
Course number	4034151
Credit hours	3Hrs Theory
Education type	[Online (Synchronous, Asynchronous)], [Hybrid (Face-to-Face, Online (Synchronous, Asynchronous)), OR [Face-to-Face]
Prerequisites/corequisites	04033151 – Geotechnical Engineering-1
Academic Program	Civil Engineering
Program code	40
Faculty	Engineering
Department	Civil Engineering
Level of course	Forth Year
Academic year /semester	1 st 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	saad.alabdullah@iu.edu.jo

Other Instructors:

Instructor name	Prof. Dr. Saad Alabdullah
Office No	3411
Office Phone extension number	2452
Office Hours	Sundays 12-3, Mondays 2-3, Tuesdays 1-2, Wednesdays 2-3,
Email	saad.alabdullah@iu.edu.jo

Course Description (English/Arabic):

English	This course presents the planning, analysis, and design of shallow and deep foundations. Topics supporting course objectives include aspects of subsurface investigations, Settlement . Bearing Capacity in-situ testing, factors of safety, margin of safety, reliability, and Load and Resistance Factor Design.
Arabic	قدم هذا المقرر الدراسي تخطيط وتحليل وتصميم الاسس الضحلة وأسس عميقة. الموضوعات التي تدعم أهداف المادة تشمل جوانب التحريات للتربة والمقع ومشاكل الجلوس وتحمل التربة ، الفحوص في الموقع ، عوامل الأمان ، هامش السلامة والموثوقية وتصميم عامل الحمل والمقاومة.

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

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

2. 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. Foundation Engineering, 1st edition, T. Ramamurthy, 2011.
2. Modern Foundation Engineering, S. Alam, 2009.
3. Soil Mechanics and Foundation Engineering, S. Dhananjay, 2003.
4. Foundation Engineering Handbook, 2nd Ed., 1991, Fang. ON RESERVE
5. An Introduction to Geotechnical Engineering, 2nd Ed., 2011, Holtz, et al.
6. Soil Mechanics in Engineering Practice, 3rd Ed., 1996, Terzaghi, et al.
7. EPRI Manual for Estimating Soil Properties for Foundation Design
8. Elastic Solutions for Soil and Rock Mechanics, Poulos & Davis 6. FHWA Manuals: http://www.fhwa.dot.gov/engineering/geotech/library_listing.cfm

Course Educational Objectives (CEOs):

1.	will learn how to design shallow and deep foundations, retaining walls, and slopes
2.	learn how to utilize their knowledge in soil mechanics to perform various types of engineering calculations. This includes consolidation analysis for foundations, and stability analysis of slopes and retaining walls
3.	be able to design and analyze a variety of geotechnical engineering structures including foundations, piles, and slopes.
4.	Develop skills in solving several classical and major problems in Foundation Engineering
5.	earn how to interact professionally among themselves during their assigned design projects where they will be divided into teams.
6.	Be able to design foundation on problematic soil

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 Foundation Engineering	1	1	1	K
2. A2	Demonstrate an understanding of the site investigation and in site tests	2	1	1	K
B	Intellectual skills:				
3. B1	Review stress in different types of foundation and effected criteria's	3	2	2	KS
4. B2	Use the techniques, skills and modern engineering tools for recognize all foundation theories	3	2	2	KSC
5. B3	Develop professional skills in stiffness of foundation	3	2	3	KSC
C	Subject specific skills:				
6. C1	Develop understanding of foundation types and its engineering classifications	4	2	4	SC
7. C2	Be aware of the role of Foundation Engineering in civil engineering design, construction.	5	6	5	SC
D	Transferable skills:				
8. D1	Solve the Foundation Engineering problems	6	6	6	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	Introduction	Site investigation	How to write reports	A1	1	K
2	In site tests	Evaluate Bearing Capacity	Understand Bearing Capacity of soil	A2	1	K
3	Settlement	Differential settlement	Effect of compressibility on Foundation Design	B1	1	KS
4	Earth Pressure theories	Failure Criteria's	Understand the Failure of Retaking Wall ,	B2	1	KSC
5	Active Earth Pressure	Passive Earth Pressure	Effect of active and passive E.P. on Design of Retaking Wall	C1	2	KSC
6	Evaluate Bearing Capacity	B.C theories	Solving problems in B.C	C2	2	KSC
7	Design of footing	Types of footings	General discussions on footings types	C3	2	KSC
8	Isolated footing	Square footing	Rectangular footings	A1 & C1	1 & 2	KSC
9	Combined footing	One way shear	Punching shear	B1 & D1	2 & 6	SC
10	Wall footing	Evaluate size and dimensions	Behaviour of soil under wall footings	B2 & C3	2	SC
11	Trapezoidal footing	Specific consideration	Evaluating of areas and dimensions	C1	2	KSC
12	Raft foundation	Shear and Moment diagram	Various types of engineering calculations	C1	2	KSC
13	Special footings	Soil stiffness	problems in S. footings	C2	6	KSC
14	Deep foundation	piles	Design criteria's	D1	6	KSC
15	Review	Review	Final exam	D1	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.io/>**
- **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

<ul style="list-style-type: none"> Practice Labs ✓ Discussion Forums ✓ Periodic reports for learning assessment ✓ Improvement plans for online or face-to-face teaching Others:.....

Responsible Persons and their Signatures:

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