جامعة الإسراء
ISRA UNIVERSITY

Course Syllabus

According to JORDAN National Qualification Framework (JNQF)

Course Name: Structural Analysis - 2

Course Number: 04033241

General Course Information:

Course title	Structural Analysis - 2
Course number	04033241
Credit hours	Three hours' theory
Education type	[Face-to-Face]
Prerequisites/corequisites	Structural Analysis-1 04033141
Academic Program	BSc in Civil Engineering
Program code	04
Faculty	Engineering
Department	Civil Engineering
Level of course	Three
Academic year /semester	2022-2023/First
Awarded qualification	Structural Engineer
Other department(s) involved in teaching the course	Non
Language of instruction	English
Date of production/revision	October 2022

Course Coordinator:

Coordinator's name	Dr. Mohammed Al-lami
Office No	4251
Office Phone extension number	2454
Office Hours	Sun. Tu.&Th.: 10-1 Mon. &Wen.: 11-12:30
Email	mohammed.allamy@iu.edu.jo

Other Instructors:

Instructor name	NON
Office No	
Office Phone extension number	
Office Hours	
Email	

Course Description *(English/Arabic)*:

English	Determinate, indeterminate, stable and unstable structures. Analysis of statically indeterminate structures. Equilibrium and compatibility equations. Virtual Work Method for indeterminate; trusses, beams and frames. Castigiliano's second theorem for indeterminate; trusses, beams and frames. Three Moment Equation Method for beams. Slope Deflection Method for beams and frames with and without side sway. Moment Distribution Method for beams and frames with and without side sway.
Arabic	المنشآت المحددة وغير المحددة استاتيكيا، استقرارية المنشات ، تحليل الهياكل المفصلية والعوارض والأطر الغير محددة استاتيكيا؛ معادلات الاتزان والتوافق، طريقة القوة والإزاحة (الشغل الافتراضي) وطريقة الشغل الأدنى (نظرية كاستليانو الثانية)، طريقة معدلات العزوم الثلاثة للعوارض، طريقة ميل الترخيم للعوارض والأطر بدون ومع إزاحة جانبية، طريقة توزيع العزوم للعوارض والأطر بدون ومع إزاحة جانبية، تحليل العوارض والأطر المتغيرة المقاطع.

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

R.C. Hibbeler, Structural Analysis, Pearson, 10th edition, 2018

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

1. C. H. Noriss, & J. B. Wilbur, Elementary Structural Analysis, New York McGraw, 4 th. Edition, 1991

Course Educational Objectives (CEOs):

1.	Provide a thorough understanding and practical applications of structural analysis theories for indeterminate structures
2.	Develop the skills to analyze and understand the behavior and response of indeterminate structures to various loads and constraints.
3.	Establish foundation knowledge and skills through structural analysis in preparation for structural design; concrete, steel and other structural materials

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:**				
A1	Identify different structures, external loads and internal forces and moments, support conditions, and constraints.	1	1,7	3	K,C
A2	The student should be able to analyze indeterminate structures (trusses, beams and frames), under various loading and support conditions using the Force method.	1	1,7	3	K,C
A3	The student should be able to analyze indeterminate structures (trusses, beams and frames), under various loading and support conditions using the Least Work method.	2,3	1,7	4	K,C
A4	The student should be able to analyze indeterminate structures beams, under various loading and support conditions using the Three Moments Equations method.	2,3	1,7	5	K,C
A5	The student should be able to analyze indeterminate structures (beams and frames), under various loading and support conditions using the Slope Deflection method.	2,3	1,7	5	K,C
A6	The student should be able to analyze indeterminate structures (beams and frames), under various loading and support conditions using the Moment Distribution method.	2,3	1,7	3	K,C

B	**Intellectual skills:**				
B1					
B2					
B3					
C	**Subject specific skills:**				
C1					
C2					
C3					
D	**Transferable skills:**				
D1					
D2					
D3					

***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**		**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			
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, analyze and interpret data, and use engineering judgment to draw conclusions			
7.	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	K		C

**** 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 (12:30-2:00)	Second Lecture (12:30-2:00)	Ach. ILOs	Ach. PLOs	Descriptors**
1	Classifications of structures, loads, and support	Determinate, indeterminate, stable and unstable; trusses, beams and frames.	1	1,7	K
2	The Virtual Work Method; indeterminate trusses.	The Virtual Work Method; indeterminate trusses.	1	1,7	K,C
3	The Virtual Work Method; indeterminate beams and frames	The Virtual Work Method; indeterminate beams and frames	1	1,7	K,C
4	Castigiliano's Second Theorem; theory, trusses, beams and frames.	Castigiliano's Second Theorem; theory, trusses, beams and frames.	1	1,7	K,C
5	Castigiliano's Second Theorem; theory, trusses, beams and frames.	Castigiliano's Second Theorem; theory, trusses, beams and frames.	2	1,7	K,C
6	Three Moment Equation Method; theory, uniformly distributed and concentrated loads.	Three Moment Equation Method; theory, uniformly distributed and concentrated loads.	2	1,7	K,C
7	Three Moment Equations Method; other special loads.	Three Moment Equation Method; other special loads..	3	1,7	K,C
8	The Slope Deflection Method; theory, beams, braced frames.	The Slope Deflection Method; theory, beams, braced frames.	3	1,7	K,C

9	The Slope Deflection Method; unbraced frames.	The Slope Deflection Method; unbraced frames.	3	1,7	K,C
10	The Moment Distribution Method; theory, beams.	The Moment Distribution Method; theory, beams.	3	1,7	K,C
11	The Moment Distribution Method; braced frames.	The Moment Distribution Method; braced frames.	4	1,7	K,C
12	The Moment Method; Unbraced frames	The Moment Method; Unbraced frames	4	1,7	K,C
13	The Column Analogy Method	The Column Analogy Method	5	1,7	K,C
14	The Column Analogy Method	The Column Analogy Method	5	1,7	K,C

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

Teaching Methods and Assignments:

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

- **Interactive videos**
- **Discussion Forums**
- **Quizzes**
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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
- Discussion Forums
- Periodic reports for learning assessment
- face-to-face teaching

Responsible Persons and their Signatures:

Course Coordinator	Dr. Mohammed Al-lami	**Completed Date**	/ /
		Signature	

Received by (Department Head)	Dr. Ibrahim Varouqa	**Received Date**	/ /
		Signature	