ISRA UNIVERSITY
جامعة الإسـراء

Course Syllabus
According to JORDAN National Qualification Framework (JNQF)

Course Name: Steel Structures 1

Course Number: 04034242

General Course Information:

Course title	**Steel Structures (1)**
Course number	**04034242**
Credit hours	**3 CrH**
Education type	**Face-to-Face**
Prerequisites/corequisites	**04033241-Structural Analysis (2)**
Academic Program	**Bachelor's in civil engineering**
Program code	**03**
Faculty	**Engineering**
Department	**Civil Engineering**
Level of course	**Fourth year**
Academic year /semester	**2022-2023 (First Semester)**
Awarded qualification	**Bachelor**
Other department(s) involved in teaching the course	**None**
Language of instruction	**English**
Date of production/revision	**3/10/2022**

Course Coordinator:

Coordinator's name	Walid Hasan
Office No	4351
Office Phone extension number	2601
Office Hours	As Attached
Email	Walid.hasan@iu.edu.jo

Other Instructors:

Instructor name	
Office No	
Office Phone extension number	
Office Hours	
Email	

Course Description *(English/Arabic)*:

English	Properties and types of steel structures, loads and load combinations, design of steel members using LRFD method, tension members, compression members, elastic and inelastic buckling of compression members by flexure and torsion, local buckling of slender elements, flexural members, limit state of yielding, elastic and inelastic lateral-torsional buckling, design against shear force, design for deflection, members subjected to combined stresses, simple connections.
Arabic	خواص الفولاذ الإنشائي وأنواعه، الأحمال وتجميعات الأحمال، التصميم باستخدام طريقة معاملات الأحمال والمقاومة، فلسفة التصميم حسب نظرية الحدود. العناصر الإنشائية المعرضة للشد المحوري، العناصر الإنشائية المعرضة للضغط المحوري، الانبعاج الكلي المرن وغير المرن بالانحناء واللي لعناصر الضغط، العناصر الإنشائية المعرضة للانحناء، الفشل بالخضوع، انبعاج اللي الجانبي المرن وغير المرن، التصميم لمقاومة القص، التصميم لمتطلبات الترخيم، تصميم العناصر الإنشائية لمقاومة الاجهادات المركبة، وصلات البراغي البسيطة.

D040_JNQF_Rev2
Ref: Deans Council (05) Decision No. (06) Date: 18/10/2021.
Ref: Quality Assurance Council Session (03) Decision No. (03) Date:05/10/2021.

Page 2 of 6

QUALITY ASSURANCE ISRA UNIVERSITY

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

Walid M. Hasan, *Structural Steel Design*, 1st edition, Dar Assawaqi, 2017.

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

ANSI/AISC 360-16, *Specification for Structural Steel Buildings*, American Institute of Steel Construction, 2016.

Course Educational Objectives (CEOs):

1.	To provide students with scientific background to recognize steel composition, properties, types and shapes.
2.	To provide students with educational experience to apply fundamental mathematical and engineering principles to analyze steel structures.
3.	To instruct students to use the applicable Codes to design, in safe and economical manner, the various structural steel members.
4.	To warn students about the catastrophic consequences of failure of steel members.

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	To be able to identify, according to ASTM standards, the various types and shapes of steel and their physical and mechanical properties.	1	7	1	K, C
B	**Intellectual skills:**				
B1	To be able to compute loads and forces on steel structures.	2	1	3	C
C	**Subject specific skills:**				
C1	To be able to analyze the failure modes of steel members under various loading conditions and compute their design strengths.	2	1	4	C
C2	To be able to select the most economical satisfactory steel section shape and size subject to various loading, according to specific design criteria.	3	2, 4	6	C
C3	To be able to apply relevant AISC 360-16 provisions to ensure safety and serviceability of structural steel elements.	4	2, 4	5	C
D	**Transferable skills:**				
D1					

D040_JNQF_Rev2
Ref: Deans Council (05) Decision No. (06) Date: 18/10/2021.
Ref: Quality Assurance Council Session (03) Decision No. (03) Date:05/10/2021.

Page 3 of 6

*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 (Civil Engineering) 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	✓		
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, analyse 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	✓		✓

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

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

✓ **Face to Face**

☐ **Hybrid** *(2 Lectures Face – To - Face +1 Lecture Asynchronous)*

☐ **Hybrid (1 Lectures Face – To - Face +1 Lecture Asynchronous)*

☐ **Online** *(2 Lectures Synchronous +1 lecture Asynchronous)*

Week	First Lecture (........................)	Second Lecture (........................)	Third Lecture (...........................)	Ach. ILOs	Ach. PLOs	Descriptors**
1	Steel properties	Steel shapes	Steel types	A1	7	K, C
2	Load calculation	Load calculation	Snow load calculation	B1	1	K
3	Tension members	Net areas	Tensile yielding	C1	1	K

D040_JNQF_Rev2
Ref: Deans Council (05) Decision No. (06) Date: 18/10/2021.
Ref: Quality Assurance Council Session (03) Decision No. (03) Date:05/10/2021.

Page 4 of 6

4	Tensile rupture	Tensile rupture	Block-shear	C1	1	K
5	Block-shear	Design of tension members	Design of tension members	C1 & C2	1, 2, 4	C
6	Pin-connected members and eye bar	Threaded rods	Compression members	C1	1	C
7	Effective length	Flexural buckling	Flexural buckling	C1, C3	1, 2, 4	C
8	Flexural buckling	Design for flexural buckling	Torsional buckling	C1 & C2	1, 2, 4	C
9	Flexural-Torsional buckling	Effective length in frames	Effective length in frames	C1	1	C
10	Beams	Bending of I-shaped sections and channels	Flexural yielding	C1, C3	1, 2, 4	C
11	Flexural yielding	Inelastic lateral-torsional buckling	Elastic lateral-torsional buckling	C1, C2	2, 4	C
12	Bending about weak	HSS bent about either axis	HSS bent about either axis	C1	1	C
13	Design for shear	Design for shear	Deflection	C3	2, 4	C
14	Deflection	Simple connections	Simple connections	C3	2, 4	C
15	Exams					

* **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:

D040_JNQF_Rev2
Ref: Deans Council (05) Decision No. (06) Date: 18/10/2021.
Ref: Quality Assurance Council Session (03) Decision No. (03) Date:05/10/2021.

Page 5 of 6

- 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) **___%**

- 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:

Course Coordinator	Dr Walid Hasan	Completed Date	3 / 10 / 2022
		Signature	

Received by (Department Head)		Received Date	/ /
		Signature	

QUALITY ASSURANCE
ISRA UNIVERSITY