جامعة الإسراء
ISRA UNIVERSITY

COURSE Syllabus
According to JNQF

Course Name: Strength of Materials

Course Number: 04032231 + 04082232

General Course Information:

Course title	Strength of Materials
Course number	04032231 + 04082232
Credit hours	(3 Hrs. Theory, 0 Hr. practical)
Contact hours	-
Prerequisites/corequisites	Applied Mechanics (Statics) 04082131
Academic Program	Renewable Energy Engineering
Program code	REE
Awarding institution	Isra University
Faculty	Engineering
Department	Renewable Energy Engineering
Level of course	3rd Year
Academic year /semester	2nd 2021-2022
Awarded qualification	B. Sc.
Other department(s) involved in teaching the course	-
Language of instruction	English
Date of production/revision	12 Sep 2022

Course Coordinator:

Coordinator's Name: Dr. Ismail Hdaib
Office No.: 4210
Office Phone: 2486
Office Hours: Su. 13.00 – 14.00
Email: ismail.hdaib@iu.edu.jo

Other Instructors:

Instructor's Name:
Office No.:
Office Phone:
Office Hours:
Email:

Course Description *(English/Arabic)*:

English	Strength of Materials (3 semester hour) Theoretical course. Defining Stress, Strain, Mechanical Properties of Solid Materials, Impact, Buckling, Beam Deflection, Torsion, Tensile, Stiffness, Hardness & Creep and compare concepts to practical applications.
Arabic	مقاومة المواد. (3 ساعة فصل دراسي) مقرر فصلي. تحديد الإجهاد ، والانفعال ، والخصائص الميكانيكية للمواد الصلبة ، والتأثير ، والتواء ، وانحراف الحزمة ، والتواء ، والشد ، والصلابة ، والصلابة والزحف ، ومقارنة المفاهيم بالتطبيقات العملية.

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

1. R. C. HIBBELER, Mechanics of Materials, Prentice Hall, Ninth Edition, © 2014, ISBN 13: 978-0-13-325442-6.

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

Ferdinand P Beer, E Russell Johnston, John T Dewolf & David F Mazurek, Mechanics of Materials, McGraw-Hill, Sixth Edition, © 2012, ISBN 978-0-07-338028-5.

Course Educational Objectives (CEOs):

1.	Define Stress, Strain, and related Tensile & Compression Tests.
2.	Obtain Stiffness, Hardness, Impact, Creep, & Buckling Properties.
3.	Determine Beam Deflection, & Torsion.
4.	Obtain Mechanical Properties of Materials.

Intended Learning Outcomes (ILO's):

	Intended Learning Outcomes (ILO's)	**Relationship to CEOs**	**Contribution to PLOs**
A	**Knowledge and Understanding:**		
A1	Review of statics and the internal resultant loadings in a body. Defining concepts of normal and shear stress, and applications of members subjected to an axial load or direct shear.	1	1, 2
A2	Introducing deformation of a body using the concepts of normal and shear strain.	2	1, 2
B	**Intellectual skills:**		
B1	Introducing experimental methods to determine the stress–strain diagram for solid materials and comparing to Engineering concepts.	1, 2	1, 2
B2	Determine the deformation of members, finding the support reactions when these reactions cannot be determined strictly from the equations of equilibrium. An analysis of the effects of thermal stress, stress concentrations, inelastic deformations, and residual stress.	1, 2, 3	1, 2
C	**Subject specific skills:**		
C1	Discuss the torsional loading for circular cross section & noncircular cross sections. Obtain stress concentrations and residual stress caused by torsional loadings.	1, 2, 3, 4	1, 2
C2	Determine the stress in Beams & Shafts members caused by bending and related shear and moment diagrams for a beam or shaft.	1, 2, 3, 4	1, 2

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

■ *(**5 hrs** Face – To - Face)*

□ *(**2 hrs** Face – To - Face**+1 hr** Asynchronous)* **(Hybrid)**

□ *(**3 hrs** Online)*

Week	First Hour (……)	Second Hour (……)	Third Hour (……)	Fourth Hour (……)	Fifth Hour (……)	Ach. ILOs	Ach. PLOs	Descriptors*
1	Stress	Stress	Stress	Stress	Stress	A1	1,2	K
2	Strain	Strain	Strain	Strain	Strain	A1	1,2	K
3	Mech. Prop of Materials.	Mech. Prop of Materials.	Mech. Prop of Materials.	Mech. Prop of Materials.	Mech. Prop of Materials.	A1,A2	1,2	K
4	Mech. Prop of Materials.	Mech. Prop of Materials.	Mech. Prop of Materials.	Mech. Prop of Materials.	Midterm Exam	A1,A2	1,2	K & C
5	Axial Loads.	Axial Loads.	Axial Loads.	Axial Loads.	Axial Loads.	A1,A2	1,2	S
6	Torsion	Torsion	Torsion	Torsion	Torsion	A2	1,2	S
7	Bending	Bending	Bending	Bending	Bending	A2	1,2	S
8	Bending	Bending	Bending	Bending	Final Exam	A2	1,2	K, S & C

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

Teaching Methods and Assignments:

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

- **(3 hrs Face – To - Face)**
- **(2 hrs. Face – To - Face +1 hr Asynchronous) (Hybrid)**
- **(3 hrs Online)**
- **Course Videos**
- **Practice Labs**
- **Discussion Forums**
- **Quizzes**
- **Other Interactive online activities**

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, Reports, & 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 Online Compiles such as:**
  Access to the IU E-Learning Platform at: https://elearn.iu.edu.jo/

Assessment Tools implemented in the course:

Final Exam
Midterm Exam
Quizzes
Practice Labs
Discussion Forums

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		Bloom Taxonomy Levels*
a	An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	1
b	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
c	An ability to communicate effectively with a range of audiences.	3
d	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.	4
e	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.	2
f	An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.	2
g	An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.	3

***Bloom Taxonomy Levels**

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

Responsible Persons and their Signatures:

Course Coordinator	**D. Ismail Hdaib**	**Completed Date**	**12 / 9 / 2022**
		Signature	

Received by (Department Head)	**D. Zakarya Al Omary**	**Received Date**	**12 / 9 / 2022**
		Signature	