



Amman - Jordan

Syllabus

Faculty	Engineering
Specialization	Civil Engineering
Semester	Second
Academic Year	2019/2020

Course Name	Engineering Mechanics
Course Number	110101213 & 1101233

A Copy of the Study Plan Shall be given to Each Registered Student in this Course. The Study Plan Shall be preserved for Future Use.



F112-3, Rev. c

Ref.: Deans' Council Session (03/2018-2019), Decision No.: 14, Date: 15/09/2018

1. Lecturer Information

1. Lecturer Name: Dr. Omaimah Al Arja
2. Office Number: B- 351
3. Phone Number:
4. Email: oalarja@meu.edu.jo
5. Office Hours: 11:00-14:00 Monday, Wednesday

2. Place and Date of the Course

1. The Days and Time of the Course: Mon-Wed (9:30-11:00)
2. Place: B 109
3. Course Laboratory (if any):

3. Sources and References

1. Course Book:

ENGINEERING MECHANICS

Twelfth Edition –R.C. Hibbeler



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4. Course Description:

1. The Description:

Introduction to static forces and Newton's laws, SI units, Vectors and operations on vectors (summation, dot product, cross product), System of forces, resultant, Definition of moment, couples, equilibrium, Types of Supports, Reactions of Structures (beams, frames, and trusses), Distributed loads, internal forces for Trusses by joints and sections method, Center of area, center of mass, Moment Of inertia for different shapes.

2. Objectives: The this course will enable students to

- An ability to apply knowledge of mathematics, science and engineering.
- An ability to identify, formulates, and solves engineering problems.
- An ability to design a system, component, or process to meet desired needs.
- A knowledge of contemporary issues.
- An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

5. Learning Outcomes of the Course:

1. Identify what is mechanics / statics, and learn how to Work with two types of units.
2. Apply vector addition and subtraction. Resolve a 2-D vector into components.
3. Represent a 3-D vector in a Cartesian coordinate system. Find the magnitude and Coordinate angles of a 3-D vector. Add vectors (forces) in 3-D space
4. Draw a free body diagram (FBD). Apply equations of equilibrium to solve a 2-D problem
5. Understand and define moment, and, determine moments of a force in 2-D
6. Method for finding the moment of a force about a specified axis, define the moment of a couple.
7. Identify support reactions; draw a free-body diagram.

8. Define a simple truss; determine the forces in members of a simple truss.
9. Understand the concept of the center of gravity, center of mass, and the centroid, determine the location of the center
10. Learning the method for determining the moment of inertia for an area

6. Learning Outcomes of the Program:

1. Apply engineering knowledge in the fields of civil engineering practically and with high professionalism.
2. Work in team on several scientific trends and background.
3. Solve problems in several engineering fields.
4. Conduct research in a way that serves the environment and society.
5. Commit themselves to ethical and professional responsibility.
6. Optimal utilize method, skill, and engineering tools.
7. Keep pace with modern structuring method and building material professionally and efficiency.

7. Teaching Methods

The methods of instruction may include, but are no limited to:

1. Lectures
2. Discussion and problem solving
3. Individual homework

8. Evaluation Methods and their Percentage Value %

#	Evaluation	Value	Description
1.	Exams	30%	Mid Term
2.	Final Exam	50%	
3.	Homework	20%	Solving problems & project
Total		100%	

9. The Timetable for the Implementation of Course

Week	Subject	Reference in the Course Book (Pages)	Number of Educational Output of the Material	Output Number of the Program
1	1. INTRODUCTION <ul style="list-style-type: none"> • Mechanics • Fundamental Concepts • Units of Measurement • The International System of Units • Numerical Calculations 	Chap 1	1	1
2&3	2. FORCE VECTORS, VECTOR OPERATIONS & ADDITION COPLANAR FORCES <ul style="list-style-type: none"> • Scalars and Vectors • Vector Operations • Vector Addition of Forces • Addition of a System of Coplanar Forces 	Chap 2	2, 3	1, 3
4&5	3. FORCE VECTORS, VECTOR OPERATIONS & EQUILIBRIUM OF A PARTICLE, THE FREE-BODY DIAGRAM <ul style="list-style-type: none"> • Cartesian Vectors (3-D) • Magnitude and Direction of a Cartesian Vector (3-D) • Vector operations (3-D) • Dot Product • Condition for the Equilibrium of a Particle • The Free-Body Diagram • Coplanar Systems 	Chap 3	4	1, 3
7&8	4. MOMENT OF A FORCE SCALAR FORMULATION, CROSS PRODUCT,	Chap 4		1, 3, 6

	<p>MOMENT OF A FORCE VECTOR FORMULATION, & PRINCIPLE OF MOMENTS</p> <ul style="list-style-type: none"> • Moment of a Force – Scalar Formation • Cross Product • Moment of Force – Vector Formulation • Principle of Moments • Moment of a Force about a Specified Axis • Moment of a Couple 		5	
8	Mid Term			
9	<p>5. MOMENT OF A FORCE</p> <ul style="list-style-type: none"> • Moment of a Force – Scalar Formation • Cross Product • Moment of Force – Vector Formulation • Principle of Moments • Moment of a Force about a Specified Axis • Moment of a Couple 	Chap 4	6	1,3,6
10	<p>6. Equilibrium of a rigid body</p> <ul style="list-style-type: none"> • Conditions for Rigid Equilibrium • Free-Body Diagrams • Equations of Equilibrium 	Chap 5	7	3
12,13	<p>7. STRUCTURAL ANALYSIS SIMPLE TRUSSES, THE METHOD OF JOINTS</p> <ul style="list-style-type: none"> • Planar Trusses • Simple Trusses • The Method of Joints • Zero-Force Members 	Chap 6	8	3,6
14	<p>8. The center of gravity, center of mass, and the centroid</p> <ul style="list-style-type: none"> • Center of Gravity and Center of Mass for a 	Chap 9	9	1,3,6

	System of Particles <ul style="list-style-type: none"> • Composite Bodies • Resultants of a General Distributed Loading 			
15	8. The moment of inertia <ul style="list-style-type: none"> • The moment of inertia • Definitions of Moments of Inertia for Areas • Parallel-Axis Theorem for an Area • Radius of Gyration of an Area • Moments of Inertia for Composite Areas • Product of Inertia for an Area • Moments of Inertia for an Area about Inclined Axes 	Chap 10	10	1,3
16	Final Exam			

10. Course Policies

- Course policies are demonstrated according to the Regulations of Granting the degree (Bachelor and Masters) / Student Guide.

- They Should Be Explained to the Students in the First Meeting.

1. Attendance:

- Students must attend all classes of this course.
- Any student with absence of 15% of the classes of any course, will be illegible to sit for the final exam and will be given the university zero (35%) in this course.
- In the case (b) above, if a student submits an official sick report authenticated by university clinic or an accepted excuse by the Dean of his/her faculty, the student will be considered as withdrawn from the course, and a "W" will be shown in the transcript for this course.

2. Delays:

Students are not allowed to come late to classes. Any student coming late will not be allowed to attend the class and he/she will be marked absent.

3. Examinations:

- Failure in attending a course exam other than the final exam, will result in zero mark unless the student provides an official acceptable excuse to the instructor who approves a makeup exam.
- Failure in attending the final exam will result in zero mark unless the student presents an official acceptable excuse to the Dean of his/her faculty who approves an incomplete exam, normally scheduled to be conducted during the first two weeks of the successive semester.

4. Homework and Projects:

Homework and projects should be submitted to the instructor on the due date. Zero mark will be given for late submissions unless the student has an acceptable excuse approved by the instructor of the course.

5. Attending the Exams and Meeting the Deadlines:

- A student who is late more than 10 minutes will not be permitted to sit the exam (first, second or mid exams).
- A student who is late more than 30 minutes will not be permitted to sit to final exam, and no student will be permitted to leave the exam center before the elapse of 30 minutes.

6. Cheating and Punishment: Cheating is an attempt to gain marks dishonestly and includes; but not limited to: Copying from another student's work.

- Using materials not authorized by the institute.
- Collaborating with another student during a test, without permission.
- Knowingly using, buying, selling, or stealing the contents of a test.
- Plagiarism which means presenting another person's work or ideas as one's own, without attribution.
- Using any media (including mobiles) during the exam.