

**The University of Jordan**  
**School of Engineering**  
**Mechatronics Engineering Department**  
2nd Semester – A.Y. 2020/2021



**Course:** Dynamics and Vibrations – 0908242 (3 Cr. – Required Course)

**Instructor:** Dr. Osama Al-Habahbeh  
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**Course website:** <https://elearning.ju.edu.jo/course/view.php?id=11208>

**Catalog description:** Kinematics of particles, kinematics of rigid bodies, kinetics of particles, kinetics of rigid bodies, free and forced vibration of systems with a single degree of freedom, vibration of systems with two or more degrees of freedom, vibration of continuous systems.

**Prerequisites by course:** 0908241 Statics and Strength of Material (pre-requisite)

**Prerequisites by topic:** The student should have the basic knowledge of Physics and engineering mathematics

**Textbook:** Engineering Mechanics, Dynamics, 14th SI Edition by R.C. Hibbeler, Prentice Hall, 2016.

**References:**

1. Vector Mechanics for Engineers, Dynamics, by Beer and Johnston, McGraw-Hill.
2. Engineering Mechanics, Volume 2, Dynamics, by Meriam and Kraige, Wiley.
3. Engineering Mechanics, Dynamics, by Bedford and Fowler, Addison Wesley.
4. Lecture notes

**Schedule:** 16 Weeks, 3 hours weekly including exams. Online using Moodle & Teams

**Course goals:** The goal of the course is to teach the student the principles of particle and rigid body motion and the cause and effect of motion, including force, energy, and momentum, as well as the basic principles of free and forced vibrations.

**Course learning outcomes (CLO) and relation to ABET student outcomes (SO):**

Upon successful completion of this course, a student should:	[SO]
1. Understand the concepts of displacement, velocity and acceleration for particles,	[1]
2. Identify and apply the differential and integral relationships between displacement, velocity and acceleration in various coordinate systems.	[1]
3. Use laws of physics to solve motion problems of engineering interest including that of	[1]
4. Use the principles of impulse-momentum, work-energy, and conservation of energy in	[1]
5. Understand the concepts of power and efficiency.	
6. Understand one degree of freedom undamped and damped free vibrations.	
7. How would you rate your distance (online) Learning this semester because of	

**Course topics:**

	Hrs
1. Kinematics of Particles	4
2. Kinetics of Particles: Force and Acceleration	4
3. Kinetics of Particles: Work and Energy	4
4. Kinetics of Particles: Impulse and Momentum	4
5. Planar Kinematics of a Rigid Body	5
6. Planar Kinetics of a Rigid Body: Force and Acceleration	4
7. Planar Kinetics of a Rigid Body: Work and Energy	4
8. Planar Kinetics of a Rigid Body: Impulse and Momentum	3
9. Vibrations	4

**Ground rules:** Attendance is required and highly encouraged. To that end, attendance will be taken every lecture; Absence of more than 7 hours will result in the expulsion of the student from the course.

<b>Assessment &amp; grading policy:</b>	Midterm Exam	30%	Final Exam	50%
	HWs	20%		

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<b>Last Revised:</b>	June 19, 2021	<b>Total</b>	<b>100%</b>
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