The University of Jordan

School of Engineering

Department	Course Name	Course Number	Semester
Mechanical Engineering	Mechanical Vibrations Lab.	0954412	

2019 Course Catalog Description

Static and dynamic balancing. Centrifugal force. Simple and compound pendulums. Bifilar suspension. Centre of percussion. Kater's reversible pendulum. Torsional oscillations of single and two rotors system. Vibration of a rigid body spring system. Undamped vibration absorber. Dunkerley's equation. Resonance and standing wave; properties of sound waves; measurement of speed of sound (with and Without echo); decoding Dual tone multi-frequency (DTMF) Tones.

Instructors

Name	E-mail	Sec	Office Hours	Lecture Time

Text Books

	Text book 1	Text book 2
Title	Mechanical Vibrations	(Laboratory Manual)
Author(s)	Singgiresu S. Rao,	-
Publisher, Year, Edition	Addison-Wesley Publishing Company, ISBN0-201-52686-7, 5th Edition.	-

References

Books	1. S. Graham Kelly "Fundamentals of Mechanical vibrations" 1993 McGraw-Hill Book Company. ISBN0-07-911533-0. 2. W. T. Thomson and M. D. Dahleh "Theory of Vibration with application" ISBNO 0-13-634734-7 3. Leonard Meirovitch "Elementary of Vibration Analysis" 1986, McGraw-Hill Book Company. ISBN0-07-041342-8.
Journals	
Internet links	

Prerequisites

Prerequisites by topic	Sound and Mechanical Vibration
Prerequisites by course	Sound and Mechanical Vibration: 0994311
Co-requisites by course	-
Prerequisite for	-

Topics Covered			
Week	**Topics**	**Chapter in Text**	**Sections**
1	Simple and Compound Pendulum		
2	Center of Percussion, Reversible Pendulum		
3	Bifilar Suspension		
4	Centrifugal Force		
5	mass spring system		
6	Simple Spring – Mass Damper System		
7	Determination Of The Mass Moment of Inertia of A Single Rotor		
8	**Midterm Examination**		
9	Determination of The Modulus of Rigidity of Shaft Material,		
10	Torsional Oscillation of A Two – Rotors System		
11	Un-damped Vibration of A Beam, Un-damped Vibration Absorber		
12	Static And Dynamic Balancing		
13-14	Resonance and standing wave; properties of sound waves; measurement of speed of sound (with and Without echo); decoding Dual tone multi-frequency (DTMF) Tones.		
15	**Final Examination**		

Mapping of Course Outcomes to ABET Student Outcomes	
SOs	**Course Outcomes**
5	1. Ability to work effectively in a team in conducting experiments, collecting data, discussing results, and writing reports.
6	2. Ability to design on experiment to measure the periodic time of free-vibrations of single degree and multi degree of freedom system. 3. Ability to analyze the mechanical vibrations to determine the material properties of mechanical elements used. 4. Ability to interpret data to understand real life applications such as design a baseball bat or hammer.

Evaluation		
Assessment Tools	**Expected Due Date**	**Weight**
Reports	One report for each experiment, which includes the following: Cover page (5%); Abstract (10%); Data observed (10%); Sample calculation (10%); Results and discussion (including applications) (20%); Uncertainty analysis (10%); Practical examples (5%); Conclusions (10%); Correct language (10%); Page numbering (5%); and Figures & Tables (5%).	30%

Midterm Exam	According to the department schedule	30 %
Final Exam	According to the University final examination schedule	40 %

Contribution of Course to Meet the Professional Components

Vibration in industrial equipment can be both a sign and a source of trouble. Thus, with a basic understanding of vibration and its causes, the maintenance professional can quickly and reliably determine the cause and severity of most machine vibration and receive recommendations for repair.

Relationship to Student Outcomes

SOs	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Availability					X	X	

Relationship to Mechanical Engineering Program Objectives (MEPOs)

MEPO1	**MEPO2**	**MEPO3**	**MEPO4**	**MEPO5**

ABET Student Outcomes (SOs)

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, 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

Updated by ABET Committee, 2025