



Jordan University of Science and Technology
Faculty of Engineering
Mechanical Engineering Department

ME463 Mechanical Vibrations - JNQF Level: 7

Summer Semester 2023-2024

Course Catalog

3 Credit Hours. Free and forced vibrations of damped and undamped single degree of freedom systems. Impulse and step response. Shock spectrum. Multi-degree of freedom systems: natural frequencies, mode shapes, modal analysis. Shock absorber.

Teaching Method: On Campus

Text Book

Title	Engineering Vibrations,
Author(s)	by D. Inman,
Edition	4th Edition
Short Name	Ref #1
Other Information	

Class Schedule & Room

Prerequisites

Line Number	Course Name	Prerequisite Type
253053	ME305 Applied Math For Engineers	Prerequisite / Study
252122	ME212 Dynamics	Prerequisite / Study

Tentative List of Topics Covered

Weeks	Topic	References
Week 1	Introduction (why study vibration)	

Weeks 2, 3, 4	Single degree of freedom Free Response (vibration concepts)	
Weeks 5, 6, 7	Single degree of freedom Response to Harmonic Excitation	
Weeks 7, 8, 9	Single degree of freedom Response to General Forced Response	
Weeks 10, 11, 12	Multi-Degree-of-Freedom System free and forced vibration, modal analysis	
Weeks 13, 14	Shock absorbers and vibration isolation design	
Week 15	Review some important concepts	

Mapping of Course Outcomes to Program Outcomes and NQF Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
Derive equations of motion for the free vibration, and solve for the natural frequency, damping, and time response for a single degree of freedom system [1SO1] [1L7S1]	25%	
calculate vibration response of a mass subjected to an arbitrary force. [1SO1] [1L7S1]	15%	
Decompose any periodic input or response of a vibrating single degree of freedom system into a series of simple harmonics using Fourier series analysis [1SO1] [1L7S1]	15%	
Solve for vibration response of multi degrees of freedom system [1SO1] [1L7S1]	20%	
Select design parameters of the vibrating system to ensure its vibration is within the allowable limits by adopted standards [1SO1] [1L7S2]	25%	

Relationship to Program Student Outcomes (Out of 100%)						
SO1	SO2	SO3	SO4	SO5	SO6	SO7
100						

Relationship to NQF Outcomes (Out of 100%)	
L7S1	L7S2
75	25

Evaluation	
Assessment Tool	Weight
First exam	30%
Second Exam	30%
Final Exam	40%

Policy

Evaluation:

First exam 30%
Second exam 30%
Final Exam 40%

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