



Philadelphia University

Faculty of Engineering & Technology
Department of Mechanical Engineering

Course Information

Title:	Mechanical Vibrations Lab. (620415)
Prerequisite:	Mechanical Vibration (620414)
CreditHours:	1 credit hour (14 weeks per semester)
Textbook:	Lab manual, lecture notes
References:	Mechanical Vibration 5th edition in SI units, Singiresu S. Rao, Pearson, 2011.

Course description: The course is a requirement for Mechanical engineering students. At completing this course, the student should be able to understand the vibration phenomena by transforming the physical model into a mathematical model and solve it by using the appropriate mathematical and numerical methods. Then, to find the response of vibrating system to external excitations experimentally.

Course requirements: Computer, internet connection, webCam

Instructor: Eng. Lina Alkhateeb

Office: Mechanical Engineering building, room E61300 , ext. : 2131

Course Topics (Experiments):

Week	Topic
1	Introduction to Vibration
2	Mass – Spring system
3	Simple and Compound Pendulums
4	Mass Moment of Inertia Estimation-Part one: Bifilar Suspension
5	Mass Moment of Inertia Estimation-Part two: Auxiliary Mass Method
6	Forced Vibration with Negligible Damping
7	Transverse Vibration of a Beam
8	Undamped vibration absorber
9	Static and Dynamic Balancing
10	Summary of lab
11	Practical final exam
12	Theoretical final exam

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

Course Learning Outcomes and Relation to ABET Student Outcomes:

Upon successful completion of this course, a student should be able to:

1.	Estimate the spring stiffness and gravitational acceleration by a mass- spring system	[6]
2.	Study the motion of pendulums as an example of rotational motion and its vibrations.	[6]
3.	Estimate the mass moment of inertia by a bifilar suspension system with and without auxiliary mass.	[6]
4.	Know the transverse vibration and its categories	[6]
5.	Know the vibration absorption and its methods	[6]

Evaluation methods:

Evaluation of students' performance (final grade) will be based on the following categories:

Reports: Each experiment has a report describing theory, procedure, readings, results, discussion, and conclusion.

Quizzes: Three quizzes will be given to the students during the semester. These quizzes will cover each three experiments in the lab. Fifteen minutes for each quiz.

Final Exam: The final exam will cover all the class material.

Grading policy:

Mid	30% (15% Reports, 15% Quiz)
Third	30% (15% Reports, 15% Quiz)
Final Exam	40%
Total:	100%

Attendance policy:

Absence from classes and/or tutorials shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse, acceptable to and approved by the Dean of the relevant college/faculty, shall not be allowed to take the final examination and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course