



**Philadelphia University**  
**Faculty of Engineering, Department of Mechatronics Engineering**  
**Course Syllabus**

**Course Title:** Mechanics and Vibrations Lab (0640337), Third year.

**Prerequisite:** Dynamics and Vibrations (0640233).

**Credit Hours:** 1 credit hour (14 weeks first semester, approximately 28 contact hours).

**Text Book:** Mechanics and Vibrations Lab Manual

**Course description:** Mechanics is a broad field where the behaviors of different bodies are studied both at rest and in motion. Mechanics include a wide spectrum of various specific topics such as: statics, dynamics, vibrations, fluid mechanics, and mechanics of materials. This lab is concerned with the investigation of different topics and concepts in

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the field of mechanics, in general, and specially in vibrations.

**Lab Experiments:**

Week	Experiment Name
1	Syllabus Discussion
2	General Introduction to the Lab
3	Introduction to Vibrations (1): Spring-Mass System
4	Introduction to Vibrations (2): Pendulum System
5	Simulation of Vibrations (1): Free Undamped and Free Damped Systems
6	Simulation of Vibrations (2): Harmonics and Base Excitations
7	Static and Dynamic Balancing
8	Introduction to signal processing
9	Shaft Balancing and Diagnosis of Bearings Faults
10	Flow Measurements
11	Impact of a Water Jet
12	Center of Pressure
13	Free Lab
14	Final Exam

**Course Learning Outcomes with reference to ABET Student Outcomes:**

Upon successful completion of this course, student should:

1.	Understand the basic principles of vibrations.	[1]
2.	Use MATLAB Simscap to simulate different mechanical systems.	[6]
3.	Understand the difference between static and dynamic balancing and implement the related experiment.	[1•6]
4.	Understand the main concepts of fluid mechanics.	[1]

**Assessment Guidance:**

Evaluation of the student performance during the semester (total final mark) will be conducted according to the following activities:

**Reports:** The students will be asked to write and submit a report after each lab experiment.

**Quizzes:** 3-quizzes of 10-minutes will be conducted during the semester.

**Final Exam:** The students will undergo a scheduled final exam at the end of the semester covering the whole materials taught in the course.

**Grading policy:**

Reports	40%
Quizzes	20%
Final Exam	40%
Total:	100%

**Attendance policy:**

The semester has in total 28 credit hours. Total absence hours from classes and tutorials must not exceed 15% of the total credit hours. Exceeding this limit without a medical or emergency excuse approved by the deanship will prohibit the student from sitting the final exam and a zero mark will be recorded for the course.