

**The University of Jordan
School of Engineering**



| Department | Course Name | Course Number | Semester |
|------------------------|---------------------------|---------------|----------|
| Mechanical Engineering | Mechanical Vibrations Lab | 0904412 | |

2005 Course Catalog Description

Static & dynamic balancing, centrifugal force, simple & compound pendulum, bifilar suspension, mass spring system, damping coefficient and logarithmic decrement, center of percussion, Katter's reversible pendulum, torsional free vibrations, resonance response of a single degree of freedom system. Base excitation and vibration isolation.

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, 5 th Edition. | - |

References

| | |
|-----------------------|--|
| Books | |
| Journals | |
| Internet links | |

Prerequisites

| | |
|--------------------------------|--------------------------------|
| Prerequisites by topic | - |
| Prerequisites by course | Mechanical Vibration (0904411) |
| 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 | 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 an 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

This course deals with analysis of force and moment systems for static equilibrium of structures and machine components.

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, 2019