



ME333 Mechanical vibrations (Required Course)

Code and Name: ME333 Mechanical vibrations

Credit Hours: 3 (Lecture: 3, Tutorial: 1)

Textbook:

- Mechanical Vibrations, Singiresu S.Rao, 5th Edition, Pearson, 2010.

Other References:

- Theory of Machines and Mechanisms, Joseph E. Shigley, and John J. Uicker, Jr., 4th edition, Oxford University Press, 2010.

Course Description:

This course envelops harmonic and periodic motion including both damped and undamped free and forced vibration, single- and multi-degree-of-freedom systems and matrix techniques suitable for computer simulations.

Pre-requisites: MATH235 Differential equations, GE202 Dynamics.

Co-requisites: None

Course Learning Outcomes:

With relation to ABET Student Outcomes (SOs: 1-7)

1. Define and explain of the importance of theory of vibrations in industrial (1)
2. Describe and define the fundamental concepts of different types of vibration systems (1)
3. Describe where the vibration systems are used (4)
4. Outline the problems related to free, damped, undamped and forced vibration systems (1)
5. List the function of each type of vibration systems (2)
6. Develop student's ability to think conceptually, critically and analytically. (4)
7. Predict and simulate an existing vibration system (4)
8. Analyze vibration systems for industry applications (1, 2, 6)
9. design a practical vibrating systems (1, 2, 6)
10. Demonstrate the knowledge through the Team work. (5)
11. Illustrate examples of modeling and simulation of vibration mechanisms using MATLAB (1, 2, 6)
12. Evaluate students in Tutorial Classes on related studied topics held in class weekly. (3)
13. Calculate the vibration behavior of structures using MATLAB and SIMULINK. (1, 2, 6, 7)
14. Illustrate examples using the internet technology. (1, 2, 4, 6)

Topics to be covered:

- Fundamentals of Vibration: Preliminaries and Introduction to Mechanical Vibrations
- System of 1 Degree of Freedom: Free Vibrations of Undamped Vibration System
- System of 1 Degree of Freedom: Free Vibrations of Damped Vibration System
- Forced Vibration of Single Degree of Freedom System
- Multiple Degree of Freedom Systems.

Grading Policy:

The grading for the course are 60% coursework and 40% Final Exam. The course work consists of two Midterm Exams, where each midterm exam is worth 20%. It also includes quizzes, homework, and projects for the remaining 20% that is modified by the course instructor.

