



Course:

Mechanical Vibration

Instructor: Dr. M. Asgari

Time: Saturday and Wednesday, 13:30-14:45.

Web site: <http://wp.kntu.ac.ir/asgari/courses.html>

Syllabus (Main Topics):

- Introduction and Basic concepts of Vibration
- Free Vibration of Single Degree of Freedom Systems
 - Undamped System
 - Viscous and Coulomb Damping
 - Energy Method and Virtual Work Principle
- Forced Harmonic Excitation
 - Harmonic Force and Rotating Unbalance
 - Harmonic Base Excitation
- General Excitation and Transient Vibration
 - Periodic and Un-periodic Forces
 - Transient Response
 - Response Spectrum
 - Vibration Measurement
 - Shock Response Spectrum
- Two DOF and Multi-DOF Systems Vibration
 - Natural Frequencies and Mode Shapes
 - Coordinate Coupling
 - Modal Matrix
 - Forced Harmonic Vibration
 - Vibration Absorber
- Lagrange's Equations
- Introduction to Vibration of Continuous Systems

Reference Text:

W. T. Thomson, M.D. Dahleh, *Theory of Vibrations with Applications*, 5th Ed., 1998.

Additional References:

- S. S. Rao, *Mechanical Vibrations*, 4th & 5th Ed.
- D. J. Inman, *Engineering Vibration*, 2nd Ed., 2001.
- L. Meirovitch, *Fundamentals of Vibrations*, 2002.
- S. Graham Kelly, *Mechanical Vibrations Theory and Applications*, 2011.
- S. Graham Kelly, *Schaums Outline of Mechanical Vibrations*, 1996.
- J. H. Ginsberg, *Mechanical and structural Vibrations; Theory and Applications*, 2001.
- C.M. Harris, *shock and vibration handbook*, McGraw-Hill Professional, 2002.

Grading

- Homework
- Midterm exam
- Final Exam
- Class Quiz (at the end of each chapter)
- Computer Project