



Vibration of Discrete Systems

MECHENG 7250

Credit Hours:

3.00 - 3.00

Course Levels:

Graduate (5000-8000 level)

Course Components:

Lecture

Course Description:

Concepts of undamped and damped vibrations of single and multi degree of freedom discrete systems. Principles of modal analysis, analytical dynamics and approximate methods.

Prerequisites and Co-requisites:

Prereq: 2030, and Math 2174, 2255, or 2415; or Sr or Grad standing in Engineering.

Course Goals / Objectives:

- Learn analytical methods for analyzing discrete vibratory systems
 - Examine approximations associated with computational and simplified theoretical methods
 - Investigate the role of alternate damping mechanisms and eigenvalue formulations
 - Apply modal analysis concepts to real-life vibration problems
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Course Topics:

- Summary of free and forced vibration analysis of damped single degree of freedom systems
 - Viscous and Coulomb damping
 - Response to periodic and arbitrary excitations; The convolution integral
 - The principle of virtual work and Lagrange's Equations of Motion
 - Damped multi-degree of freedom systems; complex eigenvalue problem; orthogonality of modes
 - Response to initial and external excitations by modal analysis
 - Approximate methods (Rayleigh's Quotient)
 - Case studies on vibration modeling of real-life systems
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Designation:

Elective