



THEORY OF VIBRATION, ME 1005S

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Reference Text: Mechanical Vibration, Fifth Edition
S. S. RAO
Prentice Hall
ISBN: 978-0-13-212819-3

Lecture Hours and Project Presentation: Tuesdays 10 am – 12 pm
Tutorial Hours: Tuesdays 12-1 pm
Room WB 144

Course Objectives:

Theory of Vibration includes versatile techniques to study dynamic behaviour of structures and mechanical systems. It utilizes the knowledge of mathematics and engineering science (statics and dynamics) to solve engineering vibration problems. Furthermore, it uses techniques, skills, and modern engineering tools (analytical, numerical, experimental) necessary for engineering practice. Vibration engineering is an indispensable part of mechanical engineering analysis and design, and is widely used in most practical problems to understand the dynamic performance of structures and mechanical systems.

In this advanced course, you will develop an understanding for both the physical and mathematical characteristics of the procedures. You will also have the opportunity to use general-purpose computational software (e.g. MATLAB) and finite element program(s) for assignments and projects. At the end of the course you will be able to develop dynamic models for multi-degree-of-freedom and continuous mechanical systems and obtain solutions for vibration problems.

Course Evaluation:	Assignments	=	25%
	Project	=	25%
	Final Exam	=	50%
	(04/05/2016, 10 am – 1 pm, WB 144; Open Book)		

	Total	=	100%

Detailed Course Content:

- 1- Introduction and Review (Free and Forced vibrations of single and two-degree of freedom systems)
- 2- Multi-Degree-of-Freedom (MDOF) Systems
- 3- Continuous Systems (Transverse Vibration of String/Cable; Longitudinal and Lateral Vibration of Beams; Torsional Vibration of Shaft; Vibration of Membranes, etc.)
- 4- Finite Element Vibration Analysis
- 5- Introduction to Modal Analysis

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