PME 434200 Mechanical Vibrations
振動學
Spring 2015

Instructor:	Prof. Jen-Yuan (James) Chang 張禎元 教授	Credits:	3 credits.
Class meetings:	**R5R6R7**	Office hours:	Thursdays 16:30-17:30

Goal: To gain a physical and mathematical understanding of how systems vibrate. First, we will gain a better understanding of how simple systems vibrate. We will then develop an understanding of the fact that complicated systems have "modes" of vibration that behave in a very similar way to simple systems. An additional goal will be to develop an understanding of some modern analytical and experimental techniques with a team work design project for vibration reduction/isolation.

Textbook (required): Daniel J. Inman, "Engineering Vibration," 4th Edition, International Edition, Pearson Education Limited, England, 2014.

Reference: Singiresu S. Rao "Mechanical Vibrations," 5th SI Edition, Prentice Hall, Singapore, 2011.

Teaching Method: Classroom lectures will be offered in both Chinese and English with teaching materials posted in Moodle.

Assessments:

Quizzes	25%	Approximately 45 minutes/quiz, 5 quizzes total. Closed book and notes. Missed quizzes: Notify Prof. Chang in advance and take quiz early.	
Lab assignment	10%	Two laboratory assignments, 4 students per group.	
Term project	15%	Group project, 4 students per group.	
Midterm Exam	20%	In-class individual efforts, closed book and notes	
Final Exam	30%	In-class individual effort, closed book and notes.	

Schedule:

Lecture	Topic	Book Chapters
1	Introduction to Vibration & Fundamentals of Mechanical Vibration Phenomena	Chapter 1
2	Newtonian Dynamics Linear Mechanical System	Chapter 1
3	Newtonian Dynamics Rotational Mechanical System	Chapter 1
4	Analytical Dynamics	Chapter 1.7, Chapter 4.7
5	Free & Forced Vibrations of Single Degree of Freedom Systems	Chapter 2, Chapter 3
6	Solving Dynamics and Vibrations with Laplace Transform	Chapter 3.4
7	Fourier Transform in Vibrations	Chapter 3.5
8	Vibrations of Multi-DOF Systems	Chapter 4
9	Forced Vibrations of Multi-DOF Systems	Chapter 4
10	Vibration Isolation and Absorption	Chapter 5
11	Vibrations of Distributed-Parameter Systems	Chapter 6
12	Practical Vibration Systems	Chapter 7
13	Vibration Measurements & Experimental Modal Analysis	Chapter 7
14	Introduction of Finite Element Method in Vibration Analysis	Chapter 8