

## PME 3320 Mechanical Vibrations

### Instructor:

Ming-Huang Li

### Objectives:

This course is aimed to deliver the basic concept of dynamic vibration analysis to the undergraduate students, including some advanced topics such as multi-degree-of-freedom systems and vibration of bars and beams. The topic covers the mathematical description on the one- and multi-degree-of-freedom systems, free and forced vibration systems, and continuous vibration system.

### Prerequisites (Suggested):

Dynamics, Mechanics of Materials, Engineering Mathematics

### Grading:

Assignments and Quiz **(30%)** [including computer-aided homework]

Exams (Mid-term & Final Exams) **(55%)**

Hands-on Experiments and Term Projects **(15%)**

### Textbook:

Singiresu S. Rao, *Mechanical Vibrations, 6th Edition (SI Units)*, Pearson. (ISBN 9781292178608)

### Course Outline:

This is a *tentative outline* of the course. The progress and content of the course will be adjusted based on student's feedback.

Introduction and review	<ol style="list-style-type: none"><li>1. Introduction</li><li>2. Fundamentals of vibration</li><li>3. Review of basic math skills</li></ol>
Vibration of 1DOF Systems	<ol style="list-style-type: none"><li>1. Free vibration of One DOF systems</li><li>2. Harmonically excited vibration</li><li>3. Vibration under general forcing conditions</li><li>4. Impact vibration of one DOF systems</li></ol>
Vibration of Multi-DOF Systems	<ol style="list-style-type: none"><li>1. Two DOF Systems</li><li>2. Introduction to multi-DOF systems</li><li>3. Free vibration of multi-DOF systems</li><li>4. Forced vibration of multi-DOF systems</li><li>5. Determination of natural frequencies and modes shapes</li></ol>
Vibration of Continuous Systems	<ol style="list-style-type: none"><li>1. Introduction to continuous system</li><li>2. String vibration</li><li>3. Torsional and longitudinal vibrations of beams</li><li>4. Transverse vibration of beams</li></ol>

## 生成式人工智慧倫理聲明：禁止使用

經仔細考量後，本課程授課教師認為不宜於此門課程當中使用生成式人工智慧於課堂學習當中。因本課程的內容於生成式 AI 中尚有諸多錯誤，且容易影響學生對基礎核心知識之判讀。

根據本校公布之「大學教育場域 AI 協作、共學與素養培養指引」，本門課程採取禁止使用，以下為相關的監管機制。

修讀本門課程之學生應注意本門課不得繳交使用生成式人工智慧所產出的作業、報告或個人心得。若經查核發現，教師、學校或相關單位有權重新針對作業或報告重新評分或不予計分。

修讀本課程之學生於選課時視為同意以上倫理聲明。

### Ethical Statement on Generative Artificial Intelligence: Prohibition on Use

After careful consideration, the course instructor believes that it is not appropriate to use generative AI in learning for this course.

Students taking this course should be aware that assignments, reports, or personal reflections generated using AI models are strictly prohibited. If such use is detected, the course instructor, university, or relevant authority reserves the right to re-evaluate or not score the assignment or report.

Students who enroll in this course are deemed to have agreed to the above ethical statement at the time of course selection.