

**ME 1020 – MECHANICAL VIBRATIONS****Spring 2021**

*(Modifications to this syllabus may be required during the semester. Any changes to the syllabus will be posted on the course website and announced in class)*

**Catalog Description and Objective**

Vibrations in engineering systems are associated with noise and rapid wear of machine parts. The course introduces the foundations of vibration theory and its applications to the analysis and design of mechanical systems. Computer tools will be utilized by students to develop programs for the vibration analysis.  
(3 credit hours).

**Schedule**

**Lecture, Room 3-309      Friday      8:15 – 11:00**

**Computer Labs**

Schedule TBA

**Instructor**

S.C. Fok, Office: Room 222 (Zone 4)

**Office Hours:** Wednesday 14:00 – 16:00 & Thursday 14:00 – 16:00

For consultation outside office hours, please send an email to make an appointment

Email: saicheong.fok@scupi.cn

**Teaching Assistants:**

He Tinting (Email: 1415696650@qq.com)

## Textbook

Engineering Vibration 4<sup>th</sup> Edition, D.J. Inman, Pearson Higher Ed., ISBN–9780273768449

Additional references and supplementary materials will be posted on Blackboard.

## Learning Outcomes

After the successful completion of this course students should be able to:

- Model mechanical systems for vibration analysis;
- Evaluate the free and forced responses of single and multiple degree of freedom systems;
- Develop solutions to suppress the vibrations
- Utilize computer tools to analyze machine vibrations

Your grade will be based on your overall performance in all assessment items as follows (note: the assessment items may be subjected to change):

ACTIVITIES	PERCENTAGES
Assignments / quizzes / participation	20%
Lab / Project	20%
Midterm	30%
Final	30%

Note: Students who need to complete the course early will take a special exam in to replace the final exam. Submission requirements (including due dates) for project and assignments will be announced to students in class or on Blackboard. Late submissions will not be accepted unless you have made prior arrangements with Instructors.

**Tentative Course Schedule:**

Week	Text	Topic
1	Chap. 1	Introduction
2	Chap. 1	Free undamped 1 DOF
3	Chap. 1	Free damped 1 DOF
4	Chap. 2	Response to harmonic excitation
5	Chap. 2	Base excitation
6	Chap. 2	Rotating imbalance
7		Midterm
8	Chap. 5	Balancing rotating machines
9	Chap. 5	Vibration isolation
10	Chap. 4	Multi DOF system modeling
11	Chap. 4	Multi DOF free undamped
12	Chap. 5	Multi DOF absorber (undamped)
13	Chap. 5	Multi DOF absorber (damped)
14	Chap. 4	Multi DOF Modal Analysis
15	Chap. 3, 7	Time & Frequency domains

The course will cover the major topics through guided learning, discussion, assignments, quizzes, and project. In class exercises involve student participation. Project will cover the vibration analysis and control. Assignments will focus on fundamentals so that students can better understand basic concepts.

**Class Policies:**

Regular class attendance is expected and encouraged. Each student is responsible for all of the material presented in class and in the reading assignments. Assessments will emphasize treatment of material covered in lectures.

In general, no late assignments will be accepted or makeup assessments given. Exceptions will be made for a valid excuse consistent with University Policy. If you cannot attend/submit an assessment or meet a due date, you must contact the instructor immediately. Arrangements will be made for students on a case-by-case basis. (Failure to contact the instructor will result in a zero on that assessment item.)



Sichuan University - Pittsburgh Institute

## Syllabus ME1020 Spring 2021

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Honesty Policy: All students admitted to the SCUPI have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a SCUPI student.

### **ACADEMIC INTEGRITY**

Students in this course will be expected to comply with the Sichuan University's Policy on Academic Integrity. Any student suspected of violating this obligation for any reason during the semester will be required to participate in the procedural process, initiated at the instructor level, as outlined in the University Guidelines on Academic Integrity. This may include, but is not limited to, the confiscation of the examination of any individual suspected of violating University Policy. Furthermore, no student may bring any unauthorized materials to an exam, including dictionaries and programmable calculators.