

MEMS 1028 – MECHANICAL DESIGN I**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

This course provides an overview of strength of materials analysis techniques as related to the design of mechanical components. The basic topics of uniaxial tension/compression, torsion, bending and combined loading will be reviewed in the context of failure analysis. Failure theories and criterion for both static and fatigue conditions will be presented and applied to mechanical design (3 credit hours).

Course Prerequisites

Statics and Mechanics of Materials 1 & 2 or equivalent

Schedule

Lecture, Room 3-103 Wednesday 8:15am – 11:00am

Instructor

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

Office Hours: Tuesday 2:00 – 4:00pm & Thursday 2:00pm – 4:00pm

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

Email: saicheong.fok@scupi.cn

Teaching Assistants:

Yuan Ping (contact: 1291068322@qq.com)

Textbook

Shigley's Mechanical Engineering Design, Budynas & Nesbett, McGraw Hill, ISBN-978-9-813-15100-0
Additional references and supplementary materials will be posted on Blackboard.

Learning Outcomes

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

- Analyze the design of mechanical components;
- Apply failure theories and criteria for both static and fatigue conditions to mechanical design;
- Utilize established standards and codes in engineering design;
- Explain the design considerations, design uncertainties and the responsibilities of the designer

Grading Policy

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	20%
Project, design exercises & participation	20%
Midterm	30%
Final	30%

Note: Students who need to complete the course early will take a special exam 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	1.1-1.13, 2.1-2.2	Introduction
2	3.1-3.12, 3.14, 3.18	Mechanical Design Elements
3	3.1-3.12, 3.14, 3.18	Mechanical Design Elements
4	3.1-3.12, 3.14, 3.18	Advanced Stress Analysis
5	3.1-3.12, 3.14, 3.18	Advanced Stress Analysis
6	4.1-4.17	Advanced Deformation Analysis (stiffness driven design)
7		Midterm
8	4.1-4.17	Advanced Deformation Analysis
9	4.1-4.17	Advanced Deformation Analysis
10	5.1-5.13, 3.13	Static Failure Theories
11	5.1-5.13, 3.13	Static Failure Theories
12	6.1-6.15, 6.17	Fatigue Failure Theories
13	6.1-6.15, 6.17	Fatigue Failure Theories
14	6.1-6.15, 6.17	Fatigue Failure Theories
15		Design Standards (pressure vessels)

The course will cover the analysis and design of simple mechanical components through guided learning, discussion, assignments, quizzes, and project. Design exercises involve student participation. Project will cover the analysis and design of mechanical devices. 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.)

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.