

ENGR 0145 – STATICS & MECHANICS OF MATERIALS II**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

The course develops the theory behind the fundamental topics of mechanics of materials and demonstrates how this theory is put into practice to analyze and design structural elements. Techniques are presented to analyze deformation/strains as well as forces/stresses for beams. Buckling and combined loading configurations will be analyzed through stress, strain and deformation. Methods to design simple flexural and buckling members in accordance prescribed limits of stress and deflection will be demonstrated. (3 credit hours)

Prerequisites: ENGR 0135 Statics and Mechanics of Materials I

Schedule

Lecture, Room 3-309 Thursday 8:15am – 11:00am

Instructor

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

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

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

Email: saicheong.fok@scupi.cn

Teaching Assistants:

Section 3 – Xu Dianxing (contact: 3289784303@qq.com)

Textbook

Statics and Mechanics of Materials: An Integrated Approach (2nd Edition), W. F. Riley, L. D. Sturges, and D. H. Morris, Wiley, ISBN – 978-0-471-43446-7

Additional references and supplementary materials will be posted on Blackboard.

Course Objective

The objectives of this course are:

- ❖ To introduce shear force & bending moment diagrams, shear force, transverse loading relationship, and flexure formulas
- ❖ To learn the concepts of deflection of beams, differential equation of deflection curve, method of super-position, and Castigliano's theorem.
- ❖ To study the stress and strain states both analytically and graphically (Mohr's Circle) at various orientation angles
- ❖ To analyse the buckling loads of columns with various end conditions
- ❖ To implement and apply these ideas for analysis of structures and design of new structures

Learning Outcomes

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

- Analyze the flexural and shear stresses in beams as well as their deflections under different loadings and support conditions
- Analyze the buckling of columns under different boundary conditions
- Analyze the plane stress and plane strain states of structures subjected to combined loadings

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
Quizzes, class-exercises & participation	15%
Assignments	10%
Midterm	35%
Final	40%

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 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	8.4	Review of stress and strain, second moment of areas
2	8.1-8.3, 8.5	Flexure stress & strain and elastic flexure formula
3	8.6-8.7	Shear force and bending moment diagrams
4	8.8-8.9	Shear stress in beams
5	9.1-9.4	Beam deflection by integration
6	9.5-9.6	Singularity functions & superposition
7		Midterm
8	9.7-9.9	Castigliano theorem
9	9.7-9.9	Statically indeterminate beam
10	10.1-10.6	Plane stress & Moore circle for stress
11	10.7-10.12	Plane strain & Moore circle for strain
12	10.13-10.14	Thin-walled vessel
13	11.1-11.3	Failure theory
14	11.4-11.7	Column buckling
15		Revision

The course will cover the materials through guided learning, discussion, assignments, and quizzes. Class exercises involve active student participation. 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.