ENGR 0145: Statics & Mechanics of Materials II

FALL, 2024

INSTRUCTOR: Dr. Shijing Luo

OFFICE: Room 522 (New Building)

EMAIL: shijing.luo@scupi.cn

OFFICE HOURS: Wednesday & Friday: 13:00-17:00, or by appointment

LECTURES: Friday 8:15-11:00
Room 3-102

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.

PREREQUISITE:

- ENGR 0145 Statics and Mechanics of Materials II

DESCRIPTION:

This course is 3 credits.

The course develops the theory behind the fundamental topics of mechanics of materials and demonstrates how this theory is put into practice to analyze 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 analyze simple flexural and buckling members in accordance prescribed limits of stress and deflection will be demonstrated.

COURSE OBJECTIVES:

This course is designed for students to be able to analyze engineering problems of structures under static loadings.

LEARNING OUTCOMES FOR THIS COURSE:

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

1) Analyze the flexural and shear stresses in beams as well as their deflections under different loadings and support conditions;

2) Analyze the plane stress and plane strain states of structures subjected to combined loadings;

3) Apply failure theories to analyze failures under static loading as well as analyze the buckling of columns under different boundary conditions.

GRADE DETERMINATION:

5%: participation (including attendance and in-class quizzes)

30%: homework

30%: 2 midterm exams (15% each)

35%: 1 final exam

EXAMS:

There will be two midterm exams and one final exam.

QUIZZES:

To be announced one week ahead, and the quizzes will be evaluated as part of students' participation.

GRADE Policy:

A: 90 – 100	B+: 80 – 84	B−: 73 – 75	C: 66 – 69	D: 60 – 62
A−: 85 – 89	B: 76 – 79	C+: 70 – 72	C−: 63 – 65	F: < 60

HOMEWORK:

To be assigned at the end of each lecture. Submission requirements (including due dates) for all assessments will be announced to students in class or on Blackboard.

ATTENDANCE:

Attendance will be taken at each class and will be evaluated in students' participation.

MAKE-UP POLICY:

Late assignments will be deducted 15%/day and will be not accepted after one week.

MATERIAL COVERED:

The intended sequent contents covered in this class are shown in the following table and might be adjusted according to the class schedule.

Week	Contents	Descriptions
1 (09/06)	Introduction	Course introduction and revision
2 (09/13)	Chp. 8	Shear force and bending moment diagrams
3 (09/20)	Chp. 8	Flexure stress & strain, elastic flexure formula
4 (09/27)	Chp. 8	Shear stress in beams
5 (10/04)	No class	Public holiday, make-up class on Sep.29
6 (10/11)	Midterm 1	Exam 1 on 10/11 08:15 – 11:00 am
7 (10/18)	Chp. 9	Beam deflection by integration
8(10/25)	Chp. 9	Singularity functions & superposition
9 (11/01)	Handout	Castigliano theorem.
10 (11/08)	Chp. 9	Statically indeterminate beam
11 (11/15)	Midterm 2	Exam 2
12 (11/22)	Chp. 10	Plane stress & Moore circle for plane stress
13 (11/29)	Chp. 10	Plane strain & Moore circle for plane strain
14 (12/06)	Chp. 10	Generalized Hooke's law, and Thin-walled vessel
15 (12/13)	Chp. 10	Combined loadings
16 (12/20)	Chp. 10	Failure theory Quiz for Chapter 10
17 (12/27)	Chp. 11	Columns - Buckling
18 (01/09)		Final Exam Week

Copyrights:

Academic Integrity:

All students are expected to adhere to the standards of academic honesty. Any student engaged in cheating, plagiarism, or other acts of academic dishonesty would be subject to disciplinary action. 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 the University Policy.