Introduction

ENGR 0145 Statics and Mechanics of Materials II

Lecturer: Shijing Luo

Sichuan University-Pittsburgh Institute

2026 Spring

Course Information

Instructor:	Dr. Shijing Luo
Office:	Room 522 (New Building)
Email:	shijing.luo@scupi.cn
Office hours:	Monday 16:30-18:00, Tuesday & Friday: 13:30-17:30 or by appointment
Lectures:	S01: Monday 13:50 - 16:25, Room S104 S02: Tuesday 08:15 - 11:00, Room S106
TAs:	Zheng Hanzhuo 2024141520061@stu.scu.edu.cn Wu Qi 2022141520042@stu.scu.edu.cn
Prerequisite:	ENGR 0135 Statics and Mechanics of Materials I
QQ group:	1085680042

Course Description

--3 credits.

The fundamental theory of mechanics of materials and implementation of the theories to analyze practical structural elements.

- Techniques are presented to analyze deformation/strains as well as forces/stresses for beams.
- Advanced topics including flexural loadings, beam deflection, stress/strain transformation, Mohr's circle, generalized Hook's Law, combined loading, and column buckling will be explored.
- Methods to both statically determinate and indeterminate beams will be presented.
- Buckling and combined loading configurations will be analyzed through stress, strain, and deformation.

Students will develop the logical thinking skills to analyze and design structural components and systems, ensuring safety, efficiency, and reliability through problem-solving exercises, case studies, and hands-on projects.

Objectives

This course is designed to equip students with the knowledge and skills to analyze and design structural components subjected to static loadings. After completion, students should be able to analyze:

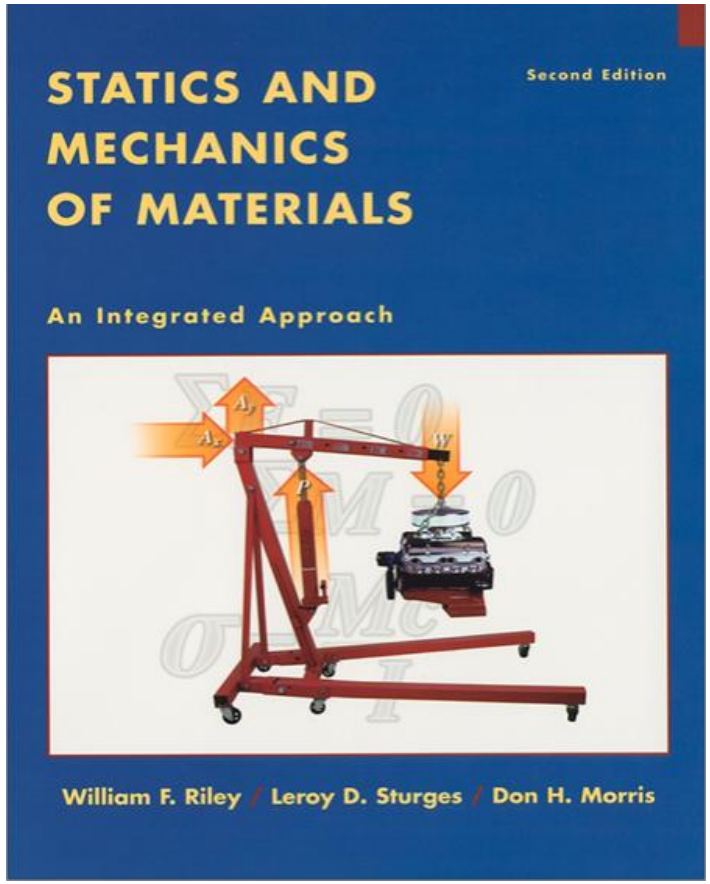
1) Flexural loadings in beams: Determine internal shear forces, bending moments, and stress distributions in beams under various loading conditions;
2) Beam deflections: Use methods such as integration, superposition, and energy-based approaches to predict and analyze beam deflections, ensuring compliance with design specifications and serviceability requirements;
3) Combined loading scenarios: Analyze structural elements subjected to combined loads, and apply stress transformation techniques (including Mohr's circle) to determine principal stresses and failure criteria.
4) Failure theories and buckling: Apply failure theories to analyze failures under static loading as well as analyze the buckling of columns under different boundary conditions.

Course Materials

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 BB.



Intended Schedule

Week	Contents	Descriptions
1 (03/09)	Introduction	Course introduction and revision, centroid, 2nd moment of area
2 (03/16)	Chp. 8	Flexure stress & strain, elastic flexure formula
3 (03/23)	Chp. 8	Shear force and bending moment diagrams
4 (03/30)	Chp. 8	Shear stress in beams
5 (04/06)	No class	Public holiday
6 (04/13)	Chp. 9	Beam deflection by integration
7 (04/20)	Chp. 9	Singularity functions & superposition
8 (04/27)	Chp. 9	Statically indeterminate beam
9 (05/04)	No class	Public holiday, Midterm Exam Week
10 (05/11)	Chp. 10	Plane stress & Moore circle for plane stress
11 (05/18)	Chp. 10	Plane strain & Moore circle for plane strain
12 (05/25)	Chp. 10	Generalized Hooke's law and strain analysis
13 (06/01)	Chp. 7	Torsional loading
14 (06/08)	Chp. 10	Thin-walled vessel Combined loadings
15 (06/15)	Chp. 10	Failure theory
16 (06/22)	Chp. 11	Columns Buckling, Fracture theory, & final review
17 (06/xx)	TBD	Final Exam Week

Course Policy

Grade determination:

5%: participation (including attendance and in-class performance)
10%: in-class assignments
20%: homework
30%: one midterm exam
35%: one final exam

Participation:

Attendance for every class is expected, and in-class performance such as asking/answering questions in classes, and giving presentations will be given extra bonus.

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**

Course Policy

In-class assignments:

In-class assignments. Generally, **no** make-up.

Usually related to the latest class or new theories/techniques.

Homework:

To be assigned after lectures. Submission requirements (including due dates) for all assessments will be announced to students in class or on BB. Late assignments will be deducted 30% per day and will be not accepted after 4 days.

Grade rebuttal:

- Once the graded assessment item has been returned to the student or solution to the assessment item has been released, no makeup of the assessment will be allowed even if there is a valid reason.
- Challenge to the grading must be made within **3 days** after the returned of the assessment item or after the release of the solutions. No challenges to the grading will be entertained after the 5-day period.

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.

- Academic misconduct will not be tolerated. All misconduct will be reported and dealt with by SCUPI.

Plagiarism is ABSOLUTELY NOT ACCEPTABLE!

Integrity is the most important!