

ENGR 0145 Statics and Mechanics of Materials II

FALL, 2026

INSTRUCTOR:	Dr. Ruiqi DONG
OFFICE:	N522
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OFFICE HOURS:	Monday 14:00~18:00 PM & Friday 9:00~12:00 AM Any other days - by appointment only at N522
LECTURES:	Tuesday 13:50-16:25 PM, N210
TEXTBOOK:	Shigley's Mechanical Engineering Design. 11th edition by <i>Keith J. Nisbett, Richard G. Budynas</i> , McGraw-Hill, 2021.
TEACHING ASSISTANT:	Luo Shicheng, 2022 ME Tel: 17369142980, E-mail: 1132153890@qq.com
PREREQUISITE:	MATH 0240 Analytic Geometry & Calculus I ENGR 0135 Statics & Mechanics of Materials I

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).

COURSE OBJECTIVES: The aim of this course is:

- ✓ 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
- ✓ To study the stress and strain states both analytically and graphically (Mohr's Circle) at various orientation angles

LEARNING OUTCOMES FOR THIS COURSE:

- ✓ To analyze the buckling loads of columns with various end conditions
 - ✓ To implement and apply these ideas for analysis of structures and design of new structures
- (1) an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
 - (2) an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.
 - (3) an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
 - (4) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

GRADE DETERMINATION:

While grades may be curved, there is no guarantee of any curve. If any student fails this course and takes Make-Up exam, the highest grade that student can receive is D.

Homework	10%
In-class quiz	20%
Mid-term exam	30%
Final exam	40%

EXAMS:

- (1) There will be one mid-term exam and one final exam. The exams in this course will be **closed book and closed note**. Exam related forms, appendices, standards and codes will be provided with the test paper, but they will not be announced before the exam.
- (2) If you are absent from any exam without a valid reason and prior report, there will be **no make-up exam**.
- (3) For **mid-term exam**, if you have a serious conflict with the exam time, you must discuss it with the instructor well ahead of the scheduled exam day (**at least one day in advance**) to make an appropriate arrangement.
- (4) For **final exam**, if you have a valid reason for not being able to attend the final exam, you must **submit a formal application for a deferred exam** to the administration.
- (5) Exams missed due to unpredictable events such as a family emergency and a traffic accident will be handled according to **SCU and**

institutional policies, if the student has a proper document(s) to prove it.

QUIZZES:

In-Class Quiz will be given weekly during class hours, and there is **no make-up** for quiz if you are absent from the class. You will work on and complete these problems as an individual within given time. All the In-Class Quiz and projects should be **submitted on BB**, and the answers **must be handwritten** otherwise no credit will be given for that work.

HOMEWORK:

There will be homework problems assigned on weekly base, which must be submitted on BB before the deadline. I strongly encourage for students to work on homework on their own since doing homework independently will reinforce and extend the knowledge of the material learned in class. Students are also encouraged to work with your classmates. Should you have any trouble with the homework, ask TA and instructors for help during designated office hours.

GRADE REBUTTAL:

- (1) For projects and quizzes, challenge to the grading must be made **within 3 days** after the returned of the graded assessment item. **No challenges** to the grading will be entertained **after the final exam**.
- (2) For exams, graded papers and standard answers will not be handed out. If you have enough confidence to argue about your score, please check your test paper at the time and place designated by the instructor or TA, and there is **no guarantee that the score will change** in any way.

MAKE-UP POLICY:

If you fail this course, the eligibility and grading criteria for the make-up exam at the beginning of the next semester will be implemented in accordance with university policies. The scope and requirements of the make-up exam are the same as those of the final exam.

OTHER POLICIES:

ATTENDANCE:

- ✓ Although attendance is not included in the grading, Sichuan University attendance policy will be enforced. Students who missed **more than a third of the classes** (these absences included classes missed with and without approval and valid reasons) will lose the right to be assessed and will receive zero for the course. These students will NOT be allowed to take the makeup exam.

ACADEMIC MISCONDUCT:

- ✓ All students in attendance at the Sichuan University are expected to be honorable and to observe standards of conduct appropriate to a

community of scholars. The University expects from its students a higher standard of conduct than the minimum required to avoid discipline. Academic misconduct includes all acts of dishonesty in any academically related matter and any knowing or intentional help or attempt to help, or conspiracy to help, another student. Academic misconduct will not be tolerated. All misconduct will be reported and *The Academic Misconduct Disciplinary Policy* will be followed in the event of academic misconduct.

CHANGES:

- ✓ The instructor reserves the right to extend credit for alternative assignments, projects, or presentations and to make changes to this syllabus as needed. All changes will be announced via Blackboard and/or announced in class.

Tentative Course Schedule (changes will be announced):

Week	Chapter	Topic & Description
1	Ch. 8.1 ~ Ch. 8.4	Flexural Stress & Flexural Strain, Second Moment of Areas
2	Ch. 8.5 ~ Ch. 8.6	Elastic Flexure Formula, Shear Force and Bending Moment Diagram
3	Ch. 8.7 ~ Ch. 8.8	Load, Shear Force, And Bending Moment Relationships
4	Ch. 8.8 ~ Ch. 8.9	Shear Stress in Beam and Design
5	Ch. 9.1 ~ Ch. 9.4	Deflection by Integration - Method of Successive Integration
6	Ch. 9.5 ~ Ch. 9.6	Singularity Functions & Deflection by Superposition Flexure
7	Ch. 9.7 ~ Ch.9.9	Statically Indeterminate Beams and Design
8	Chap. 8&9	Mid-Term Exam
9	Ch. 10.1 ~ Ch. 10.4	Plane Stress & Stress Transformation Equation
10	Ch. 10.5 ~ Ch. 10.8	Principal Stress & Maximum Shear Stress, Mohr's Circle for Stress
11	Ch. 10.5 ~ Ch. 10.8	The Strain Transformation Equations for Plane Strain

12	Ch. 10.8 ~ Ch. 10.11	Thin-Walled Pressure Vessels Combined Axial, Torsional, and Flexural Loads
13	Ch. 10.8 ~ Ch. 10.11	Strength Theory / Failure Theory
14	Ch. 10.13 ~Ch.10.15	Design: Ductile Materials and Brittle Materials
15	Ch. 11.1 ~ Ch. 11.7	Buckling of Long Straight Columns
16	Chap. 10&11	Review
17	Final Exam	