Fall
2025

SCUPI
Sichuan University - Pittsburgh Institute

ENGR0135 Statics and Mechanics of Materials 1

(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)

Instructor: Qi (Michael) Lu, Ph.D.
Office: SCUPI Building 506
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Lecture Time: Tuesday 13:50 - 16:25 PM/ Section 1
Thursday 13:50 - 16:25 PM/ Section 2
Lecture Location: SCUPI Building 209
Office Hours: Mon 2:00-5:00 PM**,** Tue 9:00AM-12:00 PM, Thu 9:00AM-12:00 AM

Teaching assistant (TA): Jingxin Xue/ Section 1 (xuejingxin@stu.scu.edu.cn)
Mingze Li/ Section 2 (2023141520007@stu.scu.edu.cn)

Note: for email, please

- Include the course number, your name and your student number in the subject field of your message.
- Use your university email account.

Credit hours: 3

Catalog Description:

This course will cover two major subjects in Mechanical Engineering i.e.: Statics and Mechanics of Materials. For Statics, the course will discuss about forces in plane and space, equilibrium of particles and equilibrium of rigid body and analysis of structure for truss problem. For Mechanics of Materials, the concept of stress, axial load, torsion load and combine load will be covered. Finally, the mechanical design of a system will also be discussed to help students to develop the critical thinking in handling the real problem in mechanics. (3 credit hours)

Course Objective:

At the completion of this course, students will be able to

- Perform a static analysis of the forces acting on a particle
- Reduce a system of forces and couples to a single equivalent force and couple
- Apply a static analysis to the forces and couples acting on a rigid body
- Find centroids of areas, volumes, masses, and wires
- Perform a static analysis on trusses, frames, and machines
- Complete internal forces analysis of beams to find stress, axial load and torsion load

Applicable ABET Learning Outcomes:

- An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.

- 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.
- An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
- An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
- An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Topics Covered:

- Newton's Laws of motion,
- Concurrent force systems and equilibrium
- Axial loading, stress, strain and material deformation
- Stress-strain diagram and Hooke's law
- Moments and equivalent systems
- Centroids, centers of mass and distributed loads
- Free-body diagrams, equilibrium of rigid and deformable bodies, equilibrium in 3D
- Plane trusses, frames and machines
- Torsion and shaft

Prerequisites:

MATH 0230 Analytic Geometry & Calculus 2, PHYS 0174 Basic Physics for Science & Engineering

Textbook:

W. F. Riley, L. D. Sturges, and D. H. Morris: Statics and Mechanics of Materials: An Integrated Approach. 2nd Edition. John Wiley & Sons, Inc

Course Gradings:

• Attendance	10 %
• In-Class Studio	15 %
• Homework	15 %
• Midterm exam I	20 %
• Midterm exam II	20 %
• Final exam	20 %

While grades may be curved, there is no guarantee of any curve. However, in order to receive a grade of D or better and to be eligible to take Make-Up exam, a student will have to reach 50 % of the total possible points. If any student fails this course and takes Make-Up exam, the highest grade that student can receive is D.

Grading Scale:

Letter	A	A-	B+	B	B-	C+	C	C-	D+	D	F
Percentage (%)	100~90	89~85	84~80	79~76	75~73	72~70	69~66	65~63	62~61	60	<60

Class Policies:

- Office hours are times to be available to students. During office hours, you can come to my office without appointment. I may be available at other times; please email to schedule a time or simply drop by.
- There will be homework problems assigned on weekly base, which will be graded. Students are expected 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, please ask TA and instructors for help during designated office hours.**
- Collaboration between students is encouraged for better understanding of the course material. Students are allowed to discuss homework problems and projects in terms of methodologies, but not the solutions of a problem, which means that each student MUST do the actual work independently. Inappropriate collaboration includes
  - Using all or parts of homework, exams or projects from this year or any previous year
  - Sharing of work such as graphs, equations, calculations, or any other derived material that was not presented to the class
  - Talking, passing information, or using inappropriate materials during an exam

  Anyone found to be participating in inappropriate collaboration may be immediately failed from the course
- In-Class studio work will be given periodically during class hours, and there is NO make-up. **Purpose is to promote in-class discussions and keep students in-sync with course material during lecturing.** You will work on and complete these problems within given time.
- There will be two mid-term exam and one final exam. The final exam is comprehensive. The exams in this course will be closed book and closed no
- **On-time attendance at all class activities is expected**. Student is responsible for any material that was covered, and any changes to the exam dates and homework assignments announced in class.
- **NOTE:** Students with **three unexcused absences** (including lateness or early departure) can be given a **zero** for their regular course grade. Students missing **a third of total class hours** in a semester (including all types of leaves) will lose the right to be assessed in that course, receiving a **zero** for the course grade.
- In general, no late assignment or make up exams will be accepted. If you have a serious conflict with an exam schedule, you must discuss it with the instructor and **take the**

exam early. Failure to contact the instructor prior to the exam or assignment due date will result in **a zero** on that exam/assignment. Exams missed due to a serious illness or a family emergency (these must be documented) will be dealt with on a **case-by-case** basis according to the University Policy.

- **Late submissions** for studio or assignment are calculated based on the following equation

$$\textbf{Late submission full mark} = 100\% \times r^n$$

$r = 0.8$: discounted return coefficient; n : number of late weeks and n is an integer number which will be round up, e.g. $n = 1$ for the late submission within a week

- Any questions regarding the grading discrepancy should be brought up **within a week** after returning the homework, report or exam.
- Violations of academic integrity include, but are not limited to, cheating, plagiarism, or misrepresentation in oral or written form. Such violations will be dealt with severely, in accordance with University policy.
- Please honor the following: do not come late; do not disturb the class by having conversation with others; do not work on any class materials other than Statics and Mechanics of Materials I.

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Tentative Course Schedule:

Week & Date	Textbook	Topic
1 Sec 1: Sep. 9 Sec 2: Sep. 11	1.1~1.6	Introduction Basic Concepts Newton's Law Units, Dimensions and Significant Figures
2 Sec 1: Sep. 16 Sec 2: Sep. 18	2.1~2.6	Force Vector and Concurrent Force Systems
3 Sec 1: Sep. 23 Sec 2: Sep. 25	3.1~3.3	Equilibrium of Concurrent Force Systems
4 Sec 1: Sep. 30	4.1~4.5	Axial Loading: Stress Axial Loading: Strain Hooke's Law
Sec 2: Oct.2		National Holiday
Sec 1: Oct. 7		National Holiday
5 Sec 2: Oct. 9	4.1~4.5	Axial Loading: Stress Axial Loading: Strain Hooke's Law
6 Sec 1: Oct. 14 Sec 2: Oct. 16	4.6~4.10	Thermal Effect Axial Loading: Deformation
7 (TBD) Sec 1: Oct. 21 Sec 2: Oct. 23	Midterm Exam I	
8 Sec 1: Oct. 28 Sec 2: Oct. 30	5.1~5.5	Moments and Couples Equivalent Force/Moment Systems
9 Sec 1: Nov. 4 Sec 2: Nov. 6	5.6~5.8	Equivalent Force/Moment Systems Centers of Gravity and Centers of Mass
10 Sec 1: Nov. 11 Sec 2: Nov. 13	5.7~5.10	Centroids of Volumes, Areas and Lines Centroids of Composite Bodies Distributed Loads on Structural Members
11 Sec 1: Nov. 18 Sec 2: Nov. 20	6.1~6.3	Free-body Diagrams Equilibrium of Rigid and Deformable Bodies
12 (TBD) Sec 1: Nov. 25 Sec 2: Nov. 27	Midterm Exam II	
13 Sec 1:Dec. 2 Sec 2:Dec. 4	6.4~6.5	Frame & Machines Statically Indeterminate Problems
14 Sec 1: Dec. 9 Sec 2: Dec. 11	6.6~6.9	Plane Truss Equilibrium in 3D and Friction

15 Sec 1: Dec. 16 Sec 2: Dec. 18	7.1~7.4	Torsion I
16 Sec 1: Dec. 23 Sec 2: Dec. 25	7.5~7.8	Torsion II
17 (TBD) Sec 1: Dec. 30 Sec 2: Jan. 1	Final Exam	