SCUPI
Sichuan University - Pittsburgh Institute

ENGR 0145 Statics and Mechanics of Materials II

Instructor:	Dr. Ruiqi DONG
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Office hours:	Tuesday 13:00 PM ~ 18:00 PM, SCUPI New Building, office 525
	Any other days - by appointment only
Class time & Location:	Sec I – Mon. 08:15 - 11:00 AM, SCUPI New Building-208
	Sec II – Tue. 08:15 - 11:00 AM, SCUPI New Building-208

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)

Course Objective
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, and Castigliano's theorem.

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

.   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

Prerequisites: ENGR 0135 Statics and Mechanics of Materials I

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.

Reference: R. C. Hibbeler Engineering Mechanics: Statics. 13th Edition. Pearson Prentice-Hall. 2013.

J. M. Gere and B. J. Goodno Mechanics of Materials. 8th Edition. Cengage Learning. 2012.

Topics Covered:

1. Flexural Loading: Stresses in Beams

2. Flexural Loading: Beam Deflections

3. Plane Stress & Strain

4. Principal Stress & Strain and Maximum Shear Stress and Strain

5. Mohr's Circle for Plane Stress and Strain

6. Generalized Hooke's Law

7. Combined Loads

8. Columns: Buckling

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Grading Breakdown

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

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.

Homework, Reading Assignment, In- Class Quiz and Exams

There will be homework problems assigned on weekly base, which will be graded as 10% of your grade. 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.

Students are expected to read textbook before and after each class period following the lecture schedule, which is the reading assignment. Remember lectures will be given assuming students read textbook before class.

In-Class Quiz will be given periodically 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 homework should be submitted on BB. **If answer(s) is(are) required to submit to BB, the answer(s) of the question(s) must be handwritten otherwise NO credit will be given for that work**.

There will be **one mid-term exam** and **one final exam**. The final exam is comprehensive. The exams in this course will be closed book and closed note.

If you miss any exam, NO make-up will be given for the missing exam without prior arrangement. If you have a serious conflict with an exam time, you MUST discuss it with the INSTRUCTOR well ahead of the scheduled exam day to make an appropriate arrangement. Exams missed due to unpredictable events such as a family emergency and a traffic accident will be dealt with on a case-by-case basis if the student has a proper document(s) to prove it.

Students have 3 days after the any graded work including exams is returned and/or the grad of a work is posted on BB to dispute the grade.

It is important that you show the work in an organized manner clearly showing your thought process in solving the assigned problems. Instructor cannot give credits for the answer(s) that is(are) not readable and/or understandable.

Collaboration:

Collaboration between students is strongly 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 (also known as cheating) 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.

Office Hours:

Office hours are times I have specifically set aside to be available to students. During office hours, you can come to my office; you don't need an appointment. I may be available at other times; please email to schedule a time. Current office hours will be posted on the class website.

Attendance:

On-time attendance at all class activities is expected. Attendance itself will not be graded, but the student is responsible for any material that was covered, and any changes to the exam dates and homework assignments announced in class. Make-up work will only be accepted if prior arrangement has been made or if a valid emergency excuse (e.g., meteor strike) is accompanied by appropriate documentation.

Other Policies:

Please honor the following: do not come late; do not disturb the class by having conservation with others; do not work on any other class materials.

Those students who fail to follow these policies may be asked to leave the class.

The instructor also 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 in class

Lecture Schedule

Week	Chapter	Topic
1		Introduction - Overview of Course, Review of the last Semester
2	Ch. 8.1 ~ Ch. 8.4	Flexural Stress & Flexural Strain, Second Moment of Areas
3	Ch. 8.5 ~ Ch. 8.6	Elastic Flexure Formula, Shear Force and Bending Moment Diagram
4	Ch. 8.7 ~ Ch. 8.8	Load, Shear Force, And Bending Moment Relationships
5	Ch. 8.8 ~ Ch. 8.9	Shear Stress in Beam and Design
6	Ch. 9.1 ~ Ch. 9.4	Deflection by Integration - Method of Successive Integration
7	Ch. 9.5 ~ Ch. 9.6	Singularity Functions & Deflection by Superposition Flexure
8	Ch. 9.7 ~ Ch. 9.9	Statically Indeterminate Beams and Design
9	Review	**Mid-Term Exam**
10	Ch. 10.1 ~ Ch. 10.4	Plane Stress & Stress Transformation Equation
11	Ch. 10.5 ~ Ch. 10.8	Principal Stress & Maximum Shear Stress, Mohr's Circle for Stress
12	Ch. 10.5 ~ Ch. 10.8	Principal Stress & Maximum Shear Stress, Mohr's Circle for Stress
13	Ch. 10.8 ~ Ch. 10.11	Principal Strain & Maximum Shear Strain, Mohr's Circle for Strain
14	Ch. 10.8 ~ Ch. 10.11	Principal Strain & Maximum Shear Strain, Mohr's Circle for Strain
15	Ch. 10.13 ~ Ch.10.15	Thin-Walled Pressure Vessels & Combined Loads
16	Ch. 11.1 ~ Ch. 11.3	Columns & Fracture Theory
17	Ch. 11.4 ~ Ch. 11.7	Columns: Buckling
18	Review	**Final Exam**