



Introduction to Solid Mechanics - VM 211

Lecture: Tuesdays and Thursdays 14:00-15:40; Fridays 14:00-15:40 (first six JI weeks)

Location: Dong Zhong Yuan (东中院) E3-304

Book: Statics and Mechanics of Materials by R. C. Hibbeler, 4nd Edition

Instructor	E-Mail	Telephone	Office hour
Prof. Yanfeng Shen 申岩峰	yanfeng.shen@sjtu.edu.cn	18721333357	Mon. 10:00 - 11:30 Room 502, JI Building Online: Feishu shared Or via appointment

Teaching assistant:

Name	Email address	Office hours
Xiaojing Tan 谭孝璟	kyletanxj@sjtu.edu.cn	Thu. 20:00 - 22:00 Room 326I, JI Building

Recitation classes: Thu. 18:20 – 20:00

Location: Offline: E4-102 (Dong Zhong Yuan 4-102)

Online: Feishu shared in VM211 group

Course Description

Develop an understanding of the physical behavior of materials under load. The course emphasizes equilibrium, compatibility of deformation, and material behavior. Weekly lectures are given on theory and applications in statics, mechanics and structural engineering. Applications include axial loads, thermal stresses, bending, shear, and torsion, combined loadings, stress and strain transformations.

Introduction, Aims, Objectives

The Statics and Mechanics of Materials course provides the knowledge of the basic theories and experience through applying theory to solve real engineering problems in statics, mechanics, and structural analysis. The secondary objective of the course is to provide the knowledge and experience needed to communicate problems and solutions to others.

Specific course objectives are as follows:

1. Calculate force and moment resultants & develop an understanding of static equilibrium
2. Draw free body diagrams
3. Assign loadings to mechanical systems
4. Satisfy equations of friction and equilibrium
5. Structural analysis for truss structures (Assumptions and applications, Method of Joints, Method of Sections)
6. Geometric Properties and Distributed Loadings (Center of mass/gravity, moment of inertia, resultant forces for distributed loadings)
7. Analyze Internal Loadings (Shear and Moment Diagrams)
8. Analyze stresses due to axial stress, shear stress



9. Calculate modulus of elasticity, Poisson's ratio, shear modulus from stress vs. strain diagrams
10. Understand basic mechanics of materials terminology
11. Apply theory to analyze:
 - thermal stresses and strains
 - statically indeterminate axial members
 - torsional stresses & strains in circular shafts, power transmission
 - bending behavior of homogeneous and composite, prismatic and tapered beams
 - shear behavior of beams and shear flow
 - stresses in thin-walled pressure vessels
 - stresses in members subject to combined loadings
12. Use Mohr's circle to analyze stress and strain components
13. Transform stress and strain components from one orientation of the coordinate system to another orientation

Grading Policy

Item	Part of Class	Percentage
Homework	ALL	20
Exam 1* (Oct. 12)	Statics and Mechanics	15
Exam 2* (Nov. 11)	Mechanics of Materials	30
Final Exam* (Dec. 14)	Comprehensive & Structures	35

*For each exam, you are allowed to bring one A4 sheet of notes made on your own.

Any student who obtains at least 60% of the weighted average points from the above grading components will pass and will get a grade between A+ and D (inclusive).

The rest of students can still pass the course by getting 70% from the final exam. These students will get a grade of D.

The Professor possesses the authority to offer bonus points to students who make contribution to the active class atmosphere.

Classroom Policies

Expectations

Bring your book, calculator, notes, and an open mind to class every day. Class participation is encouraged but not enforced due to COVID-19. The lectures will be given in a online/onsite hybrid mode.

Homework assignments

Homework is due at the beginning of class on due date. Late work receives 20% reduction/day.

Make-up exams

No make-up quizzes or exams will be given except in cases of emergency.

Dishonesty

Any form of dishonesty or falsehood related to the general conduct of the class (exams, homework, etc.) will be considered a major offense and will be brought before the Honor Council



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for appropriate action. This includes submitting an in-class quiz for someone else.

Homework policy: You can discuss your solution with your classmates, but must finish the writing of your homework on your own. The use of other people's solution in writing yours is prohibited.

Cellphones and Texting

Cellphones must be turned off or be in the silent mode during class hours. Cellphone operation (including reading or sending text messages) during class hours is not allowed and will be considered as cheating during exams.

Laptops

You are strongly discouraged to use laptops in class except **quickly** checking materials related to this course.



Tentative Schedule

week	Day	Date	Tentative Lecture Topics	Assignment	Due
1	Tue	09-14	Class Introduction; Chapters 1 and 2		
	Thurs	09-16	Chapter 3	HMWK01	
	Fri	09-17	Chapter 4		
2	Tue	09-21	Moon Festival (No Class)		
	Thurs	09-23	Chapter 5		
	Fri	09-24	Chapter 6	HMWK02	HMWK01
3	Tue	09-28	Chapter 7a		
	Thurs	09-30	Chapter 7b		
	Fri	10-01	National Holiday (No Class)		
4	Tue	10-05	National Holiday (No Class)		
	Thurs	10-07	National Holiday (No Class)		
	Fri	10-08	Midterm Exam Review		HMWK02
5	Tue	10-12	Midterm Exam 1 (Chapter 1 → Chapter 6)		
	Thurs	10-14	Chapter 8a	HMWK03	
	Fri	10-15	Chapter 8b		
6	Tue	10-19	Chapter 8c		
	Thurs	10-21	Chapter 9a	HMWK04	HMWK03
	Fri	10-22	Chapter 9b		
7	Tue	10-26	Chapter 10a		
	Thurs	10-28	Chapter 10b	HMWK05	HMWK04
8	Tue	11-02	Chapter 11a		
	Thurs	11-04	Chapter 11b		
9	Tue	11-09	Chapter 11c+ Midterm Exam Review	HMWK06	HMWK05
	Thurs	11-11	Midterm Exam 2 (Chapter 7 → Chapter 11)		
10	Tue	11-16	Chapter 12b		HMWK06
	Thurs	11-18	Chapter 13	HMWK07	
11	Tue	11-23	Chapter 14a		
	Thurs	11-25	Chapter 14b	HMWK08	HMWK07
12	Tue	11-30	Chapters 15 and 16a		
	Thurs	12-02	Chapters 16b	HMWK09	HMWK08
13	Tue	12-07	Chapter 17		
	Thurs	12-09	Final Exam Review		HMWK09
14	Tue	12-14	Final Exam (Comprehensive)		