

MEC 363 MECHANICS OF SOLIDS

Spring 2019

Instructor: Prof. Kedar Kirane

Office Hours: Tue, Thurs 1.00 pm to 2.30 pm

Location: 133 Light Engineering

Email: kedar.kirane@stonybrook.edu

Teaching Assistants:

	Jason Loprete	Xihang Jiang
Office hours	Wed 12:00 pm to 1:30 pm Thurs 2:00 pm to 3:30 pm	Tue. 11:30 am to 1:00 pm Fri. 12:00 to 13:30 pm
Location	LE 158	LE 158
Email	jason.loprete@stonybrook.edu	xihang.jiang@stonybrook.edu

Lectures: Tu, Th 8:30-9:50am (100 Frey Hall)

Recitation-01: Mon 10:00-10:53pm (HUMANITIES 1003) TA: Xihang

Recitation-02: Mon 12:00-12:53pm (ENGINEERING 145) TA: Jason

Recitation-03: Mon 12:00-12:53pm (ENGINEERING 145) TA: Jason

Recitation-04: Mon 10:00-10:53pm (HUMANITIES 1003) TA: Xihang

(For recitations please note that MEC 363.R02 and R03 will meet together, and MEC 363.R01 and R04 will meet together)

Catalog Data: Stress and deformation of engineering structures and the influence of the mechanical behavior of materials. Concepts of stress and strain, constitutive relations, analysis of statically indeterminate systems, study of simple bars and beams, and stability conditions. Emphasis on force equilibrium, elastic response of materials, geometric compatibility, Mohr's circle, stresses and deflections in beams, and torsion and buckling of rods. Design for bending, shear and combined states of stress. Prerequisites: A grade of "C" or better in MEC 260 or BME 260.

Textbook: F.P. Beer, E.R. Johnston Jr., J.T. DeWolf, and D.F. Mazurek, *Mechanics of Materials, Seventh Edition*, McGraw Hill (with McGraw Hill Connect).

Important: A grade of 'C' or higher is required to take MEC 316 (next Fall). MEC 363 will be offered in the summer for those who do not earn a 'C' or higher.

Grading: Homework (30%, your 10 best HW's, weighted equally), two Midterm Exams (2×20%), Final Exam (30%). **Note: There will be no extra credit and no exam retakes.**

Grading Scale:

92 ≤ A < 100	74 ≤ C+ < 78
88 ≤ A- < 92	70 ≤ C < 74
85 ≤ B+ < 88	67 ≤ C- < 70
81 ≤ B < 85	64 ≤ D+ < 67
78 ≤ B- < 81	60 ≤ D < 64

Exams: All exams will be closed book and closed notes. An exam absence will be scored as a zero, unless a justifiable excuse with appropriate documentation is presented to the Professors within one week following the exam. Sleeping late is not a justifiable excuse. If you are sick, see your doctor and get a note. You must bring your Stony Brook ID, two or more pencils, and an approved scientific calculator to each exam.

Allowed Calculators: Only the following calculators will be permitted to be used on all midterm and final exams in the Department of Mechanical Engineering. There will be no exceptions! This list of calculators is identical to that allowed for the National Council for Examiners for Engineering and Surveying (NCEES) Fundamentals of Engineering (FE) exam that many of you will take in your senior year, as well as Professional Engineering (PE exam) that you may take.

Casio: All fx-115 models. Any Casio calculator must contain fx-115 in its model name.

Hewlett Packard: The HP 33s and HP 35s models, but no others.

Texas Instruments: All TI-30X and TI-36X models. Any Texas Instruments calculator must contain either TI-30X or TI-36X in its model name.

For detailed information, follow <https://ncees.org/exams/calculator-policy/>

Homework Assignments:

- Homework is to be completed in McGraw-Hill Connect, which is accessible through Blackboard under Assignments.
- You need a subscription to Connect, which is available through the bookstore.
- For each problem, you will have 10 opportunities to check your work. If exhaust your 10 opportunities, you can start an additional attempt, before the due date. Thus, theoretically you have unlimited attempts. Your highest score will be recorded on Black Board. Do not settle for a score less than 100%
- Homework will be automatically submitted in connect at the time and date due.
- Solutions can be accessed through Connect 1 hour after the homework is due.
- Please contact McGraw-Hill or see a TA if you have problems with Connect.

Topics:

- Introduction and Concept of Stress (3 hours)
- Stress and Strain, Axially Loaded Members (6 hours)
- Torsion (6 hours)
- Pure Bending (6 hours)
- Shear Forces and Stresses in Beams (5 hours)
- Transformation of Stress and Strain (4 hours)
- Deflection of Beams (2 class hours)
- Statically Indeterminate Beams (2 hours)
- Columns, Buckling (2 hours)
- Exams and Reviews (6 hours)

Course Learning Objectives

- Understand the fundamental definitions of stress, strain, constitutive relations, and equilibrium
- Know how to compute principal stresses and strains
- Understand and know how to utilize Mohr's circle
- Know how to analyze the mechanical behavior of real-world structures made up of bars, columns, shells, and beams subjected to axial loading, torsion, hydrostatic pressure, and bending
- Know how to systematically approach statically indeterminate systems
- Have the ability to design structures for given applications in a simple and logical manner by employing the concepts of stress, strain, constitutive relations, equilibrium, and stability

Tentative schedule:

Please note that this schedule is tentative. Our exact schedule during the semester might differ depending on our progress, weather related class cancellations etc. Updates to this schedule will be posted on blackboard

Week	Lecture	Date	Day	Topic	HW Due
1	1	1/29	Tues	Course overview, 1.1-1.2	
1	2	1/31	Thurs	1.2-1.5	
2	3	2/5	Tues	Ch 1 Examples	
2	4	2/7	Thurs	2.1, 2.2	
3	5	2/12	Tues	2.3-2.6	HW 1
3	6	2/14	Thurs	2.6-2.8, 2.10-2.13	
4	7	2/19	Tues	Ch 2 Examples	HW 2
4	8	2/21	Thurs	7.1, 7.2	
5	9	2/26	Tues	7.3, 7.4 (~7.5) 7.6	HW 3
5	10	2/28	Thurs	7.6, Ch 7 Examples	
6	11	3/5	Tues	4.1, Review for exam I	HW 4
6	--	3/7	Thurs	<i>Exam I</i> (Chapters 1, 2, 7)	
7	12	3/12	Tues	4.2, 4.3-4.5	
7	13	3/14	Thurs	4.7 (some 4.8, 4.9)	
8	--	3/19	Tues	No Class (Spring break)	
8	--	3/21	Thurs	No Class (Spring break)	
9	14	3/26	Tues	5.1	HW 5
9	15	3/28	Thurs	5.2 - 5.3	
10	16	4/2	Tues	Ch 5 Examples	
10	17	4/4	Thurs	6.1-6.2	HW 6
11	18	4/9	Tues	6.3, 6.4	
11	19	4/11	Thurs	Ch 6 Examples, Review for exam II	HW 7
12	--	4/16	Tues	<i>Exam II</i> (Chapters 4 to 6)	
12	20	4/18	Thurs	9.1-9.2	
13	21	4/23	Tues	9.2, 9.4	
13	22	4/25	Thurs	10.1	HW 8
14	23	4/30	Tues	3.1, 3.2	HW 9
14	24	5/2	Thurs	3.3-3.5	
15	25	5/7	Tues	3.6-3.8, Ch 3 examples	
15	26	5/9	Thurs	Review for Finals	HW 10
--	--	5/14	Tue	<i>Final Exam</i> , 11.15 am to 1.45 pm	

Student Accessibility Support Center Statement

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Student Accessibility Support Center, ECC (Educational Communications Center) Building, Room 128, (631)632-6748. They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential.

Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Student Accessibility Support Center. For procedures and information go to the following website:

<http://www.stonybrook.edu/ehs/fire/disabilities>

Academic Integrity Statement

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty is required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty please refer to the academic judiciary website at

http://www.stonybrook.edu/commcms/academic_integrity/index.html

Critical Incident Management

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of University Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn.

Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.

Make up exams

The class policy on make-up exams is consistent with university policy on [Student Participation in University Sponsored Events](#), the policy on [Final Exams](#) and the New York State Education Law regarding [Equivalent Opportunity and Religious Absences](#).