

**MEC 363**  
**MECHANICS OF SOLIDS**  
Spring 2017

**Lectures:** Prof. Robert Kukta

Office Hours: M 2-4pm & F noon-2pm in 231 Engineering Building

**Teaching Asst:** Shaoyu Hou: Office Hours: TBA

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**Lectures:** MWF 11:00-11:53am (Frey Hall 102)

**Recitation-01:** M 10:00-10:53pm (Melville Lbr W4540) TA: TBA

**Recitation-02:** M 12:00-12:53pm (Melville Lbr W4540) TA: TBA

**Recitation-03:** M 12:00-12:53pm (Frey Hall 201) TA: TBA

**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 (20%, your 10 best HW's, weighted equally), two Midterm Exams (2×20%), Final Exam (30%), Project (10%). Note: There will be no extra credit and no exam retakes. Do not ask!

**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 Professor Kukta 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:** Following the Mechanical Engineering Department's mandatory calculator policy, **only** the following calculators will be allowed to be used on the midterm and final exams. 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 the Professional Engineering (PE) exam that you may take several years from now. The sooner you become comfortable on one of these calculators, the better. If you have any questions on this policy please feel free to contact me. The NCEES policy on calculators can be found here: <http://ncees.org/exams/calculator-policy>

**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.

### 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.
- On each problem, you have 10 opportunities to check your work to see if you have the correct answer. If exhaust your 10 opportunities, you will need to submit your assignment without assurance that all of your answer are correct. However, until the due date, you may rework the assignment with additional attempt. Your highest score will be recorded on Black Board. The number of attempts you have is unlimited until the due date. Do not settle for less than 100%.
- Homeworks will be automatically be submitted at the beginning of class on the due date.
- Solutions can be accessed through Connect 1 hour after the homework is due.
- Please contact McGraw-Hill or see a teaching assistant 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)

### Schedule:

<b>Date</b>	<b>Day</b>	<b>Topic</b>	<b>Homework Due</b>
1/23	M	Syllabus, 1.1	
1/25	W	1.2	
1/27	F	1.3-1.5	
1/30	M	More Ch 1 Examples	
2/1	W	2.1	HW 1
2/3	F	2.2	
2/6	M	2.3-2.4	
2/8	W	2.5-2.8	HW 2
2/10	F	2.10-2.13	
2/13	M	More Ch 2 Examples	
2/15	W	Catch-up/Examples	HW 3
2/17	F	3.1	
2/20	M	3.2	
2/22	W	3.3	HW 4
2/24	F	3.4-3.5	
2/27	M	3.6-3.8	
3/1	W	More Ch 3 Examples	HW 5
3/3	F	Review for Exam	
3/6	M	<i>Exam I</i> (Chapters 1 to 3)	*
3/8	W	4.1-4.2	
3/10	F	4.3, More Ch 4 Examples	
3/13	M	No Class	
3/15	W	No Class	
3/17	F	No Class	
3/20	M	4.4-4.5	HW 6
3/22	W	4.6	
3/24	F	4.7-4.8	
3/27	M	4.9, More Ch 4 Examples	HW 7
3/29	W	5.1-5.2	
3/31	F	5.3, More Ch 5 Examples	
4/3	M	6.1	HW 8
4/5	W	6.2-6.4	
4/7	F	More Ch 6 Examples	
4/10	M	7.1	HW 9
4/12	W	7.2-7.3	
4/14	F	7.4 (~7.5) 7.6	
4/17	M	8.1-8.3 (Ch 7 applications)	HW 10
4/19	W	Catch-up, Review for Exam II	HW X
4/21	F	<i>Exam II</i> (Chapters 4 to 8)	*
4/24	M	9.1	
4/26	W	9.2	
4/28	F	9.4, More Examples	
5/1	M	10.1 (~10.2, 10.3)	HW 11
5/3	W	Catch-up, Energy Methods (~Ch 11)	
5/5	F	Catch-up, Review for Final Exam	HW 12
5/11	Th	<i>Final Exam</i> , 11:15-1:45pm	*

### **Course Learning Objectives**

1. Understand the fundamental definitions of stress, strain, constitutive relations, and equilibrium
2. 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
3. Know how to systematically approach statically indeterminate systems
4. Know how to compute principal stresses and strains
5. Understand and know how to utilize Mohr's circle
6. 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

**Disability Support Services (DSS):** If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Disability Support Services, ECC (Educational Communications Center) Building, room 128, [\(631\) 632-6748](tel:6316326748). 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 Disability Support Services. For procedures and information go to the following

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

**Academic Integrity:** 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 are 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/uaa/academicjudiciary/>

**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 Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn.