Department of Mechanical Engineering
Mercer University

Syllabus for MAE 320
Solid Mechanics II
Fall Semester 2011
Meeting Days TTh 9:25 – 10:40 am
Room EGC 109

Instructor: Dr. Richard Kunz, Associate Professor
Department of Mechanical Engineering

Office: Suite 105F, School of Engineering
Hours: MWF 9:00 am – 10:00 am
T Th 2:00 pm – 3:00 pm
and by appointment

Phone: 301-4061

Email: kunz_rk@mercer.edu

Website: http://faculty.mercer.edu/kunz_rk/

Textbook:

Required:

- *Mechanics of Materials,* F. P. Beer, E. R. Johnston Jr., J.T. DeWolf, D. F. Mazurek, 6th ed., McGraw-Hill, 2012. ISBN 978-0-07-338028-5

Catalog Description:

Stress, strain, axial deformation of statically determinate and indeterminate systems. Generalized Hooke's Law. Torsion, beam bending, shear stresses in beams, stress and strain transformation, beam deflections. Energy methods. Static and fatigue failure theories. Design of structural members: beams, columns, etc.

Course Objectives:

- Reinforce fundamental concepts of statics, stress, strain, and Hooke's Law and their application to stress and deformation under simple axial loading, torsion, beam shear and beam bending.
- Extend the elementary solutions to more complex geometries, loading, and material behaviors.
- Introduce concepts of stress and strain transformation and strain energy as pre-cursors to consideration of combined stresses and failure theories.
- Develop a fundamental understanding of stress distributions and stress concentrations in structural components.

Prerequisites:

C or better in EGR 232, MAT 192.

Grading:

Homework	15%
Tests (3)	50% total
Final Exam	35%

Grade Averages: A: 90's; B: 80's; C: 70's; D: 60's; F: below 60.

Course Standards:

1. EGR 232 is listed as a pre-requisite to this course. You are expected to have mastered the concepts of statics and solid mechanics covered during that course. While a brief review of certain topics from EGR 232 will be conducted from time to time, I will not be re-teaching that course in here. If you are shaky on one or more key topics from the earlier course, it is your responsibility to review and refresh your understanding of the material.

2. **Homework** will be assigned at each class meeting and will be due at the beginning of the next class. Late homework will not be accepted for any reason. Your lowest homework grade will be dropped.

3. **Reading** assignments will be posted at each class meeting. You are expected to read the listed sections before the next class to prepare for the material to be covered.

4. **Tests:** There will be three 75-minute tests during the semester. No make-up tests will be given without a documented excuse.

5. **Final Exam:** There will be a comprehensive three-hour final exam.

6. The final exam is scheduled for **Tuesday, 13 December, 2:00 – 5:00 p.m.**

Additional Information:

1. Please feel free to arrange a meeting with me at any point that you feel you need it. If you would like to see me, come to my office during posted office hours, catch me after class to schedule a time, call, email, or stop by my office.

2. The **honor code** provisions as outlined in the *Catalog* and in the student handbook, *The Lair*, and on the web at http://www2.mercer.edu/HonorCouncil/default.htm apply to everyone and to all work handed in. By turning in a paper to the instructor, each student certifies that he/she has neither given nor received unauthorized aid in its completion. Plagiarism is a violation of the honor code and is prohibited. When in doubt, please ask to avoid potentially embarrassing situations.

3. Please turn off mobile phones before entering the classroom.

4. Electronic communication is an important adjunct to face-to-face communication, including from professor to students, students to professor, and students to students. You must have regular access to your Mercer e-mail. If you do not have an active e-mail address on the first day of class, please secure one.

5. Students requiring accommodations for a disability should inform the instructor at the close of the first class meeting or as soon as possible. If you are not registered with Disability Services, the instructor will refer you to the Disability Support Services office for consultation regarding documentation of your disability and eligibility for accommodations

under the ADA/504. In order to receive accommodations, eligible students must provide each instructor with a "Faculty Accommodation Form" from Disability Services. Students must return the completed and signed form to the Disability Services Coordinator on the 3rd floor of the Connell Student Center. Students with a documented disability who do not wish to use academic accommodations are also strongly encouraged to register with Disability Services and complete a Faculty Accommodation Form each semester. For further information, please contact Carole Burrowbridge, Disability Services Coordinator, at 301-2778 or visit the website at http://www.mercer.edu/stu_support/swd.htm

Tentative Course Coverage

	Chapter
Introduction – Concept of Stress	1
Stress and Strain – Axial Loading	2
Torsion	3
Beam Bending – Analysis and Design	4,5
Shearing Stresses in Beams and Thin-Walled Members	6
Transformation of Stress and Strain	7
Beam Deflections	9
Columns	10
Introduction to Energy Methods	11

Test Dates (Tentative)

Test 1	Tuesday, Sep. 20
Test 2	Tuesday, Oct. 25
Test 3	Tuesday, Nov. 29
Final	Tuesday, Dec 13 2:00 – 5:00 pm