School of Engineering EGR Mercer University

Syllabus for *EGR 232-001*
Statics/Solid Mechanics
Fall Semester 2011
Meeting Days MWF 8:00 – 8:50 a.m.
Room EGC 218

Instructor: Richard K. Kunz, Ph.D., P.E.
Associate Professor
Department of Mechanical Engineering

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

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Textbook:
Required: *Statics and Mechanics of Materials,* 3rd Edition, by R.C. Hibbeler, 2011.
ISBN: 978-0-13-216674-4

Catalog Description: Equilibrium of concurrent force systems. Stress, strain, and axial deformation. Hooke's law. Rigid-body equilibrium. Stress and deformation in shafts and beams. Shear and bending moment diagrams. Column buckling.

Course Objectives: Upon successful completion of this course, you should be able to do the following:

Combine and resolve forces and moments in 2-D and 3-D
Prepare appropriate free body diagrams.
Solve 2-D and 3-D rigid body equilibrium problems.
Solve problems involving friction and distributed loads.
Determine internal structural loads in frames.
Calculate stress and deformation in structures subjected to axial loads.
Solve problems involving torsion of circular shafts.
Calculate shear and bending stresses in beams, using shear and bending moment diagrams.
Calculate beam deflections under various loading and support conditions.
Determine critical column buckling loads

Corequisites:
MAT 192, PHY 161

Grading:

Homework	10%
Tests (3)	18% each
Final Exam	36%

Grade Averages: A (90-100), B (80s), C (70s), D (60s), F(<60).

Supplemental Instruction: Supplemental Instruction (SI) will be offered for EGR 232 by the Academic Resource Center. Details on SI session schedules will be announced the first week of class. You are strongly encouraged to take advantage of SI as an additional resource in mastering the material of this course.

Course Standards:

1. In this course, as in many other engineering disciplines, a relatively small number of fundamental physical principles are applied to the solution of a wide range of problems of engineering importance. Your success in this course, as well as later on your success as an engineer, will be largely determined by your ability (i) to understand the information that is known and the results that are needed; (ii) to synthesize and apply the relevant principles to determine the results that are needed; and (iii) to communicate and document your work. These are not skills that most people are born with, and so they must be developed. In this course, the approach to developing these skills will consist of the following elements:

   - Statement and/or development of fundamental physical principles in class, backed up by information in the textbook.
   - Demonstration and collaborative application of these principles to the solution of problems in class, backed up by information in the textbook.
   - Independent solution of problems outside of class.

   Your success in the course, as measured by your grades on the tests and final exam, will be determined in large part by the level of your involvement in each of these three elements, both in class and outside of class.

   The ability to solve engineering problems, and to document the solution, may be the most important skill that you will take from this course. While the answer to a problem is important, it is just as important to communicate the justification for that answer.

   The assigned homework is intended to provide you with the practice needed to develop the necessary skills. The evaluation of your skills is provided by the tests and final.

2. **Homework** is an important part of learning, as performing the homework is the only way to have a good understanding of the course material, to develop the skills necessary to independently solve problems, and to form good engineering work habits.

   - **Reading assignments** will be made each class period, covering the material to be discussed during the next class meeting. You are expected to read the listed sections before the next class to prepare for the material to be covered. Following class, you may find it helpful the review the sections of the text covered in class to further elucidate key concepts.

   - **Problems** will be assigned each class period, collected at the beginning of the next class, and returned the following class. Late homework will not be accepted under any circumstances. Your lowest homework grade will be dropped. Each class will begin with a discussion of the previously assigned problems as needed. Grades on

homework problems will range from 1 to 5, and will be based in part on the following standards:

- Homework must be done neatly in pencil.
- Place your name in the upper right hand corner.
- Start each problem on a separate page.
- Staple all pages together.
- Do not write on the backs of paper.
- Sketches must be neat and clear.
- Show all forces, coordinate systems, governing equations, and assumptions that are used in the solution.
- Equations and solutions must follow logically, step by step. Thus, your complete solution is supported by what you have presented. Show all your work.
- Numerical answers without units are meaningless.
- Papers not adhering to these rules will receive less than full credit.

Homework problems provide you the opportunity to develop and practice your engineering skills. I strongly recommend that you do each homework problem as if it is a quiz or test problem, and keep all solutions in a notebook as a resource for studying for tests and the final.

You may work together in groups, but copying is not permitted. Each student must turn in his/her own work. DO NOT COPY HOMEWORK. Copying work and submitting it as your own is an Honor Code violation.

Homework solutions will be placed in the library on 2-hour reserve.

3. **Tests:** There will be three 50-minute tests during the semester. Problems will be similar (in some cases identical) to the homework. All tests will be closed notes and closed book. A calculator is recommended. No make-up tests will be given without a documented excuse. Tentative test dates are: **Mon. 26 Sep.; Wed. 26 Oct.; Fri. 2 Dec.**

4. **Final Exam:** There will be a comprehensive final exam. It will be closed notes and closed book. It will consist of problems similar (in some cases identical) to the homework, quizzes, and tests.

   The final exam will be given **Tuesday, 13 December, 9:00 a.m. – 12:00 noon**

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, catch me after class to schedule a time, call, or email.

2. Please turn off cell phones before entering the classroom.

3. 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. Plagiarism is a violation of the honor code and is prohibited. When in doubt, please ask to avoid potentially embarrassing situations.

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. Access to the Web and to the Internet is also integral to the class work. A number of laboratories on campus will provide access, in addition to EGC.

5. Students requiring accommodations for a disability should inform the instructor at the close of the first class meeting or as soon as possible. The instructor will refer you to the Disability Support Services Coordinator to document your disability, determine eligibility for accommodations under the ADAAA/Section 504 and to request a Faculty Accommodation Form. Disability accommodations or status will not be indicated on academic transcripts. In order to receive accommodations in a class, students with sensory, learning, psychological, physical or medical disabilities must provide their instructor with a Faculty Accommodation Form to sign. Students must return the signed form to the Disability Services Coordinator. A new form must be requested each semester. Students with a history of a disability, perceived as having a disability or with a current disability who do not wish to use academic accommodations are also strongly encouraged to register with the Disability Services Coordinator and request a Faculty Accommodation Form each semester. For further information, please contact Carole Burrowbridge, Disability Services Coordinator, at 301-2778 or visit the Disability Support Services website at http://www.mercer.edu/studentaffairs/disabilityservices