CLARKSON UNIVERSITY  
Fall Semester 2007  
ES 222 Strength of Materials  

**Prerequisite:** ES220 Statics  
**Class Times:** Mondays & Fridays, 11:00 – 11:50; Wednesdays, 11:00 – 12:50. Room: 178 CAMP  
**Instructor:** Dr. Weiqiang Ding, E-mail: wding@clarkson.edu, 203 CAMP, Box 5725, Phone: 268-2205  
**Office Hours:** Mondays, Wednesdays & Fridays, 9:00 – 10:00 am; Tuesdays, 3:30 – 5:30 pm. Additional times are available by appointment.  
**Website:** http://people.clarkson.edu/~wding/ES222.html  

**Objectives**  
1. Introduce concepts of strength, deformation, stress and strain for deformable bodies subjected to various loading conditions: axial loads, bending and torsion.  
2. Discuss failure criteria for various materials and components, and illustrate the application of failure criteria to the design process.  

**Program Outcomes and Assessment**

**Program outcomes addressed**  
1. Students will be able to determine the stress, strain and deformation of basic mechanical and structural components, given the applied loads and component geometry. [4.3.2.1, 4.3.2.2](1,2)  
2. Students will be able to perform fundamental component design and design refinement by applying the proper failure concepts along with stress, strain and deformation analysis.[4.3.2.1, 4.3.2.2](1,2)  

**Assessment Methods**  
1. Time limited in-class examinations.  
2. Graded student homework and workshop problems.  

**Policies:**  
- Homework problems are due the class after they are assigned unless specified otherwise (e.g., problems assigned Monday are due Wednesday).  
- The Wednesday class may consist of an in-class problem-solving workshop, where completed problems must be turned in at the end of that class.  
- While students are encouraged to work on homework and workshop problems in groups, each student is responsible for turning in individual solutions for all assignments. The work you submit should be your own; copying homework typically results in low exam grades.  
- Late homework will NOT be accepted. However, the three lowest homework grades for each student will be dropped when calculating the homework average.  
- Exams must be taken during the scheduled periods per Clarkson University Policy.  
- All students must take the final exam during the scheduled period to pass the course.  
- The final exam will be cumulative but will emphasize topics not covered on prior exams.

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1 Numbers in brackets refer to the ME Program Outcomes (Section 4.3 in MAE Department Student Handbook). Numbers in parentheses refer to the Assessment Methods listed.
Grading
Exam I 20 %
Exam II 20 %
Exam III 20 %
Final Exam 25 %
Homework* 15 %
*Homework grade includes grades for workshop problems

Scores calculated using the above percentages are guaranteed to give you a grade of A if you obtain 90% or above, B+ is 85% or above, B is 80% or above, C+ is 75% or above, C is 70% or above, D+ is 65% or above, and D is 60% or above. Below 60% will be assigned a letter grade of F.

Important Dates
Exam I: Wednesday, September 19
Exam II: Wednesday, October 17
Exam III: Wednesday, November 14
Final Exam: Week of December 10-14

Exam dates are approximate and subject to change. Any changes will be announced in class and posted on the website. It is your responsibility to stay informed of such matters.

Topical Outline
Note: We will not cover every section in the chapters listed below. Refer to the reading schedule for information on which sections will be covered.

Chapter 1. Introduction, Concepts of Stress (3 classes)
Chapter 2. Stress and Strain for Axial Loading (5 classes)
Chapter 3. Torsion (4 classes)
Chapter 4. Pure Bending (5 classes)
Chapter 5. Analysis and Design of Beams for Bending (3 classes)
Chapter 6. Shearing Stresses in Beams and Thin-Walled Members (3 classes)
Chapter 7. Transformations of Stress and Strain (5 classes)
Chapter 9. Deflection of Beams (5 classes)
Chapter 10. Columns (2 classes)
Chapter 8. Combined Loading (3 classes)

Miscellaneous
1. Please bring your textbook to class (particularly on Wednesdays, for the workshops). We will often refer to figures or problems in the text.
2. Students are expected to read the appropriate sections in the textbook prior to class. A reading schedule will be provided for this purpose. The instructor reserves the right to give short reading quizzes at the beginning of class.
3. Homework problems should be neat, professional and well organized. Points will be deducted for homework that does not meet these standards. A sheet describing homework standards, along with a sample, will be provided in class.
4. Review sessions may be scheduled periodically before exams or at other times if the class desires. The times will be decided on in class. It is your responsibility to stay informed about these if you want to come; attendance is not mandatory. Dates/times will be announced in class and posted on the website.
5. Exams are closed book, closed note, and calculators are not allowed (nor are they required). A formula sheet is included with each exam; these formula sheets will be posted online.