

CLARKSON UNIVERSITY
Spring Semester 2007
ES222 Strength of Materials – Sections 02/20 and 03/30

Prerequisite: ES220 Statics

Text: Beer, Johnston and DeWolf, *Mechanics of Materials*, 4th edition, McGraw Hill, ISBN 0-07-298090-7.

Class Times: Section 02/20: Mondays, Wednesdays and Fridays, 12:00 – 12:50, 178 CAMP
Section 03/30: Mondays, Wednesdays and Fridays, 1:00 – 1:50, 178 CAMP

Instructor: Dr. Kathleen A. Issen, E-mail: issenka@clarkson.edu, 207 CAMP, Box 5725, Phone: 268-3880

Office Hours: Mondays, Wednesdays and Fridays, 10:00 – 11:00. Mondays and Wednesdays, 5:00 – 6:00. Additional times are available by appointment.

Website: <http://www.clarkson.edu/class/es22201>

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 addressed¹

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). Some classes 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 four 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.

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	22%
Exam II	22%
Exam III	22%
Final Exam	25%
Homework*	9%

*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 92% 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.

Exception: The weighted average of the four exam grades must be at least 60% in order to pass the course.

Important Dates

Exam I:	Wednesday, February 7th, Evening
Exam II:	Wednesday, March 7th, Evening
Exam III:	Wednesday, April 11th, Evening
Final Exam:	Week of April 30 th – May 4 th

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 (4 classes)
- Chapter 7. Transformations of Stress and Strain (5 classes)
- Chapter 9. Deflection of Beams (4 classes)
- Chapter 10. Columns (2 classes)
- Section 8.4 Combined Loading (4 classes)

Miscellaneous

1. Please bring your textbook to class. 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 are posted on the website.