ENME 220 Mechanics of Materials
Summer 2012

Overview

Mechanics of materials is a fundamental course on the mechanical behavior of deformable bodies under axial loads, torsion, flexure, and combined loads. The concepts of stress, strain, and material properties are introduced and used to relate external forces with the resulting internal forces and deformations of a body. Practical applications involving the design of mechanical and structural elements under various load conditions are emphasized. ENME 220 is a 3 credit course in engineering science at UMBC.

A. *General Information*

Instructor: Dwayne D. Arola, ECS 211
darola@umbc.edu
Office Hours: W 3:00-5:00 pm, by appointment, or anytime via e-mail.

Santiago Orrego, ECS 018
sorrego1@umbc.edu
Office Hours: M 3:00-5:00 pm, by appointment, or anytime via e-mail.

Teaching Asst. Hessam Majd, ECS 208,
hessam1@umbc.edu
Office Hours: Tu 1:00-4:00 pm, by appointment or anytime via e-mail.

Text (required): *Mechanics of Materials*
W. F. Riley, L. D. Sturges and D. H. Morris, 6th Edition, John Wiley Publications, 2007.

Lectures: T, Th.........6:00pm- 9:10pm, Information Technology 227

Homework: Homework will be assigned and graded. Solutions for the homework will be posted weekly in the library within a "Reserve Folder" for ENME 220 or on Blackboard.

Quizzes: Quizzes will occur at the end of one lecture each week. The quizzes will consist of one question and are to be solved with closed books and notes.

Exams: Two mid-term exams and one final examination.
All exams are open book and open notes, including the final exam.

Course Grade: Course Grades will be based on the following distribution:

Quizzes	10%
Homework	20%
Mid Term Exam I	20%
Mid Term Exam II	20%
Final Exam	30%
	100%

B. *Course Objectives and Expectations*

Objectives
There are a number of objectives that we wish to achieve through the activities of this course. In particular, we will expect the student to:

1. Learn the definitions of stress and strain.

2. Be able to solve for the state of stress or state of strain in a particular orientation with respect to a reference system using the transformation equations.

3.   Learn to solve for the stress distribution in axial members, torsion members and beams subjected to transverse loads.

4. Be able to determine the deformation of axial members, torsion members and beams that result from the application of external loads.

5. Be capable of estimating the safety of engineering components using the applicable failure criterion.

6. Become aware of the energy methods for estimating deformation and deflections that result from external loads.

7. Learn about the stability of slender columns subjected to compressive axial loads.

Expectations
Students who have enrolled in ENME 220 are expected to have completed ENES 110, Math 152 and Physics 121 or other equivalents. Students who have not completed these courses with a grade of "C" (2.0/4.0) or better are not eligible to enroll in ENME 220.

C. *Academic Integrity*

By enrolling in this course, each student assumes full responsibility of as a participant in UMBC's scholarly community in which everyone's academic work and behavior are held to the highest standards of honesty. Cheating, fabrication, plagiarism, and helping others to commit these acts are all forms of academic dishonesty. Academic misconduct could result in disciplinary action that may include, but is not limited to a grade of zero on the particular work, a grade of F in the class, suspension or dismissal. To read the full Student Academic Conduct Policy, consult the UMBC Student handbook, the Faculty Handbook, or the UMBC Policies section of the UMBC Directory.

D. *ABET Program Criteria Outcomes Achieved*

In addition to teaching the subject material, accreditation of the Department of Mechanical Engineering at UMBC by ABET requires the curriculum to meet certain criteria. In particular, the curriculum must achieve a number of "program outcomes". For a student to pass ENES 220, he or she must demonstrate the following program outcomes:

a.___*___An ability to apply knowledge of mathematics, science, and engineering

b._____An ability to design and conduct experiments, as well as to analyze and interpret data

c.___*___An ability to design a system, component, or process to meet desired needs

d._____An ability to function on multi-disciplinary teams

e.___*___An ability to identify, formulate and solve engineering problems

f._____An understanding of professional and ethical responsibility

g._____An ability to communicate effectively

h._____The broad education necessary to understand the impact of engineering solutions in a global/societal context

i._____A recognition of the need for and an ability to engage in lifelong learning

j._____A knowledge of contemporary issues

k.___*___An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice

E. Academic Integrity

ACADEMIC INTEGRITY

"By enrolling in this course, each student assumes the responsibilities of an active participant in UMBC's scholarly community in which everyone's academic work and behavior are held to the highest standards of honesty. Cheating, fabrication, plagiarism, and helping others to commit these acts are all forms of academic dishonesty, and are wrong. Academic misconduct could result in disciplinary action that may include, but is not limited to, suspension or dismissal. To read the full Student Academic Conduct Policy, consult the UMBC Student Handbook, the Faculty Handbook, or the UMBC policies section of the UMBC Directory." *UMBC Faculty Senate, February 13, 2001.*