

ESC 321 – Strength of Materials Syllabus

Credit:

3 semester hours

Prerequisites

PHY 151 or 251 and MAT 122.

Course Description

Relationships between internal stresses and deformations produced by external forces acting on deformable bodies, and design principles based on mechanics of solids: normal stresses, shear stresses, and deformations produced by tensile, compressive, and torsional, and dimensional stress states; and buckling of columns.

Rationale for Course

While many physics and engineering science classes focus on the motion of objects subject to known forces; i.e., classical mechanics, this course directs attention to what happens within the structure of each body subject to those forces.

Learning Objectives

To provide the student with an understanding of the mechanisms by which structural elements fail.

Academic Integrity

Students are expected to be honest and to submit their own work on exams and research papers. Adherence to the Mississippi College "Honesty Policy" (2009–2010 *Mississippi College Undergraduate Bulletin* pg. 60) will be followed.

Course Outline

- Review of Statics
- Analysis of Stress
- Analysis of Strain
- Material Properties and Stress–Strain Relationships
- Axial Loading Applications and Pressure Vessels
- Torsional Loading of Shafts
- Flexural Loading: Stresses in Beams
- Flexural Loading: Beam Deflections
- Columns
- Energy Methods and Theories of Failure

Methods of Instruction

Presentation of course material will be accomplished through a combination of lectures (oral and audio–visual), demonstrations, and possibly reading assignments.

Recommended Text

Mechanics of Materials, 6th Edition; Riley, Sturges, and Morris; Wiley Publishing

Grading

Final grades will normally be determined by the average scores on a number of examinations as well as some weighted average of homework assignments. Topical reports may also be assigned by the instructor. A ten point scale will be used to assign letter grades.

Makeup Tests

Makeup tests will be given only under the following circumstances:

- Consent of the instructor has been obtained prior to the test.
- An excused absence is obtained from a doctor or the Vice-President for Academic Affairs.

Absences

Mississippi College policies on attendance and academic integrity will be enforced. Please see the 2009–2010 *Mississippi College Undergraduate Bulletin*, pg. 56–57 for additional details of these policies. Students are responsible for work missed during an absence.

Special Needs

If you need special accommodations due to learning, physical, psychological or other disabilities, please contact Dr. Buddy Wagner in the Counseling and Career Development Center. He may be reached by phone at (601) 925–3354.