Credit
3 semester hours

Prerequisites
PHY 151 or 251 and MAT 122

Course Description
Forces in equilibrium, free-body diagrams, beams, trusses, engineering principles, bodies in tension and compression, stress and strain

Rationale for Course
This course has been called "the first actual engineering course that engineering majors take." Statics forms the basis for many upper division engineering courses, especially Mechanical and Civil Engineering courses. It makes practical use of both differential and integral calculus, and as such, it solidifies a student's understanding of calculus. In summary, it's the foundation course for most engineering areas.

Learning Objectives
- The student will demonstrate proficiency in using both the MKS and the English unit systems and in the conversions between the systems.
- The student will demonstrate an understanding of forces as vectors acting in a plane and will add and subtract vector forces using both the component method and the force triangle method.
- The student will understand scalar and vector products and will apply these concepts to forces on a rigid body.
- The student will demonstrate an understanding of a moment as a vector and how this concept leads to understanding a Couple and a Wrench applied to a rigid body.
- The student will become proficient in solving problems involving the equilibrium of a rigid body in three dimensions.
- The student will gain a deeper understanding of centroids and distributed forces.
- The student will learn to analyze structures by the methods of sections and joints.
- The student will solve equilibrium problems involving multiple forces on frames and machines.
- The student will gain additional proficiency in solving problems involving friction.
- The student will learn to determine the moments and products of inertia of three-dimensional objects.

Academic Integrity
Students are expected to be honest and to submit their own work on exams. Students may collaborate on homework problems. Strict adherence to the Mississippi College "Honesty Policy" (2009-2010 *Mississippi College Undergraduate Bulletin*, pg. 60) will be followed.

Course Outline
- Common engineering units in the MKS and English unit systems
- Statics of a particle, forces as vectors, forces in space, vector components of forces, adding of vectors by the component method and the force triangle method, equilibrium of a particle

- Rigid bodies, internal and external forces, scalar and vector products, moments of a force, couples, wrenches
- Equilibrium of rigid bodies in two and three dimensions
- Distributed forces on beams and areas
- Analysis of structures by the methods of joints and sections; frames and machines in equilibrium
- Friction, wedges, screws, rolling friction, belt friction
- Moments and products of inertia of two and three dimensional objects

Method of Instruction

This is primarily a problem-solving course, with the students doing the "solving." Lecture is limited to introductions of new topics. The required text presents the concepts in an excellent manner, making formal lecture less necessary. Be prepared to put your share of the 100-plus assigned homework problems on the board and to explain to the professor and the class how you solved them.

Required Text and Materials

Vector Mechanics for Engineers – Statics and Dynamics, 9th edition by Johnston, Mazurek, Cornwell, and Eisenberg. There is a "Statics-only" edition of this text, which is sufficient for this course. Students who will take both Statics and Dynamics are encouraged to buy the combined edition. Also, a scientific pocket calculator will be needed.

Grading

Class participation (defined as putting problems on the board and explaining them) comprises 20% of the course grade. There will be six unit tests, and all count equally as 70% of the course grade. Because of the nature and length of some of the problems, all tests are take-home tests. Graded homework comprises the remaining 10%.

Scale:

Grade	Final Average
A	90–100
B	80–89
C	70–79
D	60–69
F	0–59

Makeup Tests

Because all tests are take-home, makeup tests should not be an issue. But in extraordinary circumstances, something will be arranged.

Absences

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

Special Needs

Students who need special accommodations due to learning, physical, psychological, or other disabilities should contact Dr. Buddy Wagner in the Counseling and Career Development Center. He may be reached by phone at 601-925-3354.