



COURSE OUTLINE SPRING 2009

CIV106
Course Number

Mechanics
Course Title

3
Credits

3/0
Lecture/Laboratory Hours

COURSE DESCRIPTION

Introduction to the basic principles of engineering mechanics, including terminology and types of force systems, for engineering technology students. Topics include the resultant force of a force system, distributed and concentrated forces, force systems in equilibrium, trusses, frames and machines, friction, centroids, and moments of inertia.

Text (s): **Reference Division Booklist**

Prerequisites: **MAT115 or MAT110 or divisional permission**

Course Coordinator: John Santosuosso

Latest Review: 2009

I. GENERAL OBJECTIVES:

1. To introduce the technology student to the principles of engineering mechanics.
2. To understand basic engineering mechanics terminology.
3. To recognize various types of static problems.
4. To solve problems in a well organized and logical manner.
5. To understand the relationship of statics to the study of advanced topics in civil and mechanical engineering technology.
6. To prepare the student for future courses such as Structural Design, Machine Design and Mechanics of Materials.

UNIT I (3 Weeks): TERMINOLOGY, TYPES OF FORCE SYSTEMS, AND RESULTANTS OF COPLANAR FORCE SYSTEMS

The student must be able to:

1. Compute the rectangular components of a force and give their direction.
2. Identify and/or list the different types of force systems.
3. Define “resultant”.
4. Solve algebraically for the resultant of collinear or concurrent-coplanar force systems.
5. Define “moment” and differentiate between clockwise and counterclockwise moment.
6. Calculate the moment about any given point for a group of coplanar forces and/or moments.
7. Solve algebraically for the resultant of a non-concurrent coplanar force.
8. Solve algebraically for the resultant of a parallel-coplanar force system.

UNIT II (2 1/2 Weeks): FREE BODY DIAGRAMS, EQUILIBRIUM, REACTIONS

The student must be able to:

1. Draw free body diagrams of coplanar force systems considering gravity, pins, rollers, smooth surface, fixed ends, bearings, flexible cable and ball and sockets.
2. Solve for the forces and reactions in statically determinate concurrent coplanar force systems using the equations of equilibrium.
3. Solve for the reactions in statically determinate non-concurrent coplanar force systems using the equations of equilibrium.

UNIT III (2 1/2 Weeks): TRUSS ANALYSIS

The student must be able to compute the unknown tensile and compressive values of loads in truss members using the “Method of Joints” or the “Method of Sections”.

UNIT IV (2 Weeks): FRAMES AND MACHINES

The student must be able to compute the forces and reactions at various locations in moderately complex frames and machines.

UNIT V (2 ½ Weeks): CENTROIDS, MOMENTS OF INERTIA

1. Solve for the centroid of composite geometric and structural sections.
2. Solve for the moment of inertia of composite geometric and structural sections about any vertical or horizontal axis using the “parallel axis theorem”.

UNIT VI (1 ½ Weeks): FRICTION

The student must be able to:

1. Define: friction, friction force, static friction, kinetic friction, normal force, coefficient of static friction, angle of friction, and angle of repose.
2. Calculate the frictional force between two bodies for a given set of conditions.

UNIT VII (1 ½ Weeks): PRINCIPLES OF KINEMATICS (OPTIONAL TOPIC)

The student must be able to:

1. Define: kinematics, kinetics, rectilinear motion, curvilinear motion, rotation, plane motion, displacement, linear velocity, angular velocity, speed centrifugal force.
2. Solve basic problems using the equations of rectilinear motion and curvilinear motion.

This final unit on the “Principles of Kinematics” is optional, and will be included only if time permits.

II. REVIEW OF SEMESTER OBJECTIVES

Time: 1/2 Week

III. EVALUATION

Quizzes and Homework	10 - 15%
3 Tests	55 - 60%
Final Exam	25%
Attendance, Interest, and Oral Presentations	5 - 10%

Academic Integrity Statement:

Students are expected to comply with the college-wide requirements for academic integrity. Mercer County Community College is committed to Academic Integrity—the honest, fair, and continuing pursuit of knowledge, free from fraud or deception. This implies that students are expected to be responsible for their own work. Presenting another individual’s work as one’s own and receiving excessive help from another individual will qualify as a violation of Academic Integrity. The entire policy on Academic Integrity is located in the Student handbook and is found on the college website (http://www.mccc.edu/admissions_policies_integrity.shtml).

IV. ORAL PRESENTATIONS

Students will be expected to give short presentations before the class involving problem solutions. A neat blackboard sketch with an organized solution and full explanation is required.

V. ATTENDANCE

Students are expected to attend all classes unless excused by the instructor. Unexcused absences in excess of two (2) classes during the day session or one (1) class during the evening session, without a valid excuse, will result in a reduction of the average in calculating the final grade. Perfect attendance will result in an increase in the final average.

Students are expected to earn a minimum grade of “C” in order to enroll in the succeeding course CIV229 - Mechanics of Materials.

Special Needs

Any student in this class who has special needs because of a disability is entitled to receive accommodations. Eligible students at Mercer County Community College are assured services under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973. If you believe you are eligible for services, please contact Arlene Stinson, the Director of Academic Support Services. Ms. Stinson’s office is LB216, and she can be reached at (609) 570-3525.