COURSE OUTLINE SPRING 2009

CIV104	Applied Mechanics
Course Number	**Course Title**
3	**3/0**
Credits	**Lecture/Laboratory Hours**

COURSE DESCRIPTION

Introduction to the basic principles of engineering mechanics for study of applied technology. Topics include terminology, types of force systems, determination of the resultant force of force systems, analysis of coplanar force systems in equilibrium, centroids, and moments of inertia and friction.

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

Prerequisites: **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 architectural technology.
6. To prepare the student for future courses in Mechanics and Materials Fundamentals, Structural Steel Design and Drafting.

II. SPECIFIC OBJECTIVES

UNIT I (3 Weeks): TERMINOLOGY, TYPES OF FORCE SYSTEMS, 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 ½ 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 ½ Weeks): TRUSS ANALYSIS

The student should 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".

Note: Since this course is frequently instructed with CIV 106, students will not be tested on this unit. However, students are responsible for lectures, homework assignments and quizzes.

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

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, angle of repose.
2. Calculate the frictional force between two bodies for a given set of conditions.

III. METHOD OF PRESENTATION

The lecture-discussion method of instruction is used with transparencies and handouts presented for the more complicated problems. Class participation and homework to ensure that the student is grasping the terminology and basic principles is paramount. Overhead transparencies and handouts are used to complement the lectures.

IV. EVALUATION

Tests will be given which consist of 3 to 5 problems covering the material in a unit. The time limit for each test is approximately 1 hour.

The final exam consists of several problems covering principles learned throughout the semester.

V. 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).

VI. GRADE MAKE-UP

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

VII. REFERENCES

1. Mechanics
   By: John W. Breneman
   Pub: McGraw Hill

2. Elementary Practical Mechanics
   By: J. Jameson
   Pub: J. Wiley & Sons
   Ed: 4th

3. Engineering Mechanics
   By: A. Higdon & W. Stiles
   Pub: Prentice-Hall

4. Plane Trigonometry
   By: Niles
   Pub: J. Wiley & Sons

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.