**ATLANTIC CAPE COMMUNITY COLLEGE**

**AERG201 Statics**

**COURSE DESCRIPTION:**

An introduction to the concepts and characteristics of forces and couples. Topics include but are not limited to distributed forces, center of mass, equilibrium of particles and rigid bodies. Additional topics include trusses and frames, internal forces, shear, moment distribution in beams and area moments of inertia.

*Prerequisites:* Must have a grade of C or better in MATH156 or PHYS225

*Credits:3*

**COURSE TEXT:**

*Bedford & Fowler Engineering Mechanics, Statics and Statics Study Guide*  (Fifth Edition), Addison Wesley, Pearson Educational Limited. ISBN: 020140340-4

*Schiavone, P. (2010). Statics Study Pack. Princeton Hall, Upper Saddle, NJ ISBN: 0136091830*

**INTENDED COURSE OUTCOMES:**

Upon successful completion of this course students will be able to

1. Analyze static equilibrium problems in a logical manner
2. Solve static equilibrium problems in a logical manner

**COURSE GOALS AND OBJECTIVES**:

1. **Students will be able to perform basic vector operations using Cartesian vector notation:** 
   1. Define Cartesian vector notation
   2. Utilize addition
   3. Utilize subtraction
   4. Utilize multiplication by a scalar
   5. Utilize dot product
   6. Utilize cross product
   7. Utilize scalar triple product
2. **Students will perform various calculations**
   1. Calculate force resultants
   2. Calculate position vectors
   3. Calculate moments of forces
   4. Calculate couples about points and lines
3. **Students will learn about reduction of forces**
   1. Reduce an arbitrary system of forces and couples to a single force and couple
   2. Calculate the force resultant of a distributed loading
4. **Students will learn to draw two and three dimensional diagrams**
   1. Draw a two dimensional free body diagrams of particles
   2. Draw a three dimensional free body diagram of particles
   3. Draw a two dimensional free body diagram of a rigid body
   4. Draw a three dimensional free body diagram of a rigid body
5. **Students will learn to use equations to solve statics problems.**
   1. Solve the equations of equilibrium of particles and rigid bodies in two dimensions
   2. Solve the equations of equilibrium of particles and rigid bodies in three dimensions
6. **Students will learn to calculate internal member loads**
   1. Define internal member load
   2. Calculate the internal member loads in two dimensional truss
   3. Calculate the internal member loads in three dimensional truss
   4. Calculate the internal member loads in plane frames and simple machines
7. **Students will learn about shear and bending moment and their significance in engineering**
   1. Define shear
   2. Define bending moment
   3. Calculate the internal shear and bending moment distribution in beams
   4. Calculate the internal bending moment distribution in beams
   5. Draw beam internal shear and bending moment diagrams
8. **Students will learn about center of mass and centroids**
   1. Define center of mass
   2. Define centroids
   3. Calculate centers of mass and centroids of area using integration and the method of composite parts
   4. Calculate centroids of area using integration and the method of composite parts
9. **Students will learn about inertia**
   1. Define inertia
   2. Calculate the three components of the area moment of inertia tensor using integration or the method of composite parts
   3. Transform the area moments and products of inertia using the parallel axis theorem

**GRADING:**

Progress Exams (3) 45%   
Homework 15%   
Quizzes 15%   
Final Exam 25%

Total 100%

Final grade scores will be based on a scale of:

90%< A <100% Grade A   
80%< B< 89% Grade B   
72% < C< 79% Grade C   
68%<D< 71% Grade D   
Below 68% F

**ASSIGNMENTS:**

**Homework**

Homework assignments come from the book and workbook. They will be assigned at the start of each week and it is expected that you submit your work at the beginning of each class.

**Quizzes**

Quizzes are scheduled throughout the semester, and the quiz dates are marked with a Q on the class schedule. Quizzes are closed book and notes.

**Examinations**

There will be three closed book examinations and a final examination. Most of the questions will involve problems that will require the use of a hand calculator (bring your own - you will not be able to borrow from another student). You can only use a non-programmable calculator for exams or quizzes. The examinations will cover required course reading, lecture content, and homework problems.