Miami Dade College

Course Competencies Template - Form 112

| GENERAL INFORMATION | |
|---|---|
| Name: Mark Mawlawi | Phone #: 305-237-7532 |
| Course Prefix/Number: EGS2321 | Course Title: Engineering Mechanics - Dynamics |
| Number of Credits: 4 | |
| Degree Type | ☐ B.A. ☐ B.S. ☐ B.A.S **x** A.A. ☐ A.S. ☐ A.A.S. ☐ C.C.C. ☐ A.T.C. ☐ V.C.C |
| Date Submitted/Revised: 02-23-2007 | Effective Year/Term: 2007-1 |
| **x** New Course Competency ☐ Revised Course Competency | |
| Course Description (limit to 50 words or less, **must correspond with course description on Form 102**): This course provides students with the skills they need to analyze and solve problems involving bodies in motion through the application of vector mechanics and Newton's laws. Students will learn kinematics, kinetics, energy of particles, rigid bodies in 2-D and 3-D motion, and vibrations. Laboratory fee. Pre-requisite: EGS2311. (3 hr lecture, 2 hr lab) | |
| Prerequisite(s): EGS 2311 | Corequisite(s): None |

**Course Competencies:** (for further instruction/guidelines go to: http://www.mdc.edu/asa/curriculum.asp)

Competency 1: The student will demonstrate an understanding of kinematics by:

1. Defining kinematics.
2. Distinguishing between rectilinear and curvilinear motion.
3. Explaining the concepts of position, position vector, velocity and acceleration as they are applied to rectilinear and curvilinear motion.
4. Defining and solving problems of uniform rectilinear & uniformly accelerated rectilinear motion.
5. Defining & resolving tangential, normal, radial and transverse components of curvilinear motion.

Competency 2: The student will demonstrate an understanding of kinetics by:

1. Defining kinetics.
2. Applying Newton's laws to develop kinetic formulation.
3. Applying the concept of dynamic equilibrium to objects in translational or rotational motion.
4. Applying Kepler's law to planetary motion.
5. Performing kinetic analysis of rectilinear motion.
6. Performing kinetic analysis of curvilinear motion.

Competency 3: The student will be able to solve kinetics problems involving impulse and momentum by:

1. Describing impulsive motion.
2. Applying the principle of conservation of momentum.
3. Applying the concept of angular momentum.
4. Extending the concept of impulse and momentum to a system of particles.

Competency 4: The student will demonstrate the knowledge of work and energy in kinetics by:

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Approved By Academic Dean Date: _____ Reviewed By Director of Academic Programs Date: _____

1. Finding work done by a force.
2. Applying the principle of conservation work and energy.
3. Explaining the convertibility of work and energy.
4. Evaluating power requirements.
5. Defining and evaluating efficiency.
6. Extending the principle of conservation work and energy to systems of particles.

Competency 5: The student will demonstrate an understanding of how to apply the knowledge of kinetics of particles to rigid bodies in two dimensions (2-D) and three dimensions (3-D) by:

1. Applying D'Alembert's principle to plane motion of rigid body.
2. Solving problems of plane motion (2-D) of a rigid body.
3. Solving problems of constrained plane motion.
4. Solving problems of rotation of a 3-D body about a fixed axis.
5. Solving impulse and momentum problems of rigid bodies.
6. Solving work and energy problems of rigid bodies.

Competency 6: The student will demonstrate an understanding of how to apply the knowledge of kinematics of particles to rigid bodies in 2-D and 3D by:

1. Solving problems of translation and rotation in plane motion (2-D) of a rigid body.
2. Ascertaining linear and angular velocities and accelerations of a rigid body.
3. Solving problems of absolute and relative velocity and acceleration in plane motion (2-D) of a rigid body.
4. Finding instantaneous center of rotation in plane motion.
5. Generalizing the 2-D motion analysis concepts to 3-D motion analysis.

Competency 7: The student will demonstrate knowledge of the mechanics of vibration by:

1. Defining free vibration motion without damping.
2. Solving problems of simple harmonic motion.
3. Extending the principles and formulation of free vibrations to rigid bodies.
4. Explaining and solving problems of forced vibrations.
5. Explaining the difference between damped and undamped free vibration.
6. Explaining the difference between damped and undamped forced vibration.