



- B. This course has no lab component.
- C. This course generally transfers as a requirement of engineering programs.

#### **IV. Place of Course in College Curriculum**

- A. This course is a Free Elective.
- B. This course meets a program requirement for the Engineering Science AS degree.
- C. To see course transferability: a) for New Jersey schools, go to the NJ Transfer website, [www.njtransfer.org](http://www.njtransfer.org); b) for all other colleges and universities, go to the individual websites.

#### **V. Outline of Course Content**

- A. Kinematics of particles: Rectilinear motion - Uniformly accelerated motion – Curvilinear motion - Tangential and normal components. Kinetics of particles: Newton's second law - Equations of motion.
- B. Kinetics of particles: Energy and momentum methods - Work and kinetic energy - Conservation of energy - Impulsive motion - Impact.
- C. System of particles: Motion of system of particles - Energy and momentum methods for systems of particles.
- D. Kinematics of rigid bodies: Translation and rotation about fixed axis – Velocities in general plane motion - Instantaneous center of rotation.
- E. General plane motion of rigid bodies: Forces and acceleration method – General plane motion of rigid bodies – Constrained general plane motion.
- F. Plane motion of rigid bodies: Energy and momentum method - Work and energy - Impulse and momentum methods - Conservation of angular momentum - Impulsive motion - Eccentric impact.

#### **VI. General Education and Course Learning Outcomes**

##### **A. General Education Learning Outcomes:**

**At the completion of the course, students will be able to:**

1. Analyze text and interpret problem data. (GE-NJ 2)
2. Compose hypotheses and apply problem solving strategies. (GE-NJ 2, GE-NJ 3)

##### **B. Course Learning Outcomes:**

**At the completion of the course, students will be able to:**

1. Apply the method of Work and Energy.
2. Solve a problem with the method of Impulse and Momentum.
3. Evaluate the Instantaneous Center of Rotation.
4. Calculate the General Plane Motion.

### **C. Assessment Instruments**

The following assessment methods may be used:

1. Quizzes
2. Exams
3. Homework

### **VII. Grade Determinants**

Factors that may enter into the determination of the final grade

- A. Quizzes
- B. Chapter Exams
- C. Homework
- D. Final Cumulative Exam

Primary formats, modes, and methods for teaching and learning that may be used in the course:

- A. lecture/discussion
- B. small-group work
- C. student collaboration
- D. independent study

### **VIII. Texts and Materials**

The following types of course materials will be used.

Suggested textbooks:

- “Vector Mechanics for Engineers – Dynamics”, F.P. Beer & E.R. Johnston, Jr., McGraw Hill, most recent edition
- “700 Solved Problems In Vector Mechanics for Engineers”, Vol. II: Dynamics, J.F. Shelley, McGraw Hill.

Please Note: The course outline is intended only as a guide to course content and resources. Do not purchase textbooks based on this outline. The RVCC Bookstore is the sole resource for the most up-to-date information about textbooks.

### **IX. Resources**

No other type of resources are needed

### **X. Honors Option**

Not applicable.