JAMESTOWN COMMUNITY COLLEGE
State University of New York

INSTITUTIONAL COURSE SYLLABUS

Course Title: Mechanics-Dynamics

Course Abbreviation and Number: ENR 2560 **Credit Hours:** 3 **Course Type:** Lecture

Course Description: Students will study time derivatives of vectors using Cartesian, cylindrical, and path coordinates. The dynamics of a particle from a single frame of reference including rectilinear and central force problems are stressed. Other topics are conservation of energy and momentum as applied to dynamic problems. Rigid body rotations and Coriolis acceleration are studied in detail.

Prerequisite: ENR 2550; Prerequisite/Corequisite: MAT 2680.

Student Learning Outcomes:

Students who demonstrate understanding can:

1. Determine displacement, velocity, and acceleration of particles undergoing straight line motion.
2. Apply motion equations to solve trajectory problems in two and three dimensions.
3. Determine relative displacement, velocity, and acceleration between two objects in motion.
4. Determine angular components of motion including angular displacement, angular velocity, and angular acceleration.
5. Determine relationships between angular and linear motion including displacement, velocity, and normal and tangential accelerations.
6. Determine velocities and accelerations of typical engineering applications such as wheels and link mechanisms.
7. Calculate forces, accelerations, and velocities in machine elements based on inertia methods and work-energy methods.

Topics Covered:

- Kinematics of Particles
- Position Velocity and Acceleration
- Rectilinear Motion
- Curvilinear Motion – Cylindrical and Path Variables
- Kinetics of Particles
- Newton's Laws
- Energy Methods
- Impulse and Momentum
- Systems of Particles
- Kinematics of Rigid Bodies
- Translation, Rotation, General Plane Motion
- Instantaneous Center of Rotation
- Rotating Frame of Reference
- Plane Motion of Rigid Bodies Forces and Accelerations
- Plane Motion of Rigid Bodies Energy and Momentum

Information for Students

- Expectations of Students
  - Civility Statement
  - Student Responsibility Statement
  - Academic Integrity Statement
- Accessibility Services
  Students who require accommodations to complete the requirements and expectations of this course because of a disability must make their accommodation requests to the Accessibility Services Coordinator.
- Get Help: JCC & Community Resources
- Emergency Closing Procedures
- Course grade is determined by the instructor based on a combination of factors, including but not limited to, homework, quizzes, exams, projects, and participation. Final course grade can be translated into a grade point value according to the following:

A=4.0	B+=3.5	B=3	C+=2.5	C=2	D+=1.5	D=1	F=0

- Veterans and active duty military personnel with special circumstances (e.g., upcoming deployments, drill requirements, VA appointments) are welcome and encouraged to communicate these to the instructor.

Effective Date: Fall 2021