ROCHESTER COMMUNITY AND TECHNICAL COLLEGE

COMMON COURSE OUTLINE

Course discipline/number/title: ENGR 2212: Dynamics

A. CATALOG DESCRIPTION
1. Credits: 3
2. Hours/Week: 3 Lecture
3. Prerequisites (Course discipline/number): ENGR 2211, MATH 1128
4. Other requirements: None
5. MnTC Goals (if any): NA

B. COURSE DESCRIPTION: This course is the study of rigid body dynamics in fixed and rotating systems, including the analysis of systems moving with linear accelerations and/or angular accelerations to determine the reaction forces and moments of force acting on the various components of the system. The time dependent analysis of vibrating/rotating systems is studied. Extensive use is made of vector analysis and calculus.

C. DATE LAST REVISED (Month, year): February, 2025

D. OUTLINE OF MAJOR CONTENT AREAS:
1. Fundamentals
   a) Kinematics of a particle
   b) Coordinate systems
2. Forces
   a) Newton's second law
   b) Equations of motion
   c) Kinetics of systems of particles
3. Energy
   a) Work and energy
   b) Potential and kinetic energy
   c) Conservation of energy
4. Momentum
   a) Impulse
   b) Linear momentum
   c) Angular momentum
5. Rigid body dynamics
   a) Rigid body kinematics
   b) Planar kinetics
   c) Rigid bodies in three dimensions
6. Mechanical Vibrations

E. LEARNING OUTCOMES (GENERAL): The student will be able to:
1. Analyze a mechanical system to determine the reactionary forces and moments of force of the components of the mechanical system as it is accelerated.
2. Apply three dimensional vectors and calculus to accelerating systems.
3. Analyze complex problems using multiple techniques.

F. LEARNING OUTCOMES (MNTC): NA

G. METHODS FOR EVALUATION OF STUDENT LEARNING: Methods may include but are not limited to:
1. Objective exams
2. Lab exams
3. Research papers
4. Quizzes
5. Written homework
6. Online homework
7. Small group projects
8. Oral presentations

G. METHODS FOR EVALUATION OF STUDENT LEARNING: Methods may include but are not limited to: Continued. . .

9. Laboratory reports

H. RCTC CORE OUTCOME(S). This course contributes to meeting the following RCTC Core Outcome(s): Critical Thinking. Students will think systematically and explore information thoroughly before accepting or formulating a position or conclusion.

I. SPECIAL INFORMATION (if any):

1. Scientific calculator or equivalent is required.