ENGR 2102: Dynamics

A. COURSE DESCRIPTION

Credits: 3
Lecture Hours/Week: 3
Lab Hours/Week: 0
OJT Hours/Week: *.*

Prerequisites:
This course requires the following prerequisite
   ENGR 2101 - Statics (Number of Years Valid: 5)

Corequisites: None
MnTC Goals: None

This course explores the dynamics of particles and rigid bodies for rectilinear translation, curvilinear motion, rotation, plane motion, and mechanical vibrations. Students will learn how to apply Newtonian physics to relatively simple physical situations as well as principles of work and energy, impulse, and momentum.

B. COURSE EFFECTIVE DATES: 04/29/2024 - Present

C. OUTLINE OF MAJOR CONTENT AREAS

1. Compute kinematics of a particle
2. Analyze kinetics of a particle: force and acceleration
3. Analyze kinetics of a particle: work and energy
4. Analyze kinetics of a particle: impulse and momentum
5. Describe planar kinematics of a rigid body
6. Analyze kinetics of a rigid body: force and acceleration
7. Analyze kinetics of a rigid body: work and energy
8. Analyze kinetics of a rigid body: impulse and momentum
9. Discuss vibrations

D. LEARNING OUTCOMES (General)

1. Compute the kinematic vectors of a particle using fixed, rotating, and moving coordinates.
2. Analyze the acceleration of, and forces acting on, a particle and a rigid body using equations.
3. Analyze the energy at any state and the change in energy between states for systems of particles and a rigid body.
4. Use the equations of motion to describe the rate of change of the linear momentum of a system of particles and a rigid body.
5. Analyze and recognize free undamped and damped vibrations.

E. Minnesota Transfer Curriculum Goal Area(s) and Competencies

None
F. LEARNER OUTCOMES ASSESSMENT
   As noted on course syllabus

G. SPECIAL INFORMATION
   None noted