

MET-2620: DYNAMICS

Cuyahoga Community College

Viewing: MET-2620 : Dynamics

Board of Trustees:

January 2023

Academic Term:

Fall 2023

Subject Code

MET - Mech Eng/Manuf Ind Eng Tech

Course Number:

2620

Title:

Dynamics

Catalog Description:

Covers mechanics of forces and torques and the effects on motion. Emphasis on kinematics of particles and rigid bodies, Newton's Laws of Motion, Work and Kinetic Energy, Kinetics of rigid bodies, and 3D dynamics of rigid bodies. Also includes vibration and time response.

Credit Hour(s):

3

Lecture Hour(s):

3

Requisites

Prerequisite and Corequisite

MET-2610 Statics.

Outcomes

Course Outcome(s):

Apply appropriate calculations to problems to show an understanding and nature of kinematics of particles and rigid bodies.

Objective(s):

1. Solve for velocity and acceleration of linear motion.
2. Solve for velocity and acceleration in curvilinear motion.

Course Outcome(s):

Apply appropriate calculations to show an understanding of Newton's Laws of Motion.

Objective(s):

1. Draw Free Body Diagrams and Inertia or Momentum and Impulse Diagrams.
2. Explain linear and angular momentum.

Course Outcome(s):

Apply appropriate calculations to problems to show an understanding and nature of kinetics of rigid bodies.

Objective(s):

1. Solve for forces and torque for rigid bodies.
2. Solve for acceleration.

Course Outcome(s):

Apply appropriate calculations to problems to show an understanding of work and kinetic energy.

Objective(s):

1. Explain conservation of energy.
2. Solve for motion using work and energy techniques.

Course Outcome(s):

Apply appropriate calculations to show an understanding of 3D dynamics of rigid bodies.

Objective(s):

1. Solve for forces and acceleration in 3D.
2. Calculate torque and acceleration for angular momentum in 3D.

Course Outcome(s):

Apply appropriate calculations to show an understanding of vibration and time response.

Objective(s):

1. Calculate the vibration frequency and time-behavior of an unforced spring-mass-damper system.
2. Calculate the period of vibration for a pendulum.

Methods of Evaluation:

- a. Assignments and projects
- b. Quizzes and/or midterm examination
- c. Final examination

Course Content Outline:

- a. Kinematics
 - i. Particle
 - ii. Rigid Body
- b. Kinetics of a Particle
 - i. Force and Acceleration
 - ii. Work and Energy
 - iii. Impulse and Momentum
- c. Kinetics of a Rigid Body
 - i. Force and Acceleration
 - ii. Work and Energy
 - iii. Impulse and Momentum
- d. Three-Dimensional Dynamics
 - i. Kinematics
 - ii. Kinetics
 - iii. Vibrations

Resources

Beer, Johnston, and Cornwell. *Vector Mechanics for Engineers: Dynamics*. 12th. McGraw-Hill, 2019.

Hibbler, Russel. *Engineering Mechanics: Statics & Dynamics*. 15th. Pearson, 2022.

Plesha, Michael, Gary Gray, Robert J. Witt, and Francesco Costanzo. *Engineering Mechanics: Statics and Dynaics*. 3rd ed. McGraw Hill, 2023.

Physics. *Khan Academy*. Retrieved October 21, 2014, from =. {ts '2014-10-21 00:00:00'}.

Statics Dynamics: Foundations in Engineering. *Coursera*. =. {ts '2014-10-21 00:00:00'}.

Meriam, James L., L.G. Kraig, and I.N. Bolton. *Engineering Mechanics: Dynamics*. Wiley, 2018.

Resources Other

None

Instructional Services

OAN Number:

Transfer Assurance Guide OES003

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