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Department of Mechanical Engineering	
Dynamics (67210)	
Total Credits	**3**
major compulsory	
Prerequisites	P1 : Statics (61110) OR Statics (67211) OR Statics (61210)

Course Contents

Kinematics of particles, two and introduction to three dimensional dynamics of rigid bodies. Force and acceleration, work and energy, impulse and momentum. Introduction to vibrations.

	Intended Learning Outcomes (ILO's)	Student Outcomes (SO's)	Contribution
1	Apply knowledge in kinematics of particles and rigid bodies.	A	45 %
2	Apply knowledge in kinetics of a rigid body using the second law of motion.	A	20 %
3	Ability in solving work and energy problems related kinetics of a rigid body in planar motion.	E	10 %
4	Ability in formulating impulse and momentum in solving planar motion problems of rigid bodies.	E	10 %
5	Ability in deriving and solving equations of motion for free and forced vibrations of bodies with single degree of freedom	E	15 %

Textbook and/ or Refrences

R. C. Hibbeler, Engineering Mechanics, Dynamics, 12th Edition in SI Units, Pearson Education, 2010 J. L. Meriam, L. G. Kraige, Engineering Mechanics, Dynamics, 4th edition, SI Version, John Wiley, 1998 I. H. Shames, Engineering Mechanics, Dynamics, 4th edition, Prentice Hall, 1997.

Assessment Criteria	Percent (%)
First Exam	20 %
Second Exam	20 %
Quizzes	10 %
Final Exam	50 %

Course Plan

Week	Topic
1	Kinematics of a Particle: Introduction Rectilinear Kinematics General Curvilinear Motion
2	Kinematics of a Particle: Curvilinear Motion: Rectangular Components Motion of Projectile Curvilinear Motion: Normal and Tangential Components
3	Kinematics of a Particle: Curvilinear Motion: Cylindrical Components Absolute Dependent Motion Analysis of Two Particles Relative-Motion Analysis of Two Particles Using Translating Axes
4	Planar Kinematics of a Rigid Body Rigid-body Motion Translation Rotation about a Fixed Axis Absolute Motion Analysis Relative-Motion Analysis: Velocity Instantaneous Center of Zero Velocity Relative-Motion Analysis: Acceleration Relative-Motion Analysis using Rotating Axes Exam I (up to end of week 5)
5	Planar Kinematics of a Rigid Body Rigid-body Motion Translation Rotation about a Fixed Axis Absolute Motion Analysis Relative-Motion Analysis: Velocity Instantaneous Center of Zero Velocity Relative-Motion Analysis: Acceleration Relative-Motion Analysis using Rotating Axes Exam I (up to end of week 5)

6	Planar Kinematics of a Rigid Body Rigid-body Motion Translation Rotation about a Fixed Axis Absolute Motion Analysis Relative-Motion Analysis: Velocity Instantaneous Center of Zero Velocity Relative-Motion Analysis: Acceleration Relative-Motion Analysis using Rotating Axes Exam I (up to end of week 5)
7	Planar Kinetics of a Rigid Body: Force and Acceleration Moment of Inertia Planar Kinetic Equations of Motion Equations of Motion: Translation Equations of Motion: Rotation about a Fixed Axis Equations of Motion: General Plane Motion
8	Planar Kinetics of a Rigid Body: Force and Acceleration Moment of Inertia Planar Kinetic Equations of Motion Equations of Motion: Translation Equations of Motion: Rotation about a Fixed Axis Equations of Motion: General Plane Motion
9	Planar Kinetics of a Rigid Body: Work and Energy Kinetic Energy The Work of a Force The Work of a Couple Principle of Work and Energy Conservation of Energy
10	Planar Kinetics of a Rigid Body: Work and Energy Kinetic Energy The Work of a Force The Work of a Couple Principle of Work and Energy Conservation of Energy
11	Planar Kinetics of a Rigid Body: Impulse and Momentum Linear and Angular Momentum Principle of Impulse and momentum Conservation of Momentum Eccentric Impact Exam II (up to end of week 11)
12	Planar Kinetics of a Rigid Body: Impulse and Momentum Linear and Angular Momentum Principle of Impulse and momentum Conservation of Momentum Eccentric Impact Exam II (up to end of week 11)
13	Vibrations Undamped Free and Forced Vibration Energy Methods Viscous Damped Free and Forced Vibration Electrical Circuit Analogs
14	Vibrations Undamped Free and Forced Vibration Energy Methods Viscous Damped Free and Forced Vibration Electrical Circuit Analogs
15	Vibrations Undamped Free and Forced Vibration Energy Methods Viscous Damped Free and Forced Vibration Electrical Circuit Analogs
16	Review, Final Exam