ME 212: Dynamics

This is a cooperative course taught jointly by WSU and the University of Idaho.

Course description: Kinematics and kinetics of particles and rigid bodies; introduction to mechanical vibration.

Number of credits: 3. This course is required.

Course Coordinator: L.V. Smith

Prerequisites by course: Math 172 with a grade of C or better; CE 211 with a grade of C or better

Prerequisites by topic:

1. Differentiation
2. Integration
3. Newton's second law
4. Basic vector analyses

Postrequisites: ME 303 Fluid Mechanics and ME 348 Dynamics Systems

Textbooks/other required materials: R.C. Hibbeler. *Engineering Mechanics:* Dynamics, 14/e.

Course objectives:

1. Develop basic concept of Newton's law, dimensions, and units.
2. Determine the kinematics of particles in various coordinate systems.
3. Application of Newton's law, work-energy relation and impulse-momentum principle to determine the kinetics of particles.
4. Determine the plane translation and rotation of rigid bodies in various coordinates.
5. Description of the kinetics of rigid bodies in plane motion via Newton's second law, energy relations, and the impulse-momentum principle.

Topics covered:

1. Rectilinear motion.
2. Curvilinear motion in rectangular coordinates.
3. Coordinates: path and cylindrical.
4. Kinetics.
5. Newton's second law.
6. Angular momentum.
7. Work-energy methods.
8. Impulse and momentum.
9. Impact.
10. Systems of particles.
11. Plane motion: kinematics, kinetics, energy methods, and impulse-momentum.

Expected learning outcomes:

1. Describe the kinematic and kinetic behavior of a single particle by applying the Newton's law, energy conservation and impulse-momentum relations.
2. Describe the kinematic and kinetic behavior of systems of particles by applying the Newton's law, energy conservation and impulse-momentum relations.
3. Analyze the plane motion and kinetics of rigid bodies using the Newton's law and moment equation, work-energy equation and impulse-momentum relations.

Class schedule: Three 50-minute lecture sessions per week, for one semester.

Laboratory schedule: None

Contribution to meeting the professional component: Engineering Topics

Relationship of course to student outcomes:
3 strongly supported; 2 supported; 1 minimally supported

Student Outcomes Pre-Fall 2018 (ABET EC2000)

a	b	c	d	e	f	g	h	i	j	k
2										

Student Outcomes Fall 2018 forward (ABET EC2019)

1	2	3	4	5	6	7
2						

Prepared by: Andrea Butcherite and L.V. Smith *Date:* May 30, 2018