

## **Department of Engineering Technology ET-241**

**Course Number and Name:** ET 241, Applied Dynamics

### **Credits & Contact Hours**

<b>Credits</b>	<b>Lectures</b>	<b>Lab</b>	<b>Semester Contact Hours</b>
3.0	(3) 50 min lectures per week	None	45

**Instructors Name:** Manuel Gomez

**Textbook title,** *Engineering Mechanics Dynamics*, 12<sup>th</sup> edition  
**author and year:** Hibbeler, R.C., 2010

### **Specific Course Information:**

- a. **Course Catalog Description** - Applied kinematic and kinetic planar analysis of particles and rigid bodies, including use of kinematic equations, Newton's Second Law, the work energy method, and the Impulse Momentum Method.
- b. **Prerequisites:** ET 240 (Statics) and Math 235 (Calculus I).
- c. This course is required for ME-ET and CE-ET degrees

### **Course Goals & Objectives:**

Students will gain an understanding of the methods used for solving dynamics (both kinematic and kinetic) problems for particles and rigid bodies. This includes the use of the kinematic equations, equations of motion derived from Newton's Second Law, the Work-Energy method, and Impulse Momentum method.

**Related ABET Objectives & Outcomes:** An ability to select and apply the knowledge, techniques, skills, and modern tools of the discipline, to include the following:

<b>Student Outcomes of Instruction from MET (x.)</b>	<b>Student Outcomes/ Criteria 3</b>
(1.) <b>Algebra, trigonometry</b> , Boolean mathematics, <b>calculus</b> , statistics and probability, <b>fundamental principles and concepts of science and engineering technology, good practice in problem solving, and methods of standard practice in the analysis</b> and applied design of <b>mechanical systems</b> as applied to kinematics and kinetics problems for both, particle and rigid body analysis.	3.a, 3.b, 3.f

Course Topics	Class Hours
Course Introduction	1
<b>Kinematics of a Particle</b>	
Rectilinear Motion	1
Motion of a Projectile	2
Normal Tangential Components	1
Cylindrical Components	1
Dependent Motion	1
Relative Motion	1
<b>Kinetics of a Particle – Newton’s Second Law</b>	
Equations of Motion – Rectangular Components	2
Equations of Motion – Normal and Tangential Components	2
Equations of Motion – Cylindrical Components	2
<b>Kinetics of a Particle – Work and Energy</b>	
Principle of Work and Energy	2
Power and Efficiency	1
Conservation of Energy	1
<b>Kinetics of a Particle – Impulse and Momentum</b>	
Principle of Linear Input and Momentum	2
Impact	2
Angular Momentum	1
<b>Planar Kinematics of a Rigid Body</b>	
Planar Rigid Body Motion - Translation	1
Planar Rigid Body Motion - Rotation	1
Relative Motion: Velocity	1
Instantaneous Center of Zero Velocity	1
Relative Motion: Acceleration	1
<b>Planar Kinetics of a Rigid Body: Force and Acceleration</b>	
Equations of Motion: Translation	1
Equations of Motion: Rotation about a Fixed Axis	1
Equations of Motion: General Plane Motion	1
<b>Planar Kinetics of a Rigid Body: Work and Energy</b>	
Principle of Work and Energy	2
Conservation of Energy	1
Planar Kinetics of a Rigid Body: Impulse and Momentum	1
Principle of Impulse and Momentum	1
Conservation of Momentum	1
<b>Vibrations</b>	
Undamped Free Vibration	2
3 regular class exams and 1 final comp exam	6