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| **Course code** | **Course Title** | **Core/ Elective** |
| 6ES202ME | Engineering Mechanics-II | Core |
| L | T | P/D | Credits | CIE | SEE  |
| 3 | 0 | 0 | 3 | 40 | 60 |
| **Prerequisite:** Engineering Mechanics 1**Course Objectives:** The objective of this course is to make the student* Kinematics of rigid bodies modeled as particles: Rectilinear and curvilinear motion
* Concepts of dynamic equilibrium and applications to problems on dynamic motion of rigid bodies
* Work-energy principle for solving unknown kinematic and dynamic parameters in rigid body motion.
* Impulse and Momentum principle to solve problems involving collisions
* Concepts of simple harmonic motion and mechanical vibration
* Concepts of simple harmonic motion and mechanical vibration

**Course Outcomes:** After completion of the course, the student will be able to* **CO1.Solve** for the kinematic parameters of rectilinear and curvilinear translations of rigid bodies modeled as particles
* **CO2.Solve** for the unknown forces and kinetic parameters for particles and connected bodies using dynamic equilibrium equations
* **CO3.Apply** the work-energy principle for solving problems on dynamics for particles and connected bodies
* **CO4.Apply** the linear impulse momentum principle for the problems involving impact and collisions of rigid bodies
* **CO5.Formulate** dynamic equations and **solve** for unknown parameters in simple harmonic motion of solid bodies
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| **Unit-I:** **Kinematics:** Equations of motion for Rectilinear & Rotational Bodies with uniform acceleration, Application on Projectiles - Path, Range, Max Height & Time of Flight. Centripetal, Tangential & Angular Accelerations. Motion Analysis of Non Uniform Motion using Derivatives of Displacement.**Unit-II:** **Kinetics:** Laws of Motion, D’ Alembert’s Principle, Applications on Bodies involving Inertia & Centrifugal Forces, Angle of Banking. **Unit-III:** **Work, Power & Energy:** Work done by a Force & Torque, Potential Energy, Kinetic Energy**,** Translating & Rotating Bodies. Work-Energy Relation & its application on Connected Systems of Translating & Rotating Objects. Power in Mechanical, Hydraulic & Electrical Systems.**Unit-IV:** **Virtual Work:** Introduction, Application in Single & Connected System of Bodies.**Impulse-Momentum:** Introduction, Impulse-Momentum relation & application on Connected System of Bodies, Principle of Conservation of Momentum and its Applications. Types of Impacts, Coefficient of Restitution.**Unit-V:** **Mechanical Vibrations:** Introduction to Free, Forced & Damped Vibrations, Simple Harmonic Motion, Amplitude, Time Period, Frequency, Equivalent Stiffness for different configurations, Applications on Spring & Simple Pendulum. |
| **Text Books**1. Engineering Mechanics S.S. Bhavikatti et al, New Age International Publishers, 2017
2. Engineering Mechanics - Statics and Dynamics, by N H Dubey, McGraw Hill Education, 2017

**References** 1. Engineering Mechanics (In SI Units), by S.P. Timoshenko, D.H. Young, J.V. Rao, Sukumar Pati, McGraw Hill International, 5th edition, 2017
2. Singer's Engineering Mechanics Statics and Dynamics, by K. Vijay Kumar Reddy and J. Suresh Kumar, B.S. Publishers, 2011
3. Engineering Mechanics Statics and Dynamics, A. K. Tayal, 14th Edition, Umesh Publishers, 2010.
4. Engineering Mechanics: Principles of Statics and Dynamics, R. C. Hibbler, Pearson Education; Fourteenth edition, 2017
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