



# RAGATI ENGINEERING COLLEGE

(Autonomous)

1-378, ADB Road, Surampalem – 533 437, Near Peddapuram, E.G. Dist., (A.P.)

(Approved by AICTE, New Delhi & Permanently Affiliated to JNTUK & Accredited by NAAC with A)

## COURSE SYLLABUS INCLUDING COURSE STRUCTURE ENGINEERING MECHANICS

Sub. Code: CE-19ME1T02

Course Type: Theory

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3	0	0	3

Internal Assessment : 40M

Semester End Examination : 60M

Total Mar : 100M

**Prerequisites:** Exposure to Entities like Force, Centroid, Friction and Equations of motion for Linear and Curvilinear paths

### **Course Objectives:**

To make the students aware of:

1. The study of forces and force systems, free body diagrams & equations of equilibrium of coplanar systems and its applications.
2. The study of Trusses, friction and its applications.
3. Centroid, centre of gravity and moments of Inertia of simple and composite figures.
4. To learn various paths of velocity and acceleration computation.
5. To study about work, energy and particle motion for engineering applications.

### **UNIT – I**

**Introduction to Engineering Mechanics:** Basic Concepts of mechanics, System of Forces.

**Resultant System of Forces:** Resultant of Coplanar Concurrent Force System - Moment of a Force, Couple, Varignon's Theorem, Resultant of Coplanar Non-Concurrent Force System.



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**Equilibrium System of Forces:** Equations of Equilibrium of Coplanar Systems, Free Body Diagrams, Lami's Theorem, Equilibrium of Connected Bodies.

## UNIT II

**Friction:** Introduction, types of friction, Coulomb's laws of dry friction, coefficient of friction, cone of friction.

**Trusses:** Introduction, Assumptions and Equilibrium analysis of plane trusses by using method of joints.

## UNIT – III

**Centroid:** Introduction, Centroids of simple and composite sections.

**Centre of Gravity:** Simple bodies and Composite bodies, Pappus Theorem.

**Moment of Inertia:** Definition – Transfer Theorem, Perpendicular Theorem, Polar Moment of Inertia, Moment of Inertia of Simple and Composite Figures, mass moment of inertia of simple bodies.

## UNIT IV

**Kinematics:** D'Alembert's Principle, Rectilinear Motion and curvilinear motion, Motion with Uniform Velocity, Motion with Uniform Acceleration.

**Kinetics:** Analysis as a Particle and Analysis as a Rigid Body in Translation, Equations of Plane Motion – Fixed Axis Rotation.

## UNIT – V

**Work – Energy Method:** Equations for Translation, Motion of Connected Bodies Fixed Axis Rotation and Plane Motion. Impulse momentum method.

## TEXT BOOKS:

1. Engg. Mechanics - S.Timoshenko & D.H.Young., 4th Edn - , Mc Graw Hill publications.



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2. Engg. Mechanics - S. S. Bhavikatti, New Age International.

## **REFERENCES:**

1. Engineering Mechanics, N.H.Dubey, McGraw Hill, 2013.
2. Engineering Mechanics, A.K.Tayal, 14<sup>th</sup> edition, 2<sup>nd</sup> reprint, Umesh Publications, 2012.
3. Engineering Mechanics, R.K.Bansal, 3<sup>rd</sup> edition, Laxmi Publications, 1996.
4. Engineering Mechanics: Statics & Dynamics, A. Nelson, Tata McGraw-Hill Education, 2009.
5. Engineering Mechanics, Ferdinand . L. Singer, Harper – Collins.