Regulation GRBT-20	Godavari Institute of Engineering & Technology (Autonomous)	I B.Tech. II Sem (2nd semester)			
Course Code	**Engineering Mechanics** **(Common to CE, ME, Automobile, Mining, and Petroleum Engineering)**				
Teaching	Total contact hours-55	L	T	P	C
Prerequisite(s): Engineering Physics		2	1	0·	3

Course Objectives:
- To learn the resolution and composition of system of forces.
- To understand the analytical and graphical methods for analysis of static equilibrium of rigid bodies.
- To learn the concept of centroid, center of gravity, moment of inertia.
- To learn kinematic and kinetic analysis of rigid bodies.
- To learn application of work energy and impulse momentum principles to rigid body motion.

Course Outcomes:

On Completion of the course, the students will be able to-	
CO1:	Carry out composition of system of forces.
CO2:	Analyse rigid bodies in static equilibrium condition under system of forces including friction.
CO3:	Determine centre of gravity and moment of inertia of simple and composite planar, solid sections.
CO4:	Carry out dynamic analysis of rigid bodies under translation, rotation and plane motion.
CO5:	Apply work energy and impulse momentum principles to rigid body motion.

Syllabus:

UNIT – I

INTRODUCTION TO ENGINEERING MECHANICS – BASIC CONCEPTS, SYSTEMS OF FORCES: Coplanar Concurrent Forces – Components in Space – Resultant – Moment of Force and its Application – Couples and Resultant of Force Systems. Introduction, limiting friction and impending motion, coulomb's laws of dry friction, coefficient of friction, cone of friction.

UNIT- II

EQUILIBRIUM OF SYSTEMS OF FORCES: Free Body Diagrams, Equations of Equilibrium of Coplanar Systems, Spatial Systems for concurrent forces. Lamis Theorm, Graphical method for the equilibrium of coplanar forces, Converse of the law of Triangle of forces, converse of the law of polygon of forces condition of equilibrium.

UNIT – III

CENTROID: of simple figures (from basic principles) – Centroids of Composite Figures.
CENTRE OF GRAVITY: Centre of gravity of simple body (from basic principles), centre of gravity of composite bodies, pappus theorem.
AREA MOMENTS OF INERTIA: Definition – Polar Moment of Inertia, Transfer Theorem, Moments of Inertia of Composite Figures, Products of Inertia, Transfer Formula for Product of Inertia. Mass
MOMENT OF INERTIA: Moment of Inertia of Masses, Transfer Formula for Mass Moments of

UNIT –I V

KINEMATICS: Rectilinear and Curvilinear motions – Velocity and Acceleration – Motion of Rigid Body – Types and their Analysis in Planar Motion.

KINETICS: Analysis as a Particle and Analysis as a Rigid Body in Translation – Central Force Motion – Equations of Plane Motion – Fixed Axis Rotation – Rolling Bodies.

UNIT – V

WORK – ENERGY METHOD: Equations for Translation, Work-Energy Applications to Particle Motion, Connected System-Fixed Axis Rotation and Plane Motion.Impulse momentum method.
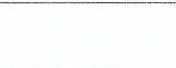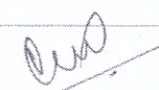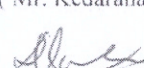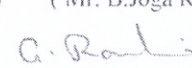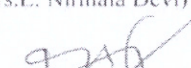
Text Books:

1. Engineering Mechanics statics and dynamics: A Nelson, McGraw Hill publications.
2. Engineering Mechanics, S S Bhavikatti, New Age International Publications.

References:

1. Engineering. Mechanics - S.Timoshenko & D.H.Young., 4th Edn - , McGraw Hill publications.
2. Engineering Mechanics: Basudeb Bhattacharyya, Oxford University Press
3. Engineering Mechanics: statics and dynamics – I.H.Shames, – Pearson Publ.
4. Engineering Mechanics, Tayal A.K. (2010) Umesh Publications
5. Engineering Mechanics,Khurmi R.S. (2010), S. Chand & Co.

Useful Web-links :   http://nptel.ac.in/courses.php
http://mit.espe.edu.ec/courses/mechanical-engineering/

University Nominee   Subject Expert   Industrial Expert   Internal Member   Special Invitee Member
Dr. B. Balakrishna)   (Dr. D. Ravi Kumar)   (Mr. Rajiv Aramadaka)   (Dr. P.M.M.S. Sarma)   (Dr. M.V.Sekhar Babu)

Internal Member   Internal Member   Internal Member   Internal Member   Internal Member
Dr. T. Jayananda Kumar)   (Dr. D. Santha Rao)   (Mr. Kedaranath M)   (Mr. B.Joga Rao)   (Mrs.E. Nirmala Devi)

Internal Member   Internal Member   Internal Member   Internal Member   Chairman, BoS
(Mr.M. Balakrishna)   (Mr. P.Veera Raju)   (Mr. D. Suman)   (Mr. G Ramakrishna)   (Dr. M. Sreenivasa Rao)