

19CE3301 - ENGINEERING MECHANICS

Offering Branches	CE													
Course Category:	Program Core										Credits:	3		
Course Type:	Theory										Lecture-Tutorial-Practical :	3-0-0		
Prerequisites:	1. 19BS1101-Engineering Mathematics – I 2. 19BS1201-Engineering Mathematics – II 3. 19BS1204- Applied Physics										Continuous Evaluation:	30		
											Semester End Evaluation:	70		
											Total Marks:	100		
Course Outcomes														
Upon successful completion of the course, the student will be able to														
CO1	Draw the free body diagram of a given physical system and compute the resultant of a given coplanar system of forces											L5		
CO2	Estimate the centroid of composite areas, bodies, area moment of inertia and mass moment of inertia of bodies											L5		
CO3	Explain concepts of friction and application to wedges and ladder problems											L5		
CO4	Analyse plane truss (frame) by method of joints and method of sections											L4		
CO5	Analyse the dynamics of particles both in rectilinear and curvilinear motion.											L4		
Contribution of Course Outcomes towards achievement of Program Outcomes & Strength Correlations (3: High, 2: Medium, 1: Low)														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3		2								3	3	
CO2	3	3		2								3	3	
CO3	3	3		2								3	3	
CO4	3	3		2								3	3	
CO5	3	3		2								3	3	
Course Content														
UNIT - 1	SYSTEM OF FORCES-EQUILIBRIUM OF SYSTEM OF FORCES Types of Force systems-Coplanar Concurrent and Non concurrent Forces-Resultant-Moment of a Force and its application- Couples and Resultant of a Force System, resolution of a force into a force and a couple, Polygon law of forces for resultant. Free body diagrams, equations of equilibrium of coplanar concurrent and non-concurrent force systems, Lami's theorem.											CO1		
UNIT - 2	PROPERTIES OF SURFACES AND SOLIDS Determination of Areas - First moment of Area and the centroid – centroid of simple figures by integration –circular arc, Quarter circular arc, semi-circular arc, triangle, semi-circle, quarter circular area, sector of circle, general spandrel, simple problems involving composite figures. Second moment of plane area - Parallel axis theorems and perpendicular axis theorems - Polar moment of Inertia - Second moment of area of simple figures- Rectangle, Triangle, Circle, Semi-circle, quarter circle. Second moment of plane area of sections like C,I,T,Z etc. - Basic Concept of Mass moment of Inertia.											CO2		

UNIT - 3	FRICITION AND ITS APPLICATION Friction: Types of friction, Laws of dry Friction, Limiting friction, Cone of Friction, Concept of Static and Dynamic Friction; Numerical problems on motion of single and connected bodies on planes, wedge friction, ladder friction.	CO3
UNIT - 4	ANALYSIS OF PERFECT FRAMES (ANALYTICAL METHOD) Types of Frames-Assumptions for forces in members of a perfect frame, Method of joints, Cantilever Trusses, Structures with one end hinged and the other freely supported on rollers (Not more than 6 members), Method of sections (Not more than 3 members).	CO4
UNIT - 5	DYNAMICS OF PARTICLES Displacements, Velocity and acceleration, their relationship in rectilinear motion, Curvilinear motion in rectangular coordinates, normal and tangential coordinates, projectile motion, Newton's law, D'Alembert's Principle.	CO5
Learning Resources		
Text Books	<ol style="list-style-type: none"> 1. S. S. Bhavikatti, Engineering Mechanics, New Age International, 2008. 2. A. K. Tayal, Engineering Mechanics (Statics and Dynamics), Umesh Publications, 14th Edition, 2011. 	
Reference Books	<ol style="list-style-type: none"> 1. S. Timoshenko & D. H. Young, and JV Rao, Engineering Mechanics, 4th Ed., TMH Education, 2006 2. K. Vijay Kumar Reddy, J. Suresh Kumar, Singer's Engineering Mechanics Statics and Dynamics, BS Publications, 3rd Edition, 2011. 	
e-Resources & other digital material	<ol style="list-style-type: none"> 1. http://nptel.ac.in/courses.php 2. http://jntuk-coeerd.in/ 	