

ENG115	ENGINEERING MECHANICS			L	T	P	C
				3	0	0	3
Co-requisite:	NIL						
Prerequisite:	NIL						
Data Book / Codes/Standards	NIL						
Course Category	P	PROFESSIONAL CORE	ENGINEERING MECHANICS				
Course designed by	Department of Mechanical Engineering						
Approval	-- Academic Council Meeting -- , 2016						

PURPOSE	The course aims at providing the solid basis in mechanics especially statics which is very useful students of core engineering branches like mechanical and civil etc. It also gives as introduction related to dynamics to the students. The fundamental concepts could be illustrated by the recent examples along with the contemporary knowledge.						
LEARNING OBJECTIVES				STUDENT OUTCOMES			
At the end of the course, student will be able to							
1.	Get an overview of the various branches of mechanics			a		e	
2.	Understand the physics behind various practical phenomena in the field of mechanical engineering.			a		e	
3.	Analyze planar and spatial systems to determine the forces in members of trusses, frames.			a		e	
4.	Calculate the motion parameters for a body subjected to a given force system.			a		e	
5.	Determine the centroid and second moment of area of various objects			a		e	

Session	Description of Topic	Contact hours	C-D-I-O	IOs	Reference
	UNIT I: STATICS OF PARTICLES AND RIGID BODIES	14			
1.	Forces on particles	1	C	1-3	1-4
2.	Resolution of forces	1	C	1-3	1-4
3.	Free body diagrams	1	C, D	2-3	1-4
4.	Equilibrium of particles	1	C	2-3	1-4
5.	Equilibrium of particles (Numerical Problems)	1	D, I	2-3	1-4
6.	Forces in a plane	1	C	2-3	1-4
7.	Forces in space	1	C	2-3	1-4
8.	Forces in space (Numerical Problems)	1	D, I	2-3	1-4
9.	Forces in space (Numerical Problems)	1	D, I	2-3	1-4
10.	Force equivalence	1	C, D	2-3	1-4
11.	Force equivalence (Numerical Problems)	1	D, I	2-3	1-4



12.	Rigid body equilibrium	1	C, D	2-3	1-4
13.	Rigid body equilibrium (Numerical Problems)	1	D, I	2-3	1-4
14.	Rigid body equilibrium (Numerical Problems)	1	D, I	2-3	1-4
	UNIT II: FRICTION	5			
15.	Laws of friction, dry friction	1	C, D, I	2-3	1-4
16.	Wedge friction, rolling friction	1	C, D, I	2-3	1-4
17.	Belt friction,	1	C, D, I	2-3	1-4
18.	Ladder friction	1	C, D, I	2-3	1-4
19.	Screw friction	1	C, D, I	2-3	1-4
	UNIT III: ANALYSIS OF TRUSSES AND CENTROIDS	10			
20.	Types of loads, type of supports, reaction	1	C, D	2-3	1-4
21.	Simple trusses, method of joints	1	C, D	2-3	1-4
22.	Method of joints	1	C, D	2-3	1-4
23.	Method of sections (Numerical Problems)	1	D, I	2-3	1-4
24.	Method of Joints (Numerical Problems)	1	D, I	2-3	1-4
25.	Method of Joints (Numerical Problems)	1	D, I	2-3	1-4
26.	Center of gravity-lines, areas	1	C	5	1-4
27.	Volumes	1	C	5	1-4
28.	Determination of centroid-integration method	1	C	5	1-4
29.	Determination of centroid-integration method (Numerical Problems)	1	D	5	1-4
	UNIT IV: MOMENT OF INERTIAS OF SURFACE AND VOLUMES	6			
30.	Determination of moment of inertia using area integration method,	1	C, D	5	1-4
31.	Determination of moment of inertia using area integration method,	1	C, D	5	1-4
32.	Determination of moment of inertia using area integration method,	1	C, D	5	1-4
33.	Analytical method, radius of gyration	1	C, D	5	1-4
34.	Polar moment of inertia,	1	C, D	5	1-4



35.	Moment of inertia of different sections	1	D, I	5	1-4
UNIT V: DYNAMICS		10			
36.	Rectilinear motion	1	C	4	1-4
37.	Projectile motion, Newtons second law of motion,	1	C	4	1-4
38.	Projectile motion, Newtons second law of motion,	1	D, I	4	1-4
39.	D'Alemberts principle	1	C	4	1-4
40.	Work, energy	1	C	4	1-4
41.	Impulse momentum	1	C	4	1-4
42.	Impact/collision of elastic bodies	1	C	4	1-4
43.	Oblique impact	1	C	4	1-4
44.	Curvilinear motion	2	C	4	1-4
		45			

LEARNING RESOURCES

TEXT BOOKS/REFERENCE BOOKS/OTHER READING MATERIAL

1	Ferdinand. P. Beer. E, Russell Johnston Jr., David Mazurek, Philip J Cornwell, Vector Mechanics for Engineers: Statics and Dynamics, McGraw - Hill, New Delhi, 10th Edition, 2013.
2	R.K.Bansal, Engineering Mechanics, Laxmi Publications Ltd, 2005
3	Meriam J.L and Kraige L.G., Engineering Mechanics, Volume I - statics, Volume II - dynamics, John Wiley & Sons, New York, 7th Edition, 2012
4	Timoshenko, Young, Engineering Mechanics, Tata Mc-Graw Hill Book Company, 5th Edition, New Delhi

Course nature				Theory		
Assessment Method (Weightage 100%)						
In-semester	Assessment tool	Mid term I	Mid term II	Class learning assessment		Total
				CLA1	CL2	
		Weightage	15%	15%	10%	10%
End semester examination Weightage:						50%

