

University of Mumbai			
CLASS: F.E (All Branches of Engineering)		Semester - I	
SUBJECT: Engineering Mechanics			
Periods per week (each of 60 min)	Lecture	5	
	Practical	2	
	Tutorial	-	
		Hours	Marks
Evaluation System	Theory Examination	3	100
	Practical and Oral Examination	2	25
	Oral Examination	--	--
	Term Work	-	25
	Total		150

Details of the Syllabus:-

Sr.No	Details	Hrs
01	1.1 System of Coplanar Forces:- Resultant of concurrent forces, Parallel force,& Non concurrent Non parallel system of forces. Moment of Force about any point, Couples, Varignon's Theorem Distributed Forces in plane.	05
	1.2 Introduction to Centroid & Center of Gravity, Introduction to Moment of Inertia & its theorem.	05
02	2.1 Equilibrium of system of coplanar forces:- Condition of equilibrium for concurrent forces, Parallel forces, & Non concurrent Non parallel general system of forces & couple.	06
	2.2 Types of supports, loads, Beams. Determination of reactions at supports for various types of loads on beams.	04
	2.3 Analysis of plane trusses by using Method of Sections & Method of Joints.	04
03	3.1 Friction: Introduction to Laws of Friction, Cone of friction, Equilibrium of bodies on inclined plane, Application to problems Involving wedges, ladders, screw friction.	05
	3.2 Belt Friction : Transmission of power by belts & ropes, centrifugal & initial tension in the belts or ropes. Condition of maximum power transmission. Flat belt & flat pulleys & ropes on Grooved pulleys.	05
04	4.1 Kinematics of Particles :- Velocity & acceleration in terms of rectangular co-ordinate system, Rectilinear Motion, Motion along plane curved path, Tangential & Normal component of acceleration Motion Curves (a-t, v-t, s-t Curves), Projectile Motion, Relative Velocities.	10

05	5.1 Kinematics of Rigid Bodies:- Introduction to general plane motion, Instantaneous center of rotation for the velocity, velocity diagrams For bodies in plane motion, (up to two linkage mechanism)	06
06	6.1 Kinetics of Particles: Introduction to basic concept, Newton's Second law, work energy principles, D'Alembert's principles, equation of dynamic equilibrium, 6.2 Moment of Energy Principles: Linear momentum, principles of conversation of momentum, Impact of solid Bodies, Direct & oblique impact, impact of solid bodies, semi elastic impact & plastic impact	06 04

Theory Examination:

1. Question paper will comprise of total 7 questions, each of 20 marks.
2. Only five questions need to be solved.
3. Question 1 will be compulsory and based on entire syllabus.
4. Remaining question will be mixed in nature (for example suppose Q.2 has part (a) from module 3 then part (b) will be from any module other than module 3).
5. In question paper weightage of each module will be proportional to number of respective lecture hours as mentioned in the syllabus.

Practical and oral Examination:

Practical and oral Examination will be based on one experiment performed from the list of experiment given in the syllabus and the oral will be based on the same experiment.

Term Work

Marks

Term work shall consist of minimum six experiments, assignments consisting numericals based on above syllabus and a written test.

The distribution of marks for term work shall be as follows,

1. Laboratory work (Experiments and Journal)	10
2. Test (at least one)	10
3. Attendance (Theory and Practical)	05
	<u>25</u>

The final certification and acceptance of TW ensures the satisfactory performance of laboratory work and minimum passing in the TW.

List of experiments:

1. Polygon law of coplanar forces (concurrent)
2. Non-concurrent non-parallel (general)
3. Bell crank lever
4. Support reaction for beam
5. Simple/ compound pendulum
6. Inclined plane (to determine coefficient of friction)
7. Collision of elastic bodies (Law of conservation of momentum)
8. Moment of inertia of fly wheel
9. Screw friction by using screw jack.

Any other experiment based on above syllabus.

Recommended Books:

1. Engineering Mechanics By R.C. Hibblar, Mac Millan
2. Engineering Mechanics By B.N. Thadani, Weinell book corporation
3. Engineering Mechanics By Beer & Johnson, Tata Mcgrawhill
4. Engineering Mechanics By F.L. Singer by Harper & Row Publication
5. Engineering Mechanics By Macklin & Nelson, Tata Mcgrawhill
6. Engineering Mechanics By Shaum Series.
7. Engineering Mechanics By Tayal, Umesh Publication
8. Engineering Mechanics By Kumar, Tata Mcgrawhill.