

Sub Code	Subject Name	Teaching Scheme			Credits Assigned			
		Theory	Pract.	Tut.	Theory	TW/Pract.	Tut.	Total
FEC104	Engineering Mechanics	05	02	-	05	01	-	06

Sub Code	Subject Name	Examination Scheme							Total	
		Theory (out of 100)					Term Work	Pract.		Oral
		Internal Assessment (out of 20)			End sem. exam (out of 80)					
		Test 1	Test 2	Average of Test 1 and Test 2						
FEC104	Engineering Mechanics	20	20	20	80	25	-	25	150	

Course objective:

Students should be able to:

1. Understand the logical sequence of any problem.
2. Understand the given data and explain with diagram.
3. Think and find an appropriate solution of the day today problems.

Course outcome:

Students should be able to:

1. Construct free body diagram and calculate the reactions for static equilibrium.
2. Determine the centroid of plane lamina.
3. Calculate the internal forces, moments and distributed loads in members.
4. Evaluate the velocity, acceleration, time, force and energy of the particle as well as rigid bodies.
5. Locate instantaneous centre of rotation for rigid bodies having plane motion.

Details of Syllabus:

Sr.No.	Topics	Hrs
01	1.1 System of Coplanar Forces: Resultant of concurrent forces, parallel forces, non-concurrent non-parallel system of forces, Moment of force about a point, Couples, Varignon's Theorem. Force couple system. Distributed Forces in plane.	05
	1.2 Centroid for plane Laminas.	04

02	<p>2.1 Equilibrium of System of Coplanar Forces: Condition of equilibrium for concurrent forces, parallel forces and non-concurrent non-parallel general forces and Couples.</p> <p>2.2 Types of support: Loads, Beams, Determination of reactions at supports for various types of loads on beams.(Excluding problems on internal hinges)</p> <p>2.3 Analysis of plane trusses: By using Method of joints and Method of sections.(Excluding pin jointed frames)</p>	06 03 05
03	<p>3.1 Forces in space:</p> <p>Resultant of Non-coplanar Force Systems: Resultant of concurrent force system, parallel force system and non-concurrent non-parallel force system. Equilibrium of Non-coplanar Force Systems: Equilibrium of Concurrent force system, parallel force system and non-concurrent non-parallel force system.</p> <p>3.2 Friction: Introduction to Laws of friction, Cone of friction, Equilibrium of bodies on inclined plane, Application to problems involving wedges, ladders.</p> <p>3.3 Principle of virtual work: Applications on equilibrium mechanisms, pin jointed frames.</p>	05 07 04
04	<p>4.1 Kinematics of a Particle: -Rectilinear motion, Velocity & acceleration in terms of rectangular co-ordinate system, Motion along plane curved path, Tangential & Normal component of acceleration, Motion curves (a-t, v-t, s-t curves), Projectile motion.</p>	10
05	<p>5.1 Kinematics of a Rigid Body :- Introduction to general plane motion, Instantaneous center of rotation for the velocity, velocity diagrams for bodies in plane motion.</p>	06
06	<p>6.1 Kinetics of a Particle: Force and Acceleration: -Introduction to basic concepts, D'Alemberts Principle, Equations of dynamic equilibrium, Newton's second law of motion.</p> <p>6.2 Kinetics of a Particle: Work and Energy: Principle of work and energy, Law of conservation of energy.</p> <p>6.3 Kinetics of a Particle: Impulse and Momentum: Principle of linear impulse and momentum. Law of conservation of momentum. Impact and collision.</p>	04 03 03

Recommended Books

1. Engineering Mechanics by R. C. Hibbeler.
2. Engineering Mechanics, statics by Meriam & kraige , Wiley Publications
3. Engineering Mechanics, Dynamics by Meriam & kraige , Wiley Publications
4. Engineering Mechanics by Beer &Johnston, Tata McGraw Hill
5. Engineering Mechanics by F. L. Singer, Harper& Raw Publication
6. Engineering Mechanics by Macklin & Nelson, Tata McGraw Hill
7. Engineering Mechanics by Shaum Series,
8. Engineering Mechanics by A K Tayal, Umesh Publication.
9. Engineering Mechanics by Kumar, Tata McGraw Hill

Theory Examination:

1. Question paper will comprise of total 06 questions, each carrying 20 marks.
2. Total 04 questions need to be solved.
3. Question No: 01 will be compulsory and based on entire syllabus wherein sub-questions of 2 to 5 marks will be asked.
4. Remaining questions will be mixed in nature.(e.g. Suppose Q.2 has part (a) from module 3 then part (b) will be from any module other than module 3) having 20 marks each.
5. In question paper weightage of each module will be proportional to number of respective lecture hrs as mentioned in the syllabus.

Oral Examination:-

Oral examination will be based on entire syllabus.

Term work:-

Term work shall consist of minimum six experiments (at least two experiments on Dynamics), assignments consisting numerical based on above syllabus, at least 3 numerical from each module.

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

Laboratory work (Experiment/ programs and journal)	: 10 marks
Assignments	: 10 marks
Attendance (Theory and Practical)	: 05 marks

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

List of Experiments:-

1. Polygon law of coplanar forces.
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.