Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Pract.	Tut.	Theory	TW/Pract	Tut.	Total
FEC104	Engineering Mechanics	05	02	-	05	01	-	06

Course Code	Course Name	Examination Scheme							
		Theory				Term Work	Pract	Oral	Total
		Internal Assessment			End Sem Exam				
		Test1	Test2	Av of Test 1 & 2					
FEC104	Engineering Mechanics	20	20	20	80	25	--	25	150

Objectives

1. To acquaint the concept of equilibrium in two and three dimensional system.
2. To study and analyse motion of moving bodies.

Outcomes: Learner will be able to…

1. Illustrate the concept of force, moment and apply the same along with the concept of equilibrium in two and three dimensional systems with the help of FBD.
2. Demonstrate the understanding of Centroid and its significance and locate the same.
3. Correlate real life application to specific type of friction and estimate required force to overcome friction.
4. Establish relation between velocity and acceleration of a particle and analyse the motion by plotting the relation
5. Illustrate different types of motions and establish Kinematic relations for a rigid body
6. Analyse body in motion using force and acceleration, work-energy, impulse-momentum principles

Module	Detailed Contents	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. **1.2 Centroid** for plane Laminas.	**05** **04**
02	**2.1Equilibrium of System of Coplanar Forces**: Condition of equilibrium for concurrent forces, parallel forces and non-concurrent non-parallel general forces and Couples. **2.2Types of support**: Loads, Beams, Determination of reactions at supports for various types of loads on beams.(Excluding problems on internal hinges) **2.3Analysis of plane trusses**: By using Method of joints and Method of sections. (Excluding pin jointed frames).	 **06** **03** **05**
03	**3.1 Forces in space**: **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. **3.2 Friction**: Introduction to Laws of friction, Cone of friction, Equilibrium of bodies on inclined plane, Application to problems involving wedges, ladders. **1.3 Principle of virtual work:** Applications on equilibrium mechanisms, pin jointed frames.	 **05** **07** **04**

04	**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.	**10**
05	**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.	**06**
06	**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. **6.2 Kinetics of a Particle: Work and Energy:** Principle of work and energy, Law of conservation of energy. **6.3 Kinetics of a Particle: Impulse and Momentum:** Principle of linear impulse and momentum. Law of conservation of momentum. Impact and collision.	**04** **03** **03**

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. Inclined plane (to determine coefficient of friction).
6. Collision of elastic bodies (Law of conservation of momentum).
7. Kinematics of particles
8. Kinetics of particles

Any other experiment based on above syllabus.

Term work:-

Term work shall consist of minimum six experiments (at least one 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:

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

Assessment:

Internal Assessment Test:

Assessment consists of two class tests of 20 marks each. The first class test is to be conducted when approx. 40% syllabus is completed and second class test when additional 35% syllabus is completed. Duration of each test shall be one hour.

End Semester 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)
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

References:

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