Semester – II

Subject Name: Applied Mechanics

Subject Code: 09CI1103

Diploma Branches in which this subject is offered: Civil, Mechanical and Automobile Engineering

Objective: Objectives of introducing this subject at first year level in all the branches are:

- To study the identification of different types of forces, systematic evaluation of the effect of these forces, the behavior of rigid bodies subjected to various types of forces, at the state of rest or motion of the particles.
- To create the base for the analysis of the structures for future semesters

Credits Earned: 5 Credits

Course Outcomes:

On the completion of the course student will be able to:
- Understand the principles of mechanics and their application to an engineering problem.
- Fundamental related to the subject will facilitate students to design structures, predict failure and understand the physical properties of materials in the higher semester.

Teaching and Examination Scheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE	IA	CSE	Viva	Term work	
4	0	2	5	50	30	20	25	25	150

Contents:

Unit	Topics	Contact hours	Weightage (%)
1	**Introduction** • Scalar and Vector quantities • System of units • SI units and conversion • Principle of mechanics	02	5
2	**Coplanar Concurrent forces** • Force, Force systems and Resultant • Composition and resolution of force	02	5
3	**Coplanar Non-Concurrent forces** • Concepts of Moment & Couple • Resultant of non-concurrent force systems • Equilibrant, Equilibrium of forces • Types of load UDL and point • Types of supports • Types of beam and its support reaction.	07	16
4	**Centre of gravity and Centroid** • Concept of center of gravity • Center of mass & Centroid • Centroid lines • Plane areas of volumes and bodies	04	10
5	**Friction** • Friction • Types • Applications • Simple frictionless rigid body assemblies • Rigid body assemblies including friction • Friction for a body resting on horizontal plane & on inclined plane	07	16
6	**Introduction to Dynamics** • Kinematics of particle • Concept of rectilinear motion • Circular motion • Projectile motion	09	21
7	**Work, Power and Energy** • Work done • Force displacement diagram • Torque • Work done by torque • Kinetic & Potential energy and Engineering Problems • I.H.P and B.H.P of engine	06	15

	• Equation of H.P in terms of Torque and R.P.M , Engineering Problems		
8	**Simple Machine**	**05**	**12**
	• Principles of machines to evaluate Mechanical Advantage		
	• Velocity Ratio of simple machine		
	• Pulley blocks		
	• Draw Line sketch of different systems of Simple and compound levers		
	• Problems		
	• Laws of Machines		
	• Reversible & non reversible machines		

Suggested Theory distribution:

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyse	Evaluate	Create
35%	40%	15%	10%	0%	0%

Suggested List of Experiments:

Sr. No.	Name of Topics	Contact Hours
1	Demonstrate and prove Lami's theorem	3
2	Find out Resultant of Concurrent forces	3
3	Find out Resultant of Non Concurrent forces	3
4	To find Centre of Gravity of plane lamina	3
5	To find the support reaction of simply supported beam experimentally	3
6	To prepare a model of bridge using popsicle sticks such that it achieves the maximum load	3
7	To determine the coefficient of Static friction	3

Tutorials:

Sr. No.	Name
1	Unit conversion and principle of Mechanics
2	Resultant force: concurrent
3	Non-concurrent force , Beam Reactions
4	CG and MI
5	Friction
6	Dynamics
7	Work Power energy
8	Simple machine

Instructional Method:

a. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

b. The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.

c. Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.

d. Students will use supplementary resources such as online videos, videos, e-courses, Virtual Laboratory

Text Books:

Applied Mechanics S. B. Junarkar& H. J. Shah-Charotar Publication

Reference Books:

1. Engineering Mechanics by G. S. Sawhney; PHI New Delhi
2. Mechanics of Materials: Beer and Johnston, TMH
3. Mechanics of Materials: Gere & Timoshenko; CBS Publishers & Distributors, Delhi
4. Mechanics of Materials: Hibbler R C; Pearson Education
5. Engineering Mechanics of Solids: Popov E.P; Prentice Hall of India, New Delhi