

INSTITUTE	DIPLOMA STUDIES
PROGRAM	DIPLOMA ENGINEERING (CIVIL ENGINEERING)
SEMESTER	2
COURSE TITLE	APPLIED MECHANICS
COURSE CODE	09CI2103
COURSE CREDITS	4

Objective:

- To study the identification of different types of forces, systematic evaluation of the effect of these forces, the behaviour 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
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Course Outcomes: After completion of this 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.

Pre-requisite of course:BASIC MATHS AND PHYSICS

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
3	0	2	50	30	20	25	25

Contents : Unit	Topics	Contact Hours
1	Introduction Scalar and Vector quantities , System of units , SI units and conversion, Principle of mechanics	2
2	Coplanar Concurrent forces Force, Force systems and Resultant, Composition and resolution of force	3
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	7

Contents : Unit	Topics	Contact Hours
4	Centre of gravity and Centroid Concept of center of gravity, Center of mass & Centroid, Centroid lines, Plane areas of volumes and bodies	8
5	Friction Friction, Types , Application, Simple frictionless rigid body assemblies, Rigid body assemblies including friction, Friction for a body resting on horizontal plane & on inclined plane	8
6	Work, Power and Energy Work done, Force displacement diagram , Torque & Work done by torque, Kinetic & Potential energy and Engineering Problems, .H.P and B.H.P of engine , Equation of H.P in terms of Torque and R.P.M , Engineering Problems	7
7	Simple Machine 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, Laws of Machines & Reversible & non reversible machines	8
Total Hours		43

Suggested List of Experiments:

Contents : Unit	Topics	Contact Hours
1	EXPERIMENT To study various equipment related to Engineering Mechanics., Derive Law of machine using Worm and worm wheel, Derive Law of machine using Single purchase crab., Derive Law of machine using double purchase crab., Determine resultant of concurrent force system applying Law of Parallelogram., Determine resultant of concurrent force system applying Law of Parallelogram., Determine resultant of concurrent force system graphically, Verify Lami's theorem., Determine support reactions for simply supported beam., Obtain support reactions of beam using graphical method., Determine coefficient of friction for motion on horizontal and inclined plane., Determine centroid of geometrical plane figures.	24
Total Hours		24

Textbook :

- 1 Applied Mechanics, S. B. Junarkar & H. J. Shah, Charotar Publication , 2019

References:

- 1 Mechanics of Materials, Mechanics of Materials, Beer and Johnston, TMH, 2019
- 2 Engineering Mechanics , Engineering Mechanics , G. S. Sawhney, PHI New Delhi, 2009
- 3 Mechanics of Materials, Mechanics of Materials, Gere & Timoshenko, CBS Publishers & Distributors, Delhi, 2004
- 4 Mechanics of Materials, Mechanics of Materials, Hibbler R C, ; Pearson Education, 2018

References:

- 5 Engineering Mechanics of Solids, Engineering Mechanics of Solids, Popov E.P; Prentice Hall of India, New Delhi , 2002

Suggested Theory Distribution:

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

Distribution of Theory for course delivery					
Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking / Creative
35.00	40.00	15.00	10.00	0.00	0.00

Instructional Method:

- 1 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.
- 2 The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.
- 3 Practical examination will be conducted at the end of semester for evaluation of performance of students in laboratory.
- 4 Students will use supplementary resources such as online videos, videos, e-courses, Virtual Laboratory.

Supplementary Resources:

- 1 <https://study.com/academy/lesson/what-is-center-of-gravity-definition-equation-examples.html>
- 2 <https://www.toppr.com/guides/physics/friction/friction-and-its-effects/>