18UCVC100/200	ENGINEERING MECHANICS	(3-0-0-4)3

Total Hrs: 42

Course Learning Objective (CLO): Engineering mechanics is taught as one of core and basic subjects for all engineering programs. In this course, topics on system of forces, friction, geometrical properties of planar elements, forces in space, kinetics are dealt. The delivering of topics will be made through lecture classes and self -study. The evaluation will be carried out through IAs and SEE.

Course Outcomes (CO):

At the end of this course, students should meet the learning objectives through following observable and measurable outcomes by undergoing various tests planned by the course teacher as a part of course assessment.

ID	Description of the Course Outcome	Mapping to programme outcome @ Level		
		3	2	1
CO-1	Summarize and sketch different force systems.	1,2		12
CO-2	Calculate the resultant, reaction of system of forces.	1,2		12
CO-3	Calculate geometric properties of planar elements.	1,2		12
CO-4	Calculation of range of forces for objects subjected to friction.	1,2		12

POs→	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PO-13	PO-14	PO-15
Mapping Level	**3**	**3**										**1**			

Prerequisites

Students taking this course shall have the knowledge of following:

1) Basics of trigonometry.
2) Basics of calculus.
3) Newton's laws of motion.

Course Content

1) **Introduction to Engineering Mechanics:**Concurrent and non-concurrent force systems, Conditions of equilibrium, resultant of systems, Support reactionsfor statically determinate structures. **10 Hrs.**
   Self-Study: Types of supports- smooth, hinge, roller and fixed.
2) **Friction:**Types of friction, laws of dry friction, problems on block, wedge, ladder friction and belt friction. **08 Hrs.**

Self-Study: Lifting machines like screw jack, tripod.

3) **Geometrical Properties of Planar Elements** Determination of Centroid and Moment of Inertia of simple geometric shapes by first principles-composite areas-Radius of Gyration. **10 Hrs.**
   Self-Study: Centroid and moment of inertia for built up sections.
4) **Plane trusses:** Analysis of plane statically determinate trusses by method of joints.**05 Hrs.**
   Self-Study: Method of sections.
5) **Kinetics:**Newton's Law (D'Alemberts principle), Work, Power and Energy, principle of work-energy, principle of conservation of energy.**09 Hrs.**
   Self-Study: Impulse energy.

Books/ References

1) Bhavikatti S. S. &Rajashekarappa K. G., "Engineering Mechanics", New Age International (P) Ltd.
2) Singer F.L.,"Engineering Mechanics", Harper & Row Publication, London.
3) Ferdinand P. Beer and E. Russel Johnston "Mechanics for Engineers: Statics", McGraw-Hill Book Company, New York.
4) Bansal R. K. "Engineering Mechanics", Laxmi Publications, New Delhi.

18UCVL100/200	BASIC SKILL LAB	(3-0-0-4)3

Skill 1
Area Calculation

Aim : Calculation of area of a given map/ plan

Equipment : Plan, Map, Scale

Procedure :

(1) Study the geometric shape of the given map/plan.
(2) If required, divide the plan suitably in to regular geometric shapes like rectangle, square & triangle etc.
(3) Determine the area of all individual parts and take the summation which gives the total area of the plan in terms of measured units.Make use of the scale given in the map and convert the area in to actual area.
(4) Express them in different units like sq.m, sq.ft.,gunthas and hectares etc.

Skill 2
Domestic plumbing

Aim : To understand and to carry out plumbing.

Equipment : Plumbing accessories like pipes and fittings like bends, elbows, contraction, enlargement, nipples, socket, water meter etc.

Procedure :

1. Select the required fixtures for the given task.
2. Carry out the plumbing for given task.

Evaluation criteria: Students are to identify and select the different plumbing materials for a given task.

Skill -3
Producing a simple building plan

Aim : To prepare a building plan, given requirements.
Equipment : Drawing sheet (A4 Size) & scale etc.

Procedure : The students shall be given the requirements of a residential building not exceeding two bedrooms without staircase and students shall produce a simple residential building plan. They shall also calculate the plinth area and floor area.

Demonstration
Test ofwater quality for drinking purpose

Aim : To determine the water quality of the given sample of water.

Equipment : Water quality kit.

Experiment :

1. Get the water sample in a clean bottle from your respective houses/hostel.
2. Test the water quality parameters likepH, Hardness, Turbidity etc.
3. Refer to the standardsfor water quality &compare the results with IS code.
4. Comment on the potability of water based on IS 10500-212