KIIT POLYTECHNIC, BHUBANESWAR

LESSON PLAN

Session (2021-2022)

Discipline: Mechanical Engineering	**Semester:** 2nd,Summer/2022	**Name of the Teaching Faculty:** Abhijit Samant Lecturer **Email ID:** abhijit.samantfme@kp.kiit.ac.in
Subject: Engineering Mechanics, Theory-4	**No. of Days/Week:** 04	**Start Date:** 14/03/2022 **End Date:** 30/06/2022

Week	Class Day	Theory Topics
1st	1st	Engineering mechanics: Introduction, Application Assumptions: Rigid body, Particle, Point load, Branch of Mechanics
	2nd	Definition of force and its units, Effects of force, Representation of force by vector, Characteristics of force. Pull and Push. Principle of Transmissibility & Principle of Superposition.
	3rd	Classification of force system. Action and Reaction, Tension and Compression, Free body diagram.
	4th	Resolution of a Force: Definition, Method of Resolution, Types of Component forces, Perpendicular components & non-perpendicular components.
2nd	1st	Composition of Forces: Definition, Resultant Force, Method of composition of forces, Principle of resolution of forces, Method of Resolution.
	2nd	Problem solving using method of resolution.
	3rd	Parallelogram law of forces and related Problem solving
	4th	Graphical method to determine resultant of forces: Space diagram, Vector diagram, Triangle law of forces and Polygon law of forces
3rd	1st	*Doubt Clearing class*
	2nd	Moment of force, geometrical meaning of moment of a force. S.I Units of moment. Classification of moments according to direction of rotate, sign convention,
	3rd	Law of moments. Numerical to find Moments of forces
	4th	Varignon's Theorem and related problems

4th	1st	Couple, Moment of couple, Properties of couple.
	2nd	Equilibrium of forces, Analytical & Graphical conditions of equilibrium of concurrent and non-concurrent forces. Free Body Diagram.
	3rd	Lami's Theorem – Statement. Application of Lami's theorem in problem solving
	4th	*Doubt Clearing class*
5th	1st	*Assignment Evaluation & Class Test*
	2nd	*QUIZ Test-1*
	3rd	Concept of Friction, Frictional force, its advantages and disadvantages. Types of friction, Laws of friction
	4th	Coefficient of friction, Limiting friction, angle of friction and angle of repose.
6th	1st	Equilibrium of body on a rough horizontal plane. Related Numerical
	2nd	Equilibrium of body on a rough inclined plane when, (i) force applied parallel to the plane; Related Numerical
	3rd	Equilibrium of body on a rough inclined plane when, (ii) force applied horizontally; Related Numerical
	4th	Equilibrium of body on a rough inclined plane when, (iii) force applied at an angle to the inclined plane; Related Numerical
7th	1st	Ladder Friction and Related problems
	2nd	Wedge Friction and Related Problem
	3rd	*Doubt Clearing class*
	4th	*Assignment Evaluation & Class Test*
8th	1st	Centroid and Centre of gravity. Moment of an area about an axis, Centroid of plane lamina.
	2nd	Centroid of different geometrical figures.
	3rd	Numerical to find Centroid of composite sections: T,L and I-sections
	4th	Numerical to find Centroid of other composite sections
9th	1st	Numerical to find Centroid of Cut out sections
	2nd	2^{nd} moment of area, M.I of plane Lamina, Parallel and perpendicular axis theorem (Derivation).
	3rd	M.I of different geometrical sections (Formula only)
	4th	Numerical to find Moment of inertia of T-section and I-section with respect to the axes passing through its centroid
10th	1st	Numerical to find Moment of inertia of L-section with respect to the axes passing through its centroid
	2nd	Numerical to find Moment of inertia of other composite sections
	3rd	*Doubt Clearing class*
	4th	Define simple lifting machine, Load and effort. Input and output work. M.A, V.R and efficiency.

11th	1st	Friction loss in terms of load and effort. Reversible and self locking machine, condition of reversibility and self locking. Numerical to find M.A, V.R and efficiency of lifting machine
	2nd	Law of Machine and Related Problems
	3rd	Study of simple axle & wheel and Worm and worm wheel. M.A, V.R and efficiency of machine. Related Problem
	4th	Study of single and double purchase crab winch. M.A, V.R and efficiency of machines. Related Problem
12th	1st	Study of Screw Jack. M.A, V.R and efficiency of machines. Related Problem.
	2nd	*Doubt Clearing class*
	3rd	*Assignment Evaluation & Class Test*
	4th	*QUIZ Test-2*
13th	1st	Kinematics & Kinetics, Principles of Dynamics, Newton's Laws of Motion, De-Alembert's Principle.
	2nd	Motion of Particle acted upon by a constant force, Equations of motion, Related problems
	3rd	Motion of lift, Recoil of gun problems
	4th	Work, Power and energy and their applications. Kinetic and potential energy. Law of conservation of energy.
14th	1st	Numerical to find work, power and energy.
	2nd	Momentum and Impulse, Conservation of Linear momentum. Elastic collision. Coefficient of restitution.
	3rd	Numerical from conservation of linear momentum and elastic collision.
	4th	*Doubt Clearing class*
15th	1st	*Assignment Evaluation & Class Test*
	2nd	*Discussion of Previous year questions*
	3rd	*Discussion of Previous year questions*
	4th	*Discussion of Previous year questions*