KIIT POLYTECHNIC, BHUBANESWAR

LESSON PLAN
Session (2023-2024)

Discipline: Mechanical Engineering	Semester: 2nd, Summer/2024	Name of the Teaching Faculty: Prasant Kumar Patra, (Lecturer) **Email ID:** pkpatrafme@kp.kiit.ac.in
Subject: Engineering Mechanics, Theory-4	**No. of Days/Week:** 04	**Start Date:** 29/01/2024 **End Date:** 14/05/2024

Week	Class Day	Theory Topics
1st	1st	Engineering Mechanics: Introduction; Application; Assumptions: Rigid body, Particle and Point load; Statics and Dynamics (Kinetics and Kinematics).
	2nd	Force – its effects, Units and Characteristics; Graphical representation of force; Pull & Push; Tension & Compression; Action & Reaction;
	3rd	Classification of force system. Principle of Transmissibility & Superposition.
	4th	Resolution of a Force: Definition, Resolved parts/Components; Composition of Forces: Definition, Resultant of Forces; Principle of Resolution.
2nd	1st	Determination of Resultant Force: Based on method of resolution.
	2nd	Determination of Resultant Force: Based on method of resolution.
	3rd	Parallelogram law of forces: Statement, Proof, Special cases.
	4th	Parallelogram law of forces: Numerical
3rd	1st	Graphical method to determine resultant of forces: Space diagram, Vector diagram, Triangle law of forces and Polygon law of forces
	2nd	*Doubt Clearing class*
	3rd	Equilibrium of forces, Analytical & Graphical conditions of equilibrium of concurrent and non-concurrent forces. Free Body Diagram.
	4th	Lami's Theorem – Statement. Application of Lami's theorem in problem solving
4th	1st	Numerical: Based on Lami's theorem.
	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; Law of moments.
	3rd	Numerical: To find out Moment
	4th	Varignon's Theorem and related problems
5th	1st	Couple, Moment of couple, Properties of couple, Related problem.
	2nd	*Class test/Assignment-01*
	3rd	Concept of Friction, Frictional force, Advantages and disadvantages of friction. Types of friction, Laws of friction
	4th	Coefficient of friction, Limiting friction, angle of friction and angle of repose. Equilibrium of body on a rough horizontal plane.
6th	1st	Numerical: Based on Equilibrium of body on a rough horizontal plane.
	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	Ladder Friction and Related problems

7th	1st	*Doubt Clearing class*
	2nd	*Quiz Test-1*
	3rd	Centroid and Centre of gravity. Moment of an area about an axis, Centroid of plane lamina. Centroid of different geometrical figures.
	4th	Numerical to find Centroid of composite sections
8th	1st	Numerical to find Centroid of composite sections
	2nd	Numerical to find Centroid of Cut out sections
	3rd	2nd moment of area, M.I of plane Lamina, Parallel and perpendicular axis theorem (Derivation).
	4th	Numerical to find Moment of inertia of T-section and I-section with respect to the axes passing through its centroid
9th	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	Define simple lifting machine, Load and effort. Input and output work. M.A, V.R and efficiency and relationship between them.
	4th	Friction loss in terms of load and effort. Reversible and self locking machine, condition of reversibility and self locking. Numerical: To find out M.A, V.R and efficiency of lifting machine and checking the reversibility.
10th	1st	Law of Machine and Related Problems
	2nd	Study of simple axle & wheel and Worm and worm wheel. Determination of their M.A, V.R and efficiency.
	3rd	Study of single and double purchase crab winch. Determination of their M.A, V.R and efficiency.
	4th	Study of Screw Jack. Determination of its M.A, V.R and efficiency.
11th	1st	Velocity ratio of Simple and Compound gear train
	2nd	*Doubt Clearing class*
	3rd	Kinematics & Kinetics, Principles of Dynamics, Newton's Laws of Motion, De-Alembert's Principle.
	4th	Motion of Particle acted upon by a constant force, Equations of motion, Related problems
12th	1st	Motion of lift, Recoil of gun problems
	2nd	Work, Power and energy and their applications. Kinetic and potential energy. Law of conservation of energy.
	3rd	Numerical to find work, power and energy.
	4th	Momentum and Impulse, Conservation of Linear momentum. Elastic collision. Coefficient of restitution.
13th	1st	Numerical from conservation of linear momentum and elastic collision.
	2nd	*Doubt Clearing class*
	3rd	Class test/Assignment-02
	4th	*QUIZ Test-2*
14th	1st	*Semester Question Discussion*
	2nd	*Semester Question Discussion*
	3rd	*Doubt Clearing Class*
	4th	*Doubt Clearing Class*