GOVERNMENT POLYTECHNIC JAJPUR
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DEPARTMENT OF MATHEMATICS AND SCIENCE

LESSON PLAN (2021-22)

Discipline: Electrical & Mtallurgy	Semester: 2nd	Name of the Teaching faculty: KEDARNATH JENA
Subject: ENGG. MECHANICS (Th-4)	No of Days/Week class alloted: 4	Semester from Date: 14 .03 . 2022 To Date: 30.06.2022 No of weeks: 15
Week	Class Day	Topics
1st	1st	CHAPTER 1. FUNDAMENTALS OF ENGINEERING MECHANICS
		Definitions of mechanics, Statics, Dynamics and Rigid bodies.
	2nd	i) Definition of force.
		ii) Definition, classification of force system according to plane and line of action.
	3rd	i) Characteristics of Force & effect of Force.
		ii) Principles of Transmissibility & Principles of Superposition.
	4th	Action & Reaction Forces & concept of Free Body Diagram.
2nd	1st	i) Definition of Resolution of force, Method of Resolution.
		ii) Types of Component forces, Perpendicular components & non-perpendicular components.
	2nd	Definition of composition of force, Resultant Force, Method of composition of forces.
	3rd	Analytical Method such as Law of Parallelogram of forces
	4th	Method of resolution.
3rd	1st	Graphical Method: Introduction, Space diagram, Vector diagram, Polygon law of forces.
	2nd	Resultant of concurrent, non-concurrent & parallel force system by Analytical method.
	3rd	Resultant of concurrent, non-concurrent & parallel force system by Graphical method.
	4th	Definition, Geometrical meaning of moment of a force, measurement of moment of a force & its S.I units.
4th	1st	Classification of moments according to direction of rotation, sign convention, Law of moments, Varignon's Theorem.
	2nd	Definition of couple, S.I. units, measurement of couple, properties of couple.
	3rd	CHAPTER - 2. EQUILIBRIUM
		i) Definition of equilibrium, condition of equilibrium.
		ii) Analytical conditions of equilibrium for concurrent force system.
	4th	Analytical conditions of equilibrium for non-concurrent force system.
	1st	Graphical conditions of equilibrium for concurrent force system.
	2nd	Graphical conditions of equilibrium for non-concurrent force system.

5th	3rd	Free Body Diagram.
	4th	Lami's Theorem – Statement, Application for solving various engineering problems.
6th	1st	Application of Lami's theorem for solving various engineering problems.
	2nd	Application of Lami's theorem for solving various engineering problems.
	3rd	**Class test 1**
	4th	**CHAPTER -3. FRICTION**
		Definition of friction, Frictional forces.
7th	1st	Limiting frictional force, Co-efficient of Friction.
	2nd	Angle of Friction & Repose, Laws of Friction.
	3rd	Laws of Friction, Advantages & Disadvantages of Friction.
	4th	Equilibrium of bodies on level plane – Force applied on horizontal plane.
8th	1st	Equilibrium of bodies on level plane – Force applied on inclined plane.
	2nd	Ladder Friction.
	3rd	Ladder Friction and Wedge Friction.
	4th	Wedge Friction.
9th	1st	**CHAPTER - 4. CENTROID & MOMENT OF INERTIA**
		Centroid – Definition, Moment of an area about an axis.
	2nd	Centroid of geometrical figures such as squares, rectangles, triangles.
	3rd	Centroid of geometrical figures such as circles, semicircles & quarter circles.
	4th	Centroid of composite figures.
10th	1st	Centroid of composite figures.
	2nd	Centroid of composite figures.
	3rd	Moment of Inertia – Definition, Parallel axis Theorems.
	4th	Perpendicular axis Theorems.
11th	1st	M.I. of plane lamina & different engineering sections.
	2nd	M.I. of plane lamina & different engineering sections.
	3rd	M.I. of plane lamina & different engineering sections.
	4th	M.I. of plane lamina & different engineering sections.
12th	1st	Previous year question discussion.
	2nd	Previous year question discussion.
	3rd	**CHAPTER-5. SIMPLE MACHINES**
		Definition of simple machine, velocity ratio of simple gear train and compound gear train.
	4th	Explain simple & compound lifting machine.
13th	1st	Define M.A, V.R. & Efficiency and State the relation between M.A, V.R. & Efficiency.
	2nd	State Law of Machine, Reversibility of Machine and Self Locking Machine.
	3rd	Study of simple machines – simple axle & wheel, single purchase crab winch & double purchase crab winch.
	4th	Study of simple machines – Worm & Worm Wheel, Screw Jack.
	1st	Types of hoisting machine like derricks etc, Their use and working principle.
	2nd	Types of hoisting machine like derricks etc, Their use and working principle.

14th	3rd	**CHAPTER-6. DYNAMICS**
		Kinematics & Kinetics, Principles of Dynamics, Newton's Laws of Motion,Motion of Particle acted upon by a constant force.
	4th	Equations of motion, De-Alembert's Principle.
15th	1st	Work, Power, Energy & its Engineering Applications.
	2nd	Kinetic & Potential energy & its application.
	3rd	Momentum & impulse, conservation of energy & linear momentum.
	4th	Collision of elastic bodies, and Coefficient of Restitution.
16th	1st	CLASS TEST 2
	2nd	
	3rd	
	4th	

14.03.21

Signature of faculty

Books Recommended

1. Engineering Mechanics – by A.R. Basu (TMH Publication Delhi)
2. Engineering Machines – Basudev Bhattacharya (Oxford University Press).
3. Text Book of Engineering Mechanics – R.S Khurmi (S. Chand).
4. Applied Mechanics & Strength of Material – By I.B. Prasad.
5. Engineering Mechanics – By Timosheenko, Young & Rao.
6. Engineering Mechanics – Beer & Johnson (TMH Publication).