Discipline: ENGINEERING MECHANICS	Semester: 2nd	Name of the Teaching faculty: Jagannath Das		
Subject: MECHANICS	No of Days /Week class alloted: 4	Semester from Date: 20·06·23 No of weeks: 15		To Date: 27·06·23
1ST	1st	i) FUNDAMENTALS OF ENGINEERING MECHANICS. (Chapter-1)		
		ii) Fundamentals.		
		iii) Definitions of Mechanics, Statics, Dynamics, Rigid Bodies.		
	2nd	i) Force System.		
		ii) Definition, Classification of force system according to plane & line of action.		
		iii) Characteristics of Force & effect of Force.		
		iv) Principles of Transmissibility & Principles of Superposition.		
		v) Action & Reaction Forces & concept of Free Body Diagram.		
	3rd	i) Resolution of a Force.		
		ii) Definition, Method of Resolution, Types of Component forces, Perpendicular components & non-perpendicular components.		
	4th	i) Composition of Forces.		
		ii) Definition, Resultant Force, Method of composition of forces, such as:		
		A) Analytical Method such as Law of Parallelogram of forces & method of resolution.		
		iii) Numerical solving related to Parallelogram Law of Force.		
2ND	1st	B) Graphical Method - Introduction, Space diagram, Vector diagram, Polygon law of forces.		
	2nd	C) Resultant of concurrent, non-concurrent & parallel force system by Analytical & Graphical Method.		
		i) Numerical solving using method of resolution of forces to find a resultant force.(Analytical Method)		
	3rd	i) Numerical solving class using method of resolution of forces to find a resultant force.(Analytical Method)		
	4th	i) Numerical solving class using method of resolution of forces to find a resultant force (Graphical Method)		
3RD	1st	i) Moment of Force		
		ii) Definition, Geometrical meaning of moment of a force, measurement of moment of a force & its S.I units.		
		iii) Classification of moments according to direction of rotation, sign convention.		
	2nd	i) Law of moments, Varignon's Theorem of moments.		
		ii) Applications of moments.		
		iii) Analytical method for finding position of the resultant force by moments.		
	3rd	i) Numerical solving class based on law of moments to find the force.		
	4th	ii) Numerical solving class based on Varignon's Principle of moments to find magnitude and position of the resultant force.		

Week	Period	Content
4TH	1st	iii) Couple – Definition, moment of a couple classification, SI units, measurement of couple, properties of couple
	2nd	i) Numerical solving class based on couple to find magnitude of the couple
	3rd	CLASS TEST-I i) EQUILIBRIUM OF FORCES (Chapter-2) ii) Definition, condition of equilibrium, Analytical & Graphical conditions of equilibrium for concurrent, non-concurrent & Free Body Diagram
	4th	i) Lamia's Theorem – Statement and its proof
5TH	1st	i) Numerical solving class by the application of Lami's Theorem for solving various engineering problems. (String problems)
	2nd	i) Numerical solving class by the application of Lami's Theorem for solving various engineering problems. (String problems)
	3rd	i) Numerical solving class by the application of Lami's Theorem for solving various engineering problems. (String problems)
	4th	i) Numerical solving class by the application of Lami's Theorem for solving various engineering problems. (Ball problems)
6TH	1st	i) Numerical solving class by the application of Lami's Theorem for solving various engineering problems. (Ball problems)
	2nd	i) Numerical solving class by the application of Lami's Theorem for solving various engineering problems. (Ball problems)
	3rd	i) FRICTION. (Chapter-3) ii) Definition of friction, Frictional forces, Limiting frictional force, Coefficient of Friction.
	4th	iii) Angle of Friction & Repose, Laws of Friction, Advantages & Disadvantages of Friction.
7TH	1st	i) Equilibrium of a body on a rough horizontal plane. (both upward & downward conditions) ii) Numerical solving on friction of a body on rough horizontal plane.
	2nd	i) Equilibrium of a body on a rough inclined plane subjected to a force acting along the inclined plane. (both upward & downward conditions) i) Numerical solving on friction of a body on rough inclined plane subjected to a force acting along the inclined plane.
	3rd	i) Equilibrium of a body on a rough inclined plane subjected to a force acting horizontally. (both upward & downward conditions) ii) Numerical solving on friction of a body on rough inclined plane subjected to a force acting horizontally.
	4th	i) Equilibrium of a body on a rough inclined plane subjected to a force acting at some angle with the inclined plane. (both upward & downward conditions) ii) Numerical solving on friction of a body on rough inclined plane subjected to a force acting at some angle with the inclined plane.
8TH	1st	i) Applications of friction.(Ladder Friction) ii) Numerical solving based on ladder friction.
	2nd	i) Applications of friction.(Wedge Friction) ii) Numerical solving based on wedge friction.
	3rd	ii) Numerical solving based on wedge friction.

	4th	Previous year questions solving class on Friction.
9TH	1st	i) CENTROID & MOMENT OF INERTIA (Chapter-4)
		ii) Centroid – Definition. Moment of an area about an axis, centroid of geometrical figures such as squares, rectangles, triangles, circles, semicircles & quarter, circles, centroid of composite figures
	2nd	i) Centre of gravity-Definition, Methods for finding centre of gravity
		ii) Centre of gravity of plane area figures (Rectangle, triangle, trapezium circle, semicircle, quarter circle, circular sector.)
		iii) Centre of gravity of solid figures. (Cube, cylinder, right circular cone, sphere hemisphere, segment of sphere)
	3rd	i) Centre of gravity of Plane Figures. (such as T-section, I-section, L-section etc)
		ii) Centre of gravity of symmetrical sections. (such as T-section, C-section, I-section)
		iii) Numerical solving on centre of gravity of above symmetrical sections
	4th	i) Centre of gravity of unsymmetrical sections. (such as L-section, composite section)
		ii) Numerical solving on centre of gravity of above unsymmetrical sections.
10TH	1st	i) Centre of gravity of solid bodies. (Volume of cylinder, hemisphere, right circular solid cone.)
		ii) Numerical solving on centre of gravity of composite solid bodies.
	2nd	i) Centre of gravity of sections with cut out holes.
		ii) Numerical solving on centre of gravity of hollow sections.
	3rd	i) Moment of Inertia – Definition, units of M.I , Methods for finding M I..
		ii) Moment of Inertia of rectangular section, hollow rectangular section.
		iii) Numerical solving on moment of inertia of above sections.
	4th	i) Perpendicular axis Theorems.
		ii) Moment of Inertia of circular section, hollow circular section.
		iii) Numerical solving on moment of inertia of above sections.
11TH	1st	i) Parallel axis Theorems.
		ii) Moment of Inertia of triangular section, hollow triangular section, semi circular section, hollow semi circular section.
		iii) Numerical solving on moment of inertia of above sections.
	2nd	i) M.I. of plane lamina & different engineering sections. (T-section, I-section, L-section)
		ii) Numerical solving on moment of inertia of T-section, I-section.
	3rd	i) Numerical solving on moment of inertia of L-section.
	4th	i) Revision and doubt clearing class on C.G. and M.I..
12TH	1st	Previous year questions solving class on Friction.
	2nd	CLASS TEST-II
	3rd	i) SIMPLE MACHINES. (Chapter-5)
		ii) Definition of simple machine and its types.
		iii) Derive velocity ratio of simple and compound gear train.
	4th	i) Explain simple & compound lifting machine.
		ii) Define M.A, V.R. & Efficiency of a machine & State the relation between them.

		iii) Numerical solving to find M.A., V.R., Efficiency of a machine
13TH	1st	i) Reversibility of Machine, Self Locking Machine
		ii) Numerical solving to check the reversibilty of machine
		iii) State and show the graph of friction in a machine
		iv) Numerical solving related to friction in a machine.
	2nd	i) State Law of Machine and show the graph.
		ii) Numerical solving to find law of machine, effort required to run the machine at no load and load condition.
	3rd	i) Maximum M.A and maximun efficiency of a lifting machine.
		ii) Numerical solving related to maximum M.A. and maximum efficiency.
		iii) Study of simple machines – A) Simple axle & wheel.
	4th	i) Study of simple machines – B) Single purchase crab winch & C) Double purchase crab winch.
		ii) Study of simple machines – D) Worm & Worm Wheel.
14TH	1st	i) Study of simple machines – E) Screw Jack.
		ii) Numerical solving to find efficiency of above simple machines.
		iii) Numerical solving to find efficiency of above simple machines.
	2nd	**Previous year questions solving class on simple machine.**
	3rd	i) DYNAMICS. (Chapter-6)
		ii) Kinematics & Kinetics, Principles of Dynamics. Newton's Laws of Motion.
	4th	i) Motion of Particle acted upon by a constant force.
		ii) Equations of motion, De-Alembert's Principle.
15TH	1st	i) Work, Power, Energy & its Engineering Applications.
		ii) Kinetic & Potential energy & its application.
	2nd	i) Momentum & impulse.
		ii) Conservation of energy & linear momentum, collision of elastic bodies and Coefficient of Restitution.
		iii) Numerical solving related to Coefficient of Restitution.
	3rd	i) Numerical solving related to Coefficient of Restitution.
	4th	**Previous year questions solving class on dynamics.**

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).

Jagannath Das
Signature of faculty