UTKAL GOURAV MADHUSUDAN INSTITUTE OF TECHNOLOGY, RAYAGADA

Academic Lesson Plan for 2nd Semester – 2023 (Summer)

Name of teaching faculty: Miss Rojina Rout,
PTGF Lecturer (Civil)
Dept.: Department of Mathematics & Science
Semester & Branch: 2nd Sem, Electrical & ETC Engg.
Subject: Theory 4: Engg. Mechanics
No. of periods per week: 4, Total Periods: 60
End semester Exam: 80 Marks, Class Test (I.A.): 20 Marks,
Total Marks: 100 Marks

Week	Date	Period	Unit/ Chapter	Topics to be covered
1st		1	1.1	Fundamentals. Definitions of Mechanics, Statics, Dynamics, Rigid Bodies,
		1	1.2	Force System. Definition, Classification of force system according to plane & line of action.
		1	1.2	Characteristics of Force & effect of Force. Principles of Transmissibility & Principles of Superposition. Action & Reaction Forces & concept of Free Body Diagram.
		1	1.3	Resolution of a Force. Definition, Method of Resolution, Types of Component forces, Perpendicular components & non- perpendicular components.
2nd		1	1.4	Composition of Forces. Definition, Resultant Force, Method of composition of forces
		1	1.4.1	Analytical Method such as Law of Parallelogram of forces & method of resolution.
		1	1.4.2	Graphical Method. Introduction, Space diagram, Vector diagram, Polygon law of forces.
		1	1.4.3	Resultant of concurrent, non-concurrent & parallel force system by Analytical & Graphical Method.
3rd		1	1.5	Moment of Force. Definition, Geometrical meaning of moment of a force, measurement of moment of a force & its S.I units.
		1	1.5	Classification of moments according to direction of rotation, sign convention,
		1	1.5	Law of moments, Varignon's Theorem
		1	1.5	Couple – Definition, S.I. units, measurement of couple
4th		1	1.5	properties of couple, simple problems on Force systems
		1	2.1	Introduction to Equilibrium, Definition, condition of equilibrium
		1	2.1	Analytical & Graphical conditions of equilibrium for concurrent, non-concurrent & Free Body Diagram.
		1	2.2	Lami's Theorem – Statement, Application for solving

				various engineering problems.
5th		1		Revision- CH-1& 2
		1	3.1	Definition of friction& Frictional forces
		1	3.1	Define Limiting frictional force & Coefficient of Friction.
		1	3.1	Define Angle of Friction & Repose & Laws of Friction
6th		1	3.1	Advantages & Disadvantages of Friction.
		1		Friction problem
		1		Friction problem
		1		Friction problem
7th		1	3.2	Equilibrium of bodies on level plane – Force applied on horizontal plane
		1		Problem solved of Force applied on horizontal plane
		1	3.2	Equilibrium of bodies on level plane – Force applied on inclined plane
		1	3.2	Problem solved of Force applied on inclined plane
8th		1	3.3	Ladder, Wedge Friction
		1		Problems solved on Ladder friction
		1		Problems solved on Ladder friction
		1		Problems solved on wedge friction
9th		1		Revision- CH-3
		1	4.1	Introduction to centroid and M.I, Lamia's Theorem – Statement, Application for solving various engineering problems.
		1	4.1	centroid of geometrical figures such as squares, rectangles, triangles, circles, semicircles & quarter circles
		1	4.1	centroid of composite figures, problems on centroid
10th		1	4.2	Moment of Inertia – Definition, Parallel axis & Perpendicular axis Theorems
		1	4.2	M.I. of plane lamina & different engineering sections.
		1		Problems on M.I
		1		Problems on M.I
11th		1	5.1	Definition of simple machine, velocity ratio of simple and compound gear train
		1	5.1	Explain simple & compound lifting machine
		1	5.1	Define M.A, V.R.& Efficiency and State the relation between them
		1	5.1	State Law of Machine, Reversibility of Machine, Self- Locking Machine.
12th		1	5.2	Study of simple machines – simple axle & wheel
		1	5.2	Problems solved on simple axle & wheel
		1	5.2	Discussion about Single purchase crab winch
		1	5.2	Problem solved on Single purchase crab winch
13th		1	5.2	Discussion about double purchase crab winch
		1	5.2	Problems on double purchase crab winch
		1	5.2	Discussion of Worm & Worm Wheel
		1	5.2	Problems on Worm& Worm Wheel

14th		1	5.2	Screw Jack
		1	5.2	Problems solved on screw jack
		1	5.3	Types of hoisting machine-like derricks etc. Their use and working principle
		1	6.1	Kinematics & Kinetics, Principles of Dynamics, Newton's Laws of Motion.
15th		1	6.1	Motion of Particle acted upon by a constant force, Equations of motion
		1	6.2	De-Alembert's Principle, Work, Power, Energy & its Engineering Applications.
		1	6.3	Kinetic & Potential energy & its application, Momentum & impulse, conservation of energy & linear momentum
		1	6.3	collision of elastic bodies, and Coefficient of Restitution

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