

NILASAILA INSTITUTE OF SCIENCE & TECHNOLOGY SERGARH-756060, BALASORE (ODISHA)



(Approved by AICTE& affiliated to SCTE&VT, Odisha)



## LESSON PLAN

**SUBJECT: Th-4 (ENGINEERING MECHANICS)**

### CHAPTER WISE DISTRIBUTION OF PERIODS

Sl.No.	Name of the chapter as per the Syllabus	No. of Periods as per the Syllabus	No. of periods actually needed
1	Fundamentals of Engineering Mechanics	14	14
2	Equilibrium	8	8
3	Friction	10	10
4	Centroid & moment of Inertia	14	14
5	Simple Machines	8	8
6	Dynamics	6	6
	Total Period:	60	60



Discipline: AUTO/MECH/C IVIL	Semester: 2ND	Name of the Teaching Faculty: Er. Santosh Kumar
Week	Class Day	Theory / Practical Topics
1 <sup>st</sup>	1 <sup>st</sup>	1.1 Fundamentals. Definitions of Mechanics, Statics, Dynamics, Rigid Bodies,
	2 <sup>nd</sup>	1.1 Fundamentals. Definitions of Mechanics, Statics, Dynamics, Rigid Bodies,
	3 <sup>rd</sup>	1.2 Introduction to Force, Force System. Definition, Classification of force system according to plane & line of action
	4 <sup>th</sup>	Principles of Superposition. Action & Reaction Forces & concept of Free Body Diagram
2 <sup>nd</sup>	1 <sup>st</sup>	simple problems related to force system
	2 <sup>nd</sup>	1.3 Resolution of a Force. Definition, Method of Resolution, Types of Component forces, Perpendicular components & non-perpendicular components.
	3 <sup>rd</sup>	1.3 Resolution of a Force. Definition, Method of Resolution, Types of Component forces, Perpendicular components & non-perpendicular components.
	4 <sup>th</sup>	1.4 Composition of Forces. Definition, Resultant Force, Method of composition of forces
3 <sup>rd</sup>	1 <sup>st</sup>	1.4 Composition of Forces. Definition, Resultant Force, Method of composition of forces
	2 <sup>nd</sup>	1.4.1 Analytical Method such as Law of Parallelogram of forces & method of resolution
	3 <sup>rd</sup>	1.4.2. Graphical Method. Introduction, Space diagram, Vector diagram, Polygon law of forces
	4 <sup>th</sup>	1.4.3 Resultant of concurrent, non-concurrent & parallel force system by Analytical & Graphical Method
	1 <sup>st</sup>	1.5 Moment of Force. Definition, Geometrical meaning of moment of a force, measurement of moment of a force & its S.I units.

4 <sup>th</sup>	2 <sup>nd</sup>	1.5 sign convention, Law of moments, Varignon's Theorem, Couple – Definition, S.I. units, measurement of couple, properties of couple.
	3 <sup>rd</sup>	2.1 Definition, condition of equilibrium, Analytical & Graphical conditions of equilibrium for concurrent, non-concurrent & Free Body Diagram.
	4 <sup>th</sup>	2.1 Definition, condition of equilibrium, Analytical & Graphical conditions of equilibrium for concurrent, non-concurrent & Free Body Diagram.
5 <sup>th</sup>	1 <sup>st</sup>	2.2 Lamia's Theorem – Statement, Application for solving various engineering problems
	2 <sup>nd</sup>	simple problems related to moment and lamia's theorem.
	3 <sup>rd</sup>	3.1 Definition of friction, Frictional forces, Limiting frictional force, Coefficient of Friction
	4 <sup>th</sup>	Angle of Friction & Repose, Laws of Friction, Advantages & Disadvantages of Friction
6 <sup>th</sup>	1 <sup>st</sup>	INTERNAL ASSESMENT
	2 <sup>nd</sup>	INTERNAL ASSESMENT
	3 <sup>rd</sup>	3.2 Equilibrium of bodies on level plane – Force applied on horizontal & inclined plane (up & down).
	4 <sup>th</sup>	3.3 Ladder, Wedge Friction
7 <sup>th</sup>	1 <sup>st</sup>	SIMPLE PROBLEM RELATED TO FRICTION.
	2 <sup>nd</sup>	REVISION
	3 <sup>rd</sup>	4.5 Effect of imperfection on material properties
	4 <sup>th</sup>	4.6 Deformation by slip and twinning
8 <sup>th</sup>	1 <sup>st</sup>	4.7 Effect of deformation on material properties
	2 <sup>nd</sup>	Revision

8 <sup>th</sup>	3 <sup>rd</sup>	4.1 Centroid – Definition, Moment of an area about an axis.
	4 <sup>th</sup>	centroid of geometrical figures such as squares, rectangles, triangles, circles, semicircles & quarter circles, centroid of composite figures.
9 <sup>th</sup>	1 <sup>st</sup>	centroid of geometrical figures such as squares, rectangles, triangles, circles, semicircles & quarter circles, centroid of composite figures.
	2 <sup>nd</sup>	SIMPLE PROBLEM RELATED TO CENTROID OF SOME FIGURE.
	3 <sup>rd</sup>	4.2 Moment of Inertia – Definition, Parallel axis & Perpendicular axis Theorems
	4 <sup>th</sup>	4.2 Moment of Inertia – Definition, Parallel axis & Perpendicular axis Theorems
10 <sup>th</sup>	1 <sup>st</sup>	M.I. of plane lamina & different engineering sections.
	2 <sup>nd</sup>	REVISION.
	3 <sup>rd</sup>	5.1 Definition of simple machine, velocity ratio of simple and compound gear train, explain simple & compound lifting machine
	4 <sup>th</sup>	define M.A, V.R. & Efficiency & State the relation between them, State Law of Machine, Reversibility of Machine, Self Locking Machine.
11 <sup>th</sup>	1 <sup>st</sup>	5.2 Study of simple machines – simple axle & wheel, single purchase crab winch & double purchase crab winch, Worm & Worm Wheel, Screw Jack
	2 <sup>nd</sup>	5.2 Study of simple machines – simple axle & wheel, single purchase crab winch & double purchase crab winch, Worm & Worm Wheel, Screw Jack
	3 <sup>rd</sup>	5.3 Types of hoisting machine like derricks etc, Their use and working principle
	4 <sup>th</sup>	5.3 Types of hoisting machine like derricks etc, Their use and working principle
12 <sup>th</sup>	1 <sup>st</sup>	SIMPLE PROBLEM RELATED TO MA,VR AND EFFICIENCY OF MACHINE.
	2 <sup>nd</sup>	REVISION.
	3 <sup>rd</sup>	6.1 Kinematics & Kinetics, Principles of Dynamics

	4 <sup>th</sup>	Newton's Laws of Motion, Motion of Particle acted upon by a constant force,
13 <sup>th</sup>	1 <sup>st</sup>	Newton's Laws of Motion, Motion of Particle acted upon by a constant force,
	2 <sup>nd</sup>	Equations of motion, DeAlembert's Principle.
	3 <sup>rd</sup>	SIMPLE PROBLEM RELATED TO NEWTONS LAWS OF MOTION
	4 <sup>th</sup>	6.2 Work, Power, Energy & its Engineering Applications, Kinetic & Potential energy & its application.
14 <sup>th</sup>	1 <sup>st</sup>	6.2 Work, Power, Energy & its Engineering Applications, Kinetic & Potential energy & its application.
	2 <sup>nd</sup>	6.3 Momentum & impulse, conservation of energy & linear momentum, collision of elastic bodies, and Coefficient of Restitution
	3 <sup>rd</sup>	6.3 Momentum & impulse, conservation of energy & linear momentum, collision of elastic bodies, and Coefficient of Restitution
	4 <sup>th</sup>	6.3 Momentum & impulse, conservation of energy & linear momentum, collision of elastic bodies, and Coefficient of Restitution
15 <sup>th</sup>	1 <sup>st</sup>	SIMPLE PROBLEM RELATED TO WORK ENERGY AND POWER
	2 <sup>nd</sup>	SIMPLE PROBLEM RELATED TO WORK ENERGY AND POWER
	3 <sup>rd</sup>	SIMPLE PROBLEM RELATED TO WORK ENERGY AND POWER
	4 <sup>th</sup>	REVISION