GOVERNMENT POLYTECHNIC, MALKANGIRI
DEPARTMENT OF MECHANICAL ENGINEERING

LESSON PLAN

Discipline: EE2 EEE	Semester: **2nd**	*Name of the Teaching Faculty:* **Shantanu Kumar Maity**
Subject: **Engineering Mechanics**	No. of days/week class allotted **4**	Semester From date:04.02.2025 To date:17.05.2025 No. of Week: 15
PRE-REQUISITE	Basic Knowledge about Engineering Mechanics	
Course Outcomes	CO1: Analyzing the coplanar force system and find out the resultant force of this system by applying basics of mechanics. CO2: Determining unknown forces of different engineering systems by applying laws of equilibrium. CO3: Understanding principle of friction in various conditions when the object is in static equilibrium. CO4: Understanding centroid and centre of gravity of various components in engineering system. CO5: Analyzing different simple machines to find out different influencing parameters viz. Mechanical Advantage, Velocity Ratio and Efficiency.	

Week	Class Day	Theory/Practical Topics
1st	1st	Significance and relevance of Mechanics, Applied mechanics, Statics, Dynamics.
	2nd	Significance and relevance of Mechanics, Applied mechanics, Statics, Dynamics.
	3rd	Space, time, mass, particle, flexible body and rigid body.
	4th	Scalar and vector quantity, Units of measurement (SI units) - Fundamental units and derived units.
2nd	1st	Force – unit, representation as a vector and by Bow's notation, characteristics and effects of a force, Principle of transmissibility of force, Force system and its classification.
	2nd	Force – unit, representation as a vector and by Bow's notation, characteristics and effects of a force, Principle of transmissibility of force, Force system and its classification.
	3rd	Force – unit, representation as a vector and by Bow's notation, characteristics and effects of a force, Principle of transmissibility of force, Force system and its classification.
	4th	Resolution of a force - Orthogonal components of a force, moment of a force, Varignon's Theorem
3rd	1st	Resolution of a force - Orthogonal components of a force, moment of a force, Varignon's Theorem
	2nd	Resolution of a force - Orthogonal components of a force, moment of a force, Varignon's Theorem

	3rd	Composition of forces – Resultant, analytical method for determination of resultant for concurrent, non-concurrent and parallel co-planar force systems – Law of triangle, parallelogram and polygon of forces
	4th	Composition of forces – Resultant, analytical method for determination of resultant for concurrent, non-concurrent and parallel co-planar force systems – Law of triangle, parallelogram and polygon of forces
4th	1st	Composition of forces – Resultant, analytical method for determination of resultant for concurrent, non-concurrent and parallel co-planar force systems – Law of triangle, parallelogram and polygon of forces
	2nd	Equilibrium and Equilibrant, Free body and Free body diagram, Analytical and graphical methods of analysing equilibrium
	3rd	Equilibrium and Equilibrant, Free body and Free body diagram, Analytical and graphical methods of analysing equilibrium
	4th	Equilibrium and Equilibrant, Free body and Free body diagram, Analytical and graphical methods of analysing equilibrium
5th	1st	Lami's Theorem – statement and explanation, Application for various engineering problems.
	2nd	Lami's Theorem – statement and explanation, Application for various engineering problems.
	3rd	Types of beam, supports (simple, hinged, roller and fixed) and loads acting on beam (vertical and inclined point load, uniformly distributed load, couple),
	4th	Types of beam, supports (simple, hinged, roller and fixed) and loads acting on beam (vertical and inclined point load, uniformly distributed load, couple),
6th	1st	Types of beam, supports (simple, hinged, roller and fixed) and loads acting on beam (vertical and inclined point load, uniformly distributed load, couple),
	2nd	Types of beam, supports (simple, hinged, roller and fixed) and loads acting on beam (vertical and inclined point load, uniformly distributed load, couple),
	3rd	Beam reaction for cantilever, simply supported beam with or without overhang – subjected to combination of Point load and uniformly distributed load.
	4th	Beam reaction for cantilever, simply supported beam with or without overhang – subjected to combination of Point load and uniformly distributed load.
7th	1st	Beam reaction for cantilever, simply supported beam with or without overhang – subjected to combination of Point load and uniformly distributed load.
	2nd	Beam reaction graphically for simply supported beam subjected to vertical point loads only
	3rd	Beam reaction graphically for simply supported beam subjected to vertical point loads only

	4th	Beam reaction graphically for simply supported beam subjected to vertical point loads only
8th	1st	Friction and its relevance in engineering, types and laws of friction,
	2nd	limiting equilibrium, limiting friction, co-efficient of friction,
	3rd	limiting equilibrium, limiting friction, co-efficient of friction,
	4th	angle of friction, angle of repose, relation between co-efficient of friction and angle of friction.
9th	1st	angle of friction, angle of repose, relation between co-efficient of friction and angle of friction.
	2nd	relation between co-efficient of friction and angle of friction.
	3rd	Equilibrium of bodies on level surface subjected to force parallel and inclined to plane.
	4th	Equilibrium of bodies on level surface subjected to force parallel and inclined to plane.
10th	1st	Equilibrium of bodies on inclined plane subjected to force parallel to the plane only.
	2nd	Equilibrium of bodies on inclined plane subjected to force parallel to the plane only.
	3rd	Centroid of geometrical plane figures (square, rectangle, triangle, circle, semi-circle, quarter circle)
	4th	Centroid of geometrical plane figures (square, rectangle, triangle, circle, semi-circle, quarter circle)
11th	1st	Centroid of geometrical plane figures (square, rectangle, triangle, circle, semi-circle, quarter circle)
	2nd	Centroid of composite figures composed of not more than three geometrical figures
	3rd	Centroid of composite figures composed of not more than three geometrical figures
	4th	Centroid of composite figures composed of not more than three geometrical figures
12th	1st	Centre of Gravity of simple solids (Cube, cuboid, cone, cylinder, sphere, hemisphere)
	2nd	Centre of Gravity of simple solids (Cube, cuboid, cone, cylinder, sphere, hemisphere)
	3rd	Centre of Gravity of simple solids (Cube, cuboid, cone, cylinder, sphere, hemisphere)
	4th	Centre of Gravity of simple solids (Cube, cuboid, cone, cylinder, sphere, hemisphere)
13th	1st	Centre of Gravity of composite solids composed of not more than two simple solids.
	2nd	Centre of Gravity of composite solids composed of not more than two simple solids.
	3rd	Simple lifting machine, load, effort, mechanical advantage, applications and advantages.
	4th	Simple lifting machine, load, effort, mechanical advantage, applications and advantages.

14th	1st	Velocity ratio, efficiency of machines, law of machine.
	2nd	Velocity ratio, efficiency of machines, law of machine.
	3rd	Ideal machine, friction in machine, maximum Mechanical advantage and efficiency, reversible and non-reversible machines, conditions for reversibility
	4th	Ideal machine, friction in machine, maximum Mechanical advantage and efficiency, reversible and non-reversible machines, conditions for reversibility
15th	1st	Ideal machine, friction in machine, maximum Mechanical advantage and efficiency, reversible and non-reversible machines, conditions for reversibility
	2nd	Velocity ratios of Simple axle and wheel, Differential axle and wheel, Worm and worm wheel, Single purchase and double purchase crab winch, Simple screw jack, Weston's differential pulley block, geared pulley block
	3rd	Velocity ratios of Simple axle and wheel, Differential axle and wheel, Worm and worm wheel, Single purchase and double purchase crab winch, Simple screw jack, Weston's differential pulley block, geared pulley block
	4th	Velocity ratios of Simple axle and wheel, Differential axle and wheel, Worm and worm wheel, Single purchase and double purchase crab winch, Simple screw jack, Weston's differential pulley block, geared pulley block

Learning Resources:

Prof. Bhankhar Bharat Gokaldas,	Engineering Mechanics
D.S. Bedi,	Engineering Mechanics (Khanna Publications)
Khurmi, R.S.,	Applied Mechanics(S. Chand & Co)
Bansal R K,	A text book of Engineering Mechanics,(Laxmi Pub)

Shankar Kumar Maity

Signature of Faculty

03/02/25

Signature of HOD/

02/02/2025

Signature of Academic Coordinator

Signature of Principal