# LESSON PLAN

**SUBJECT:** ENGINEERING MECHANICS **Periods:** 4 per week

**NAME OF FACULTY- SANJAY KU.MOHANTY** **SEMESTER: 1st /** 2nd (1st year )
Semester from date: **25/10/2022 to 31/01/2023,**20/03/2023 to 24.06.2023 **,**
**ACADEMIC YEAR**.- 2022 -23 **No. of weeks:** 15

| Week | Class Day | Theory / Practical Topics |
|---|---|---|
| 1st | 1st | **Fundamentals.**<br>Definitions of Mechanics, Statics, Dynamics, Rigid Bodies |
| | 2nd | **Force**<br>Force System. Definition, Classification of force system according to plane & line of action. |
| | 3rd | Characteristics of Force & effect of Force. Principles of Transmissibility & Principles of Superposition. Action & Reaction Forces & concept of Free Body Diagram. |
| | 4th | **Resolution of a Force.**<br>Definition, Method of Resolution, Types of Component forces |
| 2nd | 1st | Perpendicular components & non-perpendicular components |
| | 2nd | Composition of Forces.<br>Definition, Resultant Force, Method of composition of forces |
| | 3rd | such as<br>Analytical Method such as Law of Parallelogram of forces & method of resolution. |
| | 4th | **Graphical Method.**<br>Introduction, Space diagram, Vector diagram, Polygon law of forces |
| 3rd | 1st | Resultant of concurrent, non-concurrent & parallel force system by Analytical & Graphical Method. |
| | 2nd | **Moment of Force.**<br>Definition, Geometrical meaning of moment of a force, |
| | 3rd | measurement of moment of a force & its S.I units. |
| | 4th | Classification of moments according to<br>Direction of rotation, sign convention, Law of moments, Varignon's Theorem |
| 4th | 1st | Couple<br>Definition, S.I. units, measurement of couple, properties of couple. |
| | 2nd | Simple problems on above |
| | 3rd | Simple problems on above |
| | 4th | Revision |
| 5th | 1st | **EQUILIBRIUM**<br>Definition, condition of equilibrium, |
| | 2nd | Analytical & Graphical conditions of equilibrium for concurrent, non-concurrent & Free Body Diagram |
| | 3rd | Lamia's Theorem – Statement, Application for solving various engineering problems. |
| | 4th | Simple problems on above |
| 6th | 1st | Simple problems on above |
| | 2nd | Revision |
| | 3rd | **FRICTION**<br>Definition of friction, Frictional forces, Limiting frictional force, |
| | 4th | Coefficient of Friction. Angle of Friction & Repose, |
| 7th | 1st | Laws of Friction, Advantages & Disadvantages of Friction. |

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| | 2nd | Equilibrium of bodies on level plane – Force applied on horizontal & inclined plane (up &down). |
| | 3rd | Ladder, Wedge Friction. |
| | 4th | Simple problems on above |
| 8th | 1st | Simple problems on above |
| | 2nd | Revision |
| | 3rd | **CENTROID & MOMENT OF INERTIA**<br>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 |
| | 4th | Moment of Inertia – Definition, Parallel axis & Perpendicular axis Theorems |
| 9th | 1st | M.I. of plane lamina & different engineering sections. |
| | 2nd | Simple problems on above |
| | 3rd | Simple problems on above |
| | 4th | Revision |
| 10th | 1st | **SIMPLE MACHINES**<br>Definition of simple machine, velocity ratio of simple and compound gear train, |
| | 2nd | explain simple & compound lifting machine |
| | 3rd | Define M.A, V.R. & Efficiency & State the relation between them, |
| | 4th | State Law of Machine, Reversibility of Machine, Self-Locking Machine. |
| 11th | 1st | Simple problems on above |
| | 2nd | Simple problems on above |
| | 3rd | Study of simple machines<br>simple axle & wheel, single purchase crab winch & double purchase crab winch. |
| | 4th | Worm & Worm Wheel, Screw Jack |
| 12th | 1st | Types of hoisting machine like derricks etc., Their use and working principle. |
| | 2nd | Revision |
| | 3rd | Revision |
| | 4th | Solve simple problems |
| 13th | 1st | DYNAMICS<br>Kinematics & Kinetics, Principles of Dynamics |
| | 2nd | Newton's Laws of Motion, Motion of Particle acted upon by a constant force |
| | 3rd | Equations of motion, |
| | 4th | DeAlembert's Principle. |
| 14th | 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. |
| 15th | 1st | Solve simple problems |
| | 2nd | Solve simple problems |
| | 3rd | Revision |
| | 4th | Revision |