**Lesson Plan**

Name of the Faculty : Preeti

Discipline : Civil Engg.

Semester : 2nd

Subject : Applied Mechanics

Lesson plan duration : 06 March 2023 to 23 june2023

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| Week | **Theory** | | **Practical** | |
| Lecture Day | Topic (including assignments /tests) | Practical Day | Topic |
| Week-1 | 1st | **Introduction** Concept of mechanics, Classification of mechanics, | 1st | Verification of polygon law of forces using universal force table/Gravesend apparatus. |
| 2nd | utility of mechanics in engineering field, Concept of rigid body, scalar and vector quantities. |
| 3rd | **Laws of forces** Definition of force, measurement of force in SI units, its representation, |
| Week 2 | 1st | Point force/concentrated force & Uniformly distributed force, effects of force, characteristics of a force. | 1st | Verification of Lami’s theorem. |
| 2nd | Different force systems, principle of transmissibility of forces, law of super-position |
| 3rd | Composition and resolution of coplanar concurrent forces, resultant force, method of composition offorces |
| Week 3 | 1st | laws of forces, triangle law of forces | 1st | To verify law of moments by using Bell crank lever. |
| 2nd | polygon law of forces - graphically, analytically, resolution of forces |
| 3rd | Free body diagram  Equilibrant force and its determination |
| Week4 | 1st | Lami's theorem  [Simple problems on above topics] | 1st | To verify the forces in different members of jib crane |
| 2nd | **Moment-**Concept of moment, Moment of a force and units of moment |
| 3rd | Varignon's theorem (definition only)  Principleof moment and its applications |
| Week 5 | 1st | (Levers – simple and compound) | 1st | To determine coefficient of friction between three pairs of given surface |
| 2nd | steel yard, safety valve, reaction at support) |
| 3rd | Parallel forces (like and unlike parallel force), calculating their resultant |
| Week 6 | 1st | Concept of couple, its properties and effects | 1st | **To find out center of gravity of regular lamina.** |
| 2nd | General conditions of equilibrium of bodies under coplanar forces |
| 3rd | Position of resultant force by moment |
| Week 7 | 1st | Simple problems on the above topics] | 1st | To find out center of gravity of irregular lamina. |
| 2nd | Revision of Chapter |
| 3rd | **Friction-** Definition and concept of friction, types of friction, |
| Week 8 | 1st | force of friction, Laws of staticfriction, | 1st | To find the mechanical advantage, velocity ratio and efficiency of a screw jack |
| 2nd | coefficient of friction, angle of friction, |
| 3rd | angle of repose, cone of friction |
| Week 9 | 1st | Equilibrium of a body lying on a horizontal plane, | 1st | To find the mechanical advantage, velocity ratio and efficiency of worm and worm wheel. |
| 2nd | Calculation of least force required to maintain equilibrium of a body on a rough inclined plane subjected to a force:A)Acting along the inclined plane |
| 3rd | b)At some angle with the inclined plane |
| Week 10 | 1st | equilibrium of a body lying on a rough inclined plane.Simple numericals. | 1st | To find mechanical advantage, velocity ratio and efficiency of single purchase crab. |
| 2nd | **Centre of Gravity -** Concept, definition of centroid of plain figures,centre of gravity of symmetrical solid bodies, difference between centroid and C.G |
| 3rd | Determination of centroid of plain and composite lamina using moment method only |
| Week 11 | 1st | centroid of bodies with removed portion | 1st | Practice |
| 2nd | Determination of center of gravity of solid bodies - cylinder ,cube, cuboid, sphere |
|  |  |
| 3rd | Determination of center of gravity of solid bodies- composite bodies and bodies with portion removed |
| Week 12 | 1st | **Laws of Motion** Newton’s laws of motion and their applications, Concept of momentum**.** | 1st | Verification of polygon law of forces using universal force table/Gravesend apparatus. |
| 2nd | Derivation of force equation from second law of motion, numerical problems on second law of motion. Bodies tied with string |
| 3rd | Newton’s third law of motion, numerical problems |
| Week 13 | 1st | conservation of momentum, impulse and impulsive force. | 1st | Verification of Lami’s theorem. |
| 2nd | **Simple Machines-** Definition of Simple and compound machine (Examples)  Definition of load, effort, velocity ratio, mechanical advantage and efficiency of ­a machine |
| 3rd | load, effort, velocity ratio, mechanical advantage their relationship, law of machines and efficiency of ­a machine |
| Week 14 | 1st | Definition of ideal machine, reversible and self locking machine | 1st | To verify law of moments by using Bell crank lever. |
| 2nd | Effort lost in friction, Load lost in frictionDetermination of maximum mechanical advantage and maximum efficiency |
| 3rd | System of pulleys (first, second) |
| Week 15 | 1st | Third system of pulleys | 1st | To verify the forces in different members of jib crane |
| 2nd | Determination of velocity ratio, mechanical advantage and efficiency |
| 3rd | Working principle and application of wheel and axle |
| Week 16 | 1st | Working principle and application of Weston’s Differential Pulley Block | 1st | To determine coefficient of friction between three pairs of given surface |
| 2nd | simple screw jack, worm and worm wheel |
| 3rd | single and double winch crab. |