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| **UTKALMANI GOPABANDHU INSTITUTE OF ENGINEERING, ROURKELA** |
| **DEPARTMENT OF MECHANICAL ENGINEERING** |
| **LESSON PLAN** |
| **SUBJECT- ENGINEERING MECHANICS COURSE CODE - TH 4(b)**  |
| **NAME OF THE FACULTY – AMIT KUMAR MARANDI SEMESTER- 1ST** |
| **ACADEMIC SESSION- 2024-25**  |
| **UNIT** | **WEEK** |  **NO. OF LECTURES** | **TOPICS TO BE COVERED** |
| 1 | 1st | 1 | Significance and relevance of Mechanics, Applied mechanics, Statics, Dynamics, definition of space, time, mass, particle, flexible bodyand rigid body |
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| 1 | Scalar and vector quantity, Units of measurement(SI units), Fundamental units and derived units |
| 1 | Force - unit, representation as a vector and by Bow's Notation |
| 1 | Characteristics and effects of a force, Principle of transimissibility of Force, Force system and its classifications |
| 2nd | 1 | Resolution of a force- Orthogonal components of a force and sove simple problems |
| 1 | Moment of a Force, Varignon's Theorem |
| 1 | Solve simple problems and discussion of covered topics |
| 1 | Composition of forces- Resultant, analytical method for determination of resultant for concurrent, non-concurrent aand parallel coplanar force systems - parallelogram law of forces |
| 3rd | 1 | Parallelogram law of forces, Law of triangle and polygon of forces, solve problems |
| 1 | Solve simple problems and discussion of covered topics |
| 2 | 1 | Equilibrium and Equilibrant, Free Body and Free Body Diagram |
| 1 | Analytical and Graphical method of analysing equilibrium, Lami's theorem- statement and explanation, derivation |
| 4th | 1 | Application of lami's theorem to various Enginnering problems and discussion of solutions |
| 1 | Application of lami's theorem to various Enginnering problems and discussion of solutions continued |
| 1 | Types of beams, supports( simple, hinged, roller and fixed) and different types of loads acting on the beam |
| 1 | Beam reaction for cantilever beam with or with out overhang subjected to point loads  |
| 5th | 1 | Beam reaction for cantilever beam with or with out overhang subjected to uniformly distributed loads |
| 1 | Beam reaction for simply supported beam with or with out overhang subjected to point loads |
| 1 | Beam reaction for simply supported beam with or with out overhang subjected to uniformly distributed loads |
| 1 | Beam reaction graphically for simply supported beam subjected to vertical point loads |
| 6th | 1 | Solve various types of application problems for better understanding of topics |
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| 1 | CLASS TEST |
| 3 | 1 | Friction and its relevance in Engineering, types and laws of friction, limiting equilibrium, limiting friction |
| 7th | 1 | Coefficient of friction, angle of friction, angle of repose |
| 1 | relation between coefficient of friction and angle of friction |
| 1 | Equilibrium of bodies on level surface subjected to force parallel to the plane |
| 1 | Equilibrium of bodies on level surface subjected to force inclined to the plane |
| 8th | 1 | Solve problems for better understanding of the above topics |
| 1 | Equilibrium of bodies on inclined plane subjected to force parallel to the plane  |
| 1 | Solve problems for better understanding of the above topics |
| 1 | Solve various types of application problems for better understanding of topics |
| 4 | 9th | 1 | Define centroid& center of gravity, Centroid of geometrical plane figures (square, rectangle, triangle , circle, semi circle etc) |
| 1 | Centroid of composite figures composed of not more than three geometrical figures |
| 1 | Centroid of composite figures composed of not more than three geometrical figures continued |
| 1 | Solve problems for better understanding of the above topics |
| 10th | 1 | Method to find out Centroid of cut off plane sections with numerical problems |
| 1 | Center of gravity of simple solids (cube, cuboid, cone, cylinder, sphere, etc) |
| 1 | Center of gravity of composite soilds composed of not more than two simple solids |
| 1 | Center of gravity of composite soilds composed of not more than two simple solids contd. |
| 11th | 1 | Solve problems for better understanding of the above topics |
| 1 | Method to find out Centre of gravity of cut off solid sections with numerical problems |
| 1 | Solve various types of numerical problems for better understanding of the above topics |
| 1 | CLASS TEST |
| 5 | 12th | 1 | Simple Lifting machine, load, effort, applications and advantages, mechanical advantage and velocity ratio of the machine |
| 1 | Efficiency of the machine , relation with mechanical advantage and velocity ratio and solve related simple problems |
| 1 | Law of machine,and solving related application problems for better understanding |
| 1 | Ideal machine, friction in machine and solve related numerical problems based on friction |
| 13th | 1 | Maximum mechanical advantage and maximum efficiency - derivation and solve numerical problems |
| 1 | Reversible and non- reversible machines and conditions for reversibility |
| 1 | Solve various types of numerical problems for better understanding of the above topics |
| 1 | Velocity ratio of simple axle and wheel |
| 14th | 1 | Velocity ratio of differential axle and wheel |
| 1 | Velocity ratio of Worm and Worm Wheel |
| 1 | Velocity ratio of single purchase crab winch |
| 1 | velocity ratio of Double purchase crab winch |
| 15th | 1 | Velocity ratio of simple screw jack |
| 1 | Velocity ratio of Weston's differential pulley block |
| 1 | Velocity ratio of geared pulley block |
| 1 | Solve various types of numerical problems for better understanding of the above topics and discussion of doubts if any |
| PREPARED BY : AMIT KUMAR MARANDI |
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