**Lesson Plan**

**Name of faculty:- Mr. Naveen Kumar Pathak**

**Discipline:- Mechanical,Civil EngineeringSemester:- 2nd**

**Subject**:-**Applied MechanicsTheory**

**Lesson Plan Duration:- 15 weeks (from 15 February 2024 to 14 June 2024)**

**Work Load:- Lectures-3**

| **WEEK** | **THEORY** | | | **Sign. & date** |
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| **DAY** | **TOPIC** | |  |
| 1st | 1st | Unit -1. Concept of mechanics, Classification of mechanics, utility of mechanics in engineering field, Concept of rigid body, scalar and vector quantities. | |  |
| 2nd | Unit-2: Definition of force, measurement of force in SI units, its representation, types of force: Point force/concentrated force & Uniformly distributed force, | |  |
| 3rd | effects of force, characteristics of a force, Different force systems (coplanar and non-coplanar) | |  |
| 2nd | 1st | principle of transmissibility of forces, law of superposition, Free body diagram, | |  |
| 2nd | Composition and resolution of coplanar concurrent forces, resultant force, method of composition of forces, laws of forces, parallelogram law of forces (with derivation), | |  |
| 3rd | triangle law of forces, polygon law of forces - graphically, analytically | |  |
| 3rd | 1st | resolution of forces, resolving a force into two rectangular components, Lami's theorem, | |  |
| 2nd | Simple numericals, Equilibrium of forces and its determination | |  |
| 3rd | Unit 3: Concept of moment, Moment of a force and units of moment, Varignon's theorem (definition only),. | |  |
| 4th | 1st | Principle of moment and its applications (Levers – simple and compound, steel yard, safety valve ) | |  |
| 2nd | Simple numericals. Parallel forces (like and unlike parallel force), calculating their resultant, | |  |
| 3rd | Concept of couple, its properties and effects, General conditions of equilibrium of bodies under coplanar forces, Position of resultant force by moment | |  |
| 5th | 1st | **1st Sessional** | |  |
| 2nd |
| 3rd |
| 6th | 1st | Unit 4: Definition and concept of friction, types of friction, force of friction, Laws of static friction, coefficient of friction, | |  |
| 2nd | angle of friction, angle of repose, cone of friction, Equilibrium of a body lying on a horizontal plane, | |  |
| 3rd | equilibrium of a body lying on a rough inclined plane. | |  |
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| 7th | 1st | Calculation of least force required to maintain equilibrium of a body on a rough inclined plane subjected to a force acting along the inclined plane and subjected to a force acting at some angle with the inclined plane | |  |
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| 2nd | Simple numericals. | |  |
| 3rd | Unit 5 :Concept, definition of centroid of plain figures and centre of gravity of symmetrical solid bodies. Axis of symmetry, Reference axis. | |  |
| 8th | 1st | Determination of centroid of plain and composite lamina ( T, L, C and I shape) using moment method only, | |  |
| 2nd | centroid of bodies with removed portion. | |  |
| 3rd | Determination of center of gravity of solid bodies - cone, cylinder, hemisphere and sphere; composite bodies and bodies with portion removed. | |  |
| 9th | 1st | Unit 6 :Newton’s laws of motion and their applications, Concept of momentum. | |  |
| 2nd | Derivation of force equation from second law of motion, numerical problems on second law of motion. | |  |
| 3rd | Bodies tied with string, Newton’s third law of motion, numerical problems, conservation of momentum, impulse and impulsive force. | |  |
| 10th | 1st | **2nd Sessional** | |  |
|  | 2nd |
| 3rd |
| 11th | 1st | Unit 7: Definition of effort, velocity ratio, mechanical advantage and efficiency of a machine and their relationship, law of machines, Simple and compound machine (Examples). | |  |
| 2nd | Definition of ideal machine, reversible and self locking machine. Effort lost in friction, Load lost in friction, | |  |
| 3rd | determination of maximum mechanical advantage and maximum efficiency, Simple numericals. | |  |
| 12th | 1st | System of pulleys (first, second, third system of pulleys), | |  |
| 2nd | determination of velocity ratio, mechanical advantage and efficiency. Working principle and application of wheel and axle, Weston’s Differential Pulley Block, simple screw jack, | |  |
| 3rd | worm and worm wheel, single and double winch crab. Expression for their velocity ratio and field of their application. | |  |
| 13th | 1st | **3rd Sessional** | |  |
| 2nd |
| 3rd |
| 14th | 1st | Revision |  | |
| 2nd | Revision |  | |
| 3rd | Revision |  | |
| 15th | 1st | Revision |  | |
| 2nd | Revision |  | |
| 3rd | Revision |  | |

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**Name of faculty:- Mr. Naveen Kumar Pathak**

**Discipline:- Mechanical,civil Engineering Semester:- 2nd**

**Subject:-Applied MechanicsPractical**

**Lesson Plan Duration:-15 weeks (from 15 February 2024 to 14 June 2024)**

**Work Load:-Practicals-4**

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| **WEEK** | **TOPIC** | **Sign. & date** | |
| **Group 1** | **Group 2** |
| **1st** | 1. Verification of polygon law of forces using universal force table/Gravesend apparatus |  |  |
| **2nd** | 2. Verification of Lami’s theorem. |  |  |
| **3rd** | 3. To verify law of moments by using Bell crank lever |  |  |
| **4th** | 4. To verify the forces in different members of jib crane. |  |  |
| **5th** | 5. To determine coefficient of friction between three pairs of given surface. |  |  |
| **6th** | 6. To find out center of gravity of regular lamina |  |  |
| **7th** | 7. To find out center of gravity of irregular lamina. |  |  |
| **8th** | 8. To find the mechanical advantage, velocity ratio and efficiency of a screw jack. |  |  |
| **9th** | 9. To find the mechanical advantage, velocity ratio and efficiency of worm andworm wheel |  |  |
| **10th** | 10. To find mechanical advantage, velocity ratio and efficiency of single purchase crab. |  |  |
| **11th** | File checking |  |  |
| **12th** | File checking |  |  |
| **13th** | Revision |  |  |
| **14th** | Revision |  |  |
| **15th** | Internal viva |  |  |