# LESSON PLAN

**NAME OF FACULTY: GUEST FACULTY**

**DISCIPLINE:** MECHANICAL ENGINEERING

**SEMESTER:** Ist YEAR

**SUBJECT: APPLIED MECHANICS**

**LESSON PLAN DURATION: 15 WEEKS**

**WORK LOAD (LECTURE/PRACTICAL) PER WEEK:** (2 lectures, 2 Practical)

| WEEK | THEORY | | PRACTICALS |
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| | **LECTURE NOS** | **TOPIC** | **TOPIC** |
| 1st | 1 | **Unit-1-** Introduction, Concept of engineering mechanics | |
| | 2 | Definition of mechanics, statics, dynamics, application of engineering mechanics in practical fields. | |
| 2nd | 3 | Different systems of units (FPS, CGS, MKS and SI) | |
| | 4 | And their conversion from one to another e.g. density, force, pressure, work, | |
| 3rd | 5 | power, velocity, acceleration (Simple Numerical Problems), | |
| | 6 | Fundamental Units and Derived Units. Concept of rigid body, scalar and vector quantities | |
| 4th | 7 | **Unit-2-** Laws of forces Definition of force, Bow's Notations, types of force: Point force/concentrated force | |
| | 8 | & Uniformly distributed force, effects of force, and characteristics of a force. | |
| 5th | 9 | Different force systems, principle of transmissibility of forces, law of super-position | |
| | 10 | Composition and resolution of coplanar concurrent forces, resultant force, method of composition of forces, | |
| 6th | 11 | laws of forces, triangle law of forces, polygon law of forces - graphically, analytically, resolution of forces | **Practicals-1** Verification of the polygon law of forces using Gravesend's apparatus |
| | 12 | Free body diagram, Equilibrant force and its determination. Lami's theorem [Simple problems on above topics] | **Practical-2-** To verify the forces in different members of jib crane. |
| 7th | 13 | **Numerical Problems and its Solutions** | |
| | 14 | **Internal Assessment -I.** | |
| 8th | 15 | **Unit-3-** Moment ,Concept of moment | |
| | 16 | Moment of a force and units of moment | |

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| **9th** | 17 | Varignon's theorem (definition only) | |
| | 18 | Principle of moment and | |
| **10th** | 19 | its applications (Levers – simple and compound, steel yard, | |
| | 20 | its applications (Levers – safety valve, reaction at support) | |
| **11th** | 21 | Parallel forces (like and unlike parallel force), calculating their resultant | |
| | 22 | Parallel forces (like and unlike parallel force), calculating their resultant | |
| **12ᵗʰ** | 23 | Concept of Couple | |
| | 24 | Properties and effects of Couple | |
| **13th** | 25 | General conditions of equilibrium of bodies under coplanar forces | **Practical-3-**To verify the reaction at the supports of a simply supported beam |
| | 26 | Position of resultant force by moment [Simple problems on the above topics] | |
| **14th** | 27 | **Numerical Problems and its Solutions** | |
| | 28 | **Internal Assessment -II.** | |
| **15th** | 29 | **Unit-4 Friction**, Definition and concept of friction | |
| | 30 | types of friction, force of friction, Limiting Friction | |
| **16th** | 31 | Laws of static friction, coefficient of friction, | **Practical-10-** To determine coefficient of friction between three pairs of given surface |
| | 32 | Angle of friction, angle of repose. | |
| **17th** | 33 | Equilibrium of a body lying on a horizontal plane, | |
| | 34 | Equilibrium of a body lying on a rough inclined plane | |
| **18th** | 35 | 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 | **Practical-4-** To find the mechanical advantage, velocity ratio and efficiency in case of an inclined plane |
| | 36 | Calculation of least force required to maintain equilibrium of a body on a rough inclined plane subjected to a force b) At some angle with the inclined plane | |
| **19ᵗʰ** | 37 | Ladder friction, Advantages and Disadvantages of friction | |
| | 38 | Methods of increasing/decreasing the force of friction | |
| **20th** | 39 | Simple problems on the above topics | |
| | 40 | **Unit-5-** Centre of Gravity , Concept, definition of centroid of plain figures | |
| **21th** | 41 | and centre of gravity of symmetrical solid bodies, | |
| | 42 | difference between centroid and C.G. | |
| **22nd** | 43 | Determination of centroid of plain and | **Practical-8-** To find out center of gravity of regular lamina **Practical-9-** To find out center of gravity of irregular |
| | 44 | composite lamina using moment method only, | |

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| | | | lamina |
| **23rd** | 45 | centroid of bodies with removed portion | |
| | 46 | Determination of center of gravity of solid bodies - cylinder, | |
| **24th** | 47 | cube, cuboid and sphere; composite bodies and | |
| | 48 | bodies with portion removed [Simple problems on the above topics] | |
| **25th** | 49 | **Unit-6-** Simple Machines, Definition of Simple and | |
| | 50 | compound machine (Examples) | |
| **26th** | 51 | Definition of load, effort, velocity ratio, mechanical | |
| | 52 | advantage and efficiency of a machine | |
| **27th** | 53 | and their relationship, law of machines | |
| | 54 | Definition of ideal machine, | |
| **28th** | 55 | Reversible and self locking machine | |
| | 56 | Effort lost in friction, Load lost in friction, | |
| **29th** | 57 | Determination of maximum mechanical | |
| | 58 | Advantage and maximum efficiency | |
| **30th** | 59 | System of pulleys (first, second, third system of pulleys) | |
| | 60 | Determination of velocity ratio, mechanical advantage and efficiency, | |
| **31th** | 61 | Working principle and application of wheel and axle, Weston's Differential Pulley Block , | **Practical-5-** To find the mechanical advantage, velocity ratio and efficiency of a screw jack |
| | 62 | simple screw jack, worm | |
| **32nd** | 63 | Worm wheel, single and double winch crab. | **Practical-6-** To find the mechanical advantage, velocity ratio and efficiency of worm and worm wheel |
| | 64 | Expression for their velocity ratio and field of their application[Simple problems on the above topics] | **Practical-7-** To find mechanical advantage, velocity ratio and efficiency of single purchase crab |
| **33rd** | 65 | **Revised Unit-4** | |
| | 66 | **Revised Unit-5** | |
| **34th** | 67 | **Revised Unit-6** | |
| | 68 | **Numerical Problems and its Solutions** | |

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| **35th** | **69** | **Numerical Problems and its Solutions** | |
| | **70** | **Assessment –Final.** | |