**LESSON PLAN**

**Name of Faculty :**

**Discipline : AUTOMOBILE ENGG.**

**Semester : III**

**Subject : STRENGTH OF MATERIALS**

**Lesson plan Duration: 17 WEEKS Work Load (Lecture/Practical) per week: 4/2 PERIODS**

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| **Week** | **THEORY** | | **Percentage of Marks Allotment** | **Practical** | |
| **Lecture Day** | **TOPIC** | **Practical Day** | **TOPIC** |
| **Ist** | **1** | **1. Stresses and Strains:** (08 hrs) Concept of load, stresses & strain, Tensile compressive and shear stresses & strains and related numerical | **12** | **1.** | Tensile test on bars of Mild steel and Aluminium. |
| **2** | Concept of Elasticity, Elastic limit & limit of proportionality and related numerical |
| **3** | Hook’s Law, Young Modulus of elasticity & Nominal stress and related numerical |
| **4** | Stress- strain diagram, Yield point, plastic stage, Ultimate strength & breaking stress and related numerical |
| **2nd** | **1** | Percentage elongation, Proof stress & working stress and related numerical |  | **2.** | Bending tests on a steel bar or a wooden beam. |
| **2** | Factor of safety, Poisson’s , Shear modulus and related numerical |
| **3** | Longitudinal and circumferential stresses in seamless thin walled cylindrical shells (derivation of these formulae not required) and related numerical |
| **4** | **Revision** |
| **3rd** | **1** | **2. Resilience:** (06 hrs)  Resilience, proof resilience and modulus of resilience | **10** | **3.** | Impact test on metals a) Izod test b) Charpy test |
| **2** | Strain energy due to direct stresses |
| **3** | Stresses due to gradual, sudden and falling load |
| **4** | Related Numerical problems |
| **4th** | **1** | Related Numerical problems |  | **4.** | Torsion Test on specimens of different metals for determining modulus of rigidity. |
| **2** | **Revision** |
| **3** | **3. Moment of Inertia:** (06 hrs)  Concept of moment of Inertia and second moment of area ) | **10** |
| **4** | Radius of gyration, section modulus, Theorem of perpendicular axis and parallel axis (without derivation) |
| **5th** | **1** | Second moment of area of common geometrical sections: Rectangle, Triangle, Circle (without derivation) |  | **5.** | To determine the stiffness of a helical spring and to plot a graph between load and extension |
| **2** | Second moment of area for I,T, L, Z section and related numerical |
| **3** | Related Numerical Problems |
| **4** | **Revision** |
| **6th** | **1** | **4. Bending Moment and Shearing Force:** (10 hrs)  Concept of beam and type of loading. | **16** | **6.** | Hardness test on different metals. |
| **2** | Concept of end supports-Roller, hinged and fixed |
| **3** | Concept of bending moment and shearing force |
| **4** | B.M. and S.F. Diagram for cantilever with overhang subjected to concentrated and U.D.L |
| **7th** | **1** | B.M. and S.F. Diagram for cantilever without overhang subjected to concentrated and U.D.L |  | **Revision** |
| **2** | B.M. and S.F. Diagram for simply supported beams with overhang subjected to concentrated and U.D.L |
| **3** | B.M. and S.F. Diagram for simply supported beams without overhang subjected to concentrated and U.D.L |  |
| **4** | Related numerical problems |
| **8th** | **1** | Related numerical problems |  |  | **Revision** |
| **2** | **Revision /Sessional Test-I** |
| **3** | **Revision /Sessional Test-I** |
| **4** | **Revision /Sessional Test-I** |
| **9th** | **1** | **5. Bending stresses**: (08 hrs)  Concept of Bending stresses | **12** |  | **Revision** |
| **2** | Theory of simple bending & Use of the equation f/y = M/I = E/R |
| **3** | Concept of moment of resistance & Bending stress diagram |
| **4** | Calculation of maximum bending stress in beams of rectangular, circular, and T section. |
| **10th** | **1** | Permissible bending stress Section modulus for rectangular, circular and symmetrical I section |  |  | **Revision** |
| **2** | Related numerical problem |
| **3** | Related numerical problem |
| **4** | Related numerical problem |
| **11th** | **1** | **6. Columns**: (08 hrs)  Concept of column & modes of failure | **12** |  | **Revision** |
| **2** | Types of columns,Buckling load, crushing load, Slenderness ratio |
| **3** | Factors effecting strength of a column, End restraints and Effective length |
| **4** | 6.8 Strength of column by Euler Formula without derivation 6.9. Rankine Gourdan formula ( without derivation) |
| **12th** | **1** | Related numerical problems |  |  | **Revision** |
| **2** | **Revision /Sessional Test-II** |
| **3** | **Revision /Sessional Test-II** |
| **4** | **Revision /Sessional Test-II** |
| **13th** | **1** | **7. Torsion:** (08hrs)  Concept of torsion- difference between torque and torsion | **12** |  | **Revision** |
| **2** | Use of torque equation for circular shaft |
| **3** | Comparison between solid and hollow shaft with regard to their strength and weight. |
| **4** | Power transmitted by shaft |
| **14th** | **1** | Concept of mean and maximum torque |  | **Revision** |
| **2** | Related numerical problems |
| **3** | Related numerical problems |
| **4** | Related numerical problems |
| **15th** | **1** | **8. Springs**: (10 hrs)  Closed coil helical springs subjected to axial load and impact load | **16** |  | **Revision** |
| **2** | Stress deformation & Stiffness and angle of twist and strain energy |
| **3** | & Proof resilience & Laminated spring (semi elliptical type only) |
| **4** | Determination of number of plates |
| **16th** | **1** | Related numerical problems |  |  | **Revision** |
| **2** | Related numerical problems |
| **3** | Related numerical problems |
| **4** | Related numerical problems |
| **17th** | **1** | Related numerical problems |
| **2** | **Revision** |  |  |
| **3** | **Revision /Sessional Test-III** |
| **4** | **Revision /Sessional Test-III** |